APPENDIX 2-4

CUTAWAY BOG DECOMMISSIONING AND REHABILITATION PLAN ((BALLYDERMOT, BARNARAN, BLACKRIVER, CODD, DERRYBRENNAN, GLASHABAUN, KILLINAGH, LULLYBEG, LULLYMORE, TICKNEVIN)

Ballydermot Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026

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This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

> "*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 BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Ballydermot Bog upon cessation of peat production and complements 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 Ballydermot Bog.

BnM have defined the key rehabilitation outcome at Ballydermot Bog as environmental stabilisation.

Any consideration of any other future after-uses for Ballydermot Bog, 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.

BnM are planning to develop a potential renewable energy project at Ballydermot Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

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Non-technical summary

- BnM (formerly known as Bord na Móna) is planning to rehabilitate Ballydermot Bog, a sub-section of a larger unit called Ballydermot Bog, located in west Kildare/east Offaly between Rathangan and Edenderry.
- Ballydermot Bog is further sub-divided into two sub-sections – Ballydermot North and Ballydermot South.
- Ballydermot Bog has been in industrial peat production since the 1950s and supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use.
- BnM Industrial peat extraction ceased at Ballydermot in 2020. The bog is largely shallow cutover, however some pockets of residual deep peat remain, particularly in Ballydermot South.
- Ballydermot Bog has partially pumped bog drainage.
- Ballydermot Bog is a mosaic of bare peat, pioneer cutaway vegetation and some maturing habitats with wetlands, scrub and Birch woodland.
- BnM are planning to develop a potential renewable energy project at Ballydermot Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The wind farm planning boundary overlaps Ballydermot Bog and has been integrated into the rehabilitation plan.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing vegetation and promoting re-establishment of more typical cutaway peatland communities such as Birch woodland, fen habitat and regenerating wet deep peat communities.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures will be planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog 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.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and regenerating wet deep peat vegetation (on deeper peat); and wetlands with Reedbeds and Birch woodland on shallower peat. In time a naturalised peatland can be developed.
- It will take some time for vegetation and habitats to fully develop at Ballydermot Bog, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- The development of a range of habitats at Ballydermot Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape.

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- This peatland rehabilitation plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM operates under an IPC Licence issued and administered by the EPA to extract peat within the Allen-Lullymore Bog group (Ref. P0503-01). 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 Allen Bog Group comprises 2 main sub-groups: Allen-Clonsast and Allen-Lullymore. Ballydermot is located within the Allen-Lullymore Bog Group. Ballydermot bog is further sub-divided into two sub-sections – Ballydermot North and Ballydermot South. These sub-sections are the subject of this rehabilitation plan. Further details on the bogs within the Allen-Lullymore bog group are outlined in Appendix I.

The sub sections Ballydermot North and Ballydermot South are located at the western extent of the bogs within the wider footprint of Ballydermot Bog and are located 6.5km and 8.5 km south of Edenderry respectively. The Offaly - Kildare boundary traverses both subsections.

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Ballydermot Bog and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are **NOT** proposed as part of this draft Ballydermot rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Ballydermot will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future.

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1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

> "*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 document covers the area of **Ballydermot Bog**. Parts of Ballydermot Bog (around the perimeter) are currently being used by domestic turf cutters who have turbary rights. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting and turbary issues on Ballydermot Bog that are outside of the control of BnM. Nevertheless, BnM 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.

BnM are planning to develop a potential renewable energy project at Ballydermot Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). This proposed wind farm project is located within Ballydermot Bog as well as the adjacent BnM bogs of Barnaran, Blackriver, Codd, Derrybrennnan, Glashabaun, Killinagh, Lodge, Lullybeg, Lullymore and Ticknevin. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning consent in 2026. The proposed Ballydermot Wind Farm has been taken into account in the preparation of this Rehabilitation Plan. Where proposed wind farm infrastructure overlaps with areas identified for rehabilitation, the timing and sequencing of rehabilitation measures will be coordinated with the proposed development. Accordingly, these areas are treated as a temporal consideration in relation to the implementation of rehabilitation measures.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Ballydermot Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Ballydermot Bog 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 or issues such as rights of way.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan'* (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2011 to 2026 inclusive), monitoring and desktop analysis, forms the basis for the development of this rehabilitation plan for the bog along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the BnM 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on BnM Peatlands – Preliminary Study Nov 2022;
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

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.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.

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- 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, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- 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 2022-2027;
- BnM Annual Report 2025.
- 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 BnM's rehabilitation and Biodiversity Action Plan activities and will be contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Ballydermot Bog was surveyed in September 2011. Additional ecological walk-over surveys and visits have taken place at Ballydermot Bog between 2011-2026. 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 (2019), while moss and liverwort nomenclature follow identification keys published by the British Bryological Society (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

A detailed ecological survey report for Ballydermot Bog (comprising Ballydermot North and Ballydermot South) is contained in Appendix II.

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3. SITE DESCRIPTION

Ballydermot bog is a sub-section of a larger unit called Ballydermot Bog and is located in west Kildare/Offaly between Rathangan and Edenderry. Ballydermot bog is further sub-divided into Ballydermot North and Ballydermot South by BnM. These bog units are located approximately 6.5 km and 8.5 km respectively to the south of Edenderry. Ballydermot bog is located on the Offaly/Kildare county boundary.

A minor public road (Edenderry to Rathangan bog road) forms the eastern boundary. The Clonbrown stream (EPA code: 14C32), a tributary stream of the Figile River, flows in a northerly direction adjacent to this road, along the eastern margins of the bog.

The majority of Ballydermot Bog comprises bare peat with pioneer vegetation maturing and developing a mosaic of typical cutaway peatland habitats. Some parts of Ballydermot are developing Birch Woodland and Scrub also.

See Drawing number *BNM-ECO-26-14-01: Site Location Map*, included in the accompanying Mapbook[1], which illustrates the location of Ballydermot Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Ballydermot Bog was in full industrial peat production since the 1950's and supplied turf for fuel and energy and latterly milled peat for electricity production. The former BnM peat production bog was developed and used to produce sod-peat using the old bigger machines initially. In the 1980s Ballydermot was then converted to milled peat production. Some small sections supplied sod moss for horticultural use. Industrial peat extraction ceased at Ballydermot in 2020.

A larger section of high bog called Cloonroosk Bog (PB1) (61 ha) is located at the south-west corner of the site. This bog was partially drained by BnM in error in 2013/2014 and restoration works to block the drains were carried out in 2014.

There is an extensive BnM industrial railway network throughout this area. This has now been decommissioned.

3.1.2 Current land-use

A small part of Ballydermot North site was planted with conifer forestry as a pilot by BnM, probably in the 1970's.

The Ballydermot BnM works centre is located in the southeastern corner of the sub-section. A second small works area is located towards the centre of the bog. There are some areas of active turbary outside the margins of the site.

The bog is largely shallow cutover, however some pockets of deep peat remain, particularly in Ballydermot South.

BnM are planning to develop a potential renewable energy project at Ballydermot Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project is located within Ballydermot Bog as well as the adjacent BnM bogs. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Ballydermot Bog Map Book

Farm infrastructure **partially** overlaps with the Ballydermot Bog footprint (see drawing number *BNM-ECO-26-14-20: Standard Rehab Measures*.

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

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xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

xxv. All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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 Ballydermot Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPL).

As the primary employer in many Midland counties, BnM 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 industrial peat extraction at this bog.

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3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology[2] of Ballydermot Bog is predominantly dark limestone (Lucan Formation) in Ballydermot North with Crinoidal wackestone/packstone limestone (Ballydams formation) towards the south eastern boundary and is also predominantly Ballydams formation in Ballydermot South.

The sub-soils are classed as cutover peat. The eastern part of Ballydermot North is underlain with thick shell marl. This sub-soil is being exposed on the bog surface in places.

3.2.2 *Peat type and depths*

Much of Ballydermot Bog is now cutaway and the majority of the original raised bog has now been removed. In most of the bog the peat depth is less than 1m. Remnants of deeper peat remain in the Ballydermot South and small pockets on Ballydermot North with peat over 3-4 m in depth in some places.

3.3 Key Biodiversity Features of Interest

The majority of Ballydermot Bog comprises pioneer vegetation and bare peat mosaics. More established areas are cover developing a mosaic of typical cutaway peatland habitats. Drier sections of Ballydermot are developing Heather, grassland, Scrub and Birch Woodland. Wetter sections are developing fen, wet scrub, some Reedbeds and some embryonic *Sphagnum*-rich vegetation.

A relatively large area of raised bog called Cloonroosk is located at the south-west corner of Ballydermot South. This raised bog remnant still retains some Annex I habitats. There is biodiversity interest in the marginal habitats fringing the former production area, supporting habitats such as scrub, conifer plantation, Birch woodland and remnant raised bog. The Clonbrown stream (EPA code: 14C32), a tributary stream of the Figile River, flows in a northerly direction along the eastern margins of the bog.

The former railway track gravel beds support populations of Basil Thyme (*Clinopodium acinos*) and Blue Fleabane (*Erigeron acris*). Both are Red-listed species with Blue Fleabane listed as “Least Concern” and Basil Thyme listed as ‘Near Threatened’ on Irelands Red List (Wyse Jackson *et al*., 2016). Several populations are present on railway tracks throughout Ballydermot or on areas of exposed gravel that are associated with the railway tracks as part of the ‘weed’ or recolonising flora. These species are not typical bog species and are likely to have come on to the former production bog from nearby eskers or gravel pits. The presence of these species enhances the rare flora resource of Co. Offaly.

A detailed ecological report is provided in Appendix II. See Drawing number *BNM-ECO-26-14-17: Habitat Map 2018*, included in the accompanying Mapbook, which illustrates the habitats present.

[2] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present include:

- Bare peat (BP)
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff) (also Marsh Arrow Grass (pTrig), Bog cotton (pEang) and Reed-mace (pTyph).
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway.)
- Pioneer calcareous grassland (gCal) (developing on old track)
- Purple Moorgrass-dominated grassland (gMol) (developing on margins of site).
- Gorse scrub (eGor) (developing on margins of site).
- Access routes (railways and paved tracks and associated verges)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated.)
- Rank dry meadow-type grassland (GS2) (found at southern margin).
- Raised bog (PB1) (dried remnant being invaded by scrub)

Ballydermot North

The northern and southern boundaries Ballydermot North are marked by railway embankments.

A works area is located towards the centre of the bog and is accessed via a long track from the east (Rathangan-Edenderry Road). The site is drained by several long arterial drains orientated east-west between several series of production fields. These drains are located in deep embankments and are lined with high peat fields (remnant sod-peat cutting strip). These high peat fields have developed mature (and relatively tall) Birch woodland in places along the drains (some sections of which are dry), which other sections have scrub and dry Heather dominated communities.

A relatively large old area of cutaway is located in the centre of the site. This is located on a mound within the bog and some of this land has been planted with conifers. This conifer plantation was planted on old sod peat cutaway and consists of mostly Lodgepole Pine (*Pinus contorta*). This plantation was developed on some of the highest ground in this section. It is poor-moderate in development overall.

Natural re-colonisation of bare peat is rapidly progressing across former bare peat areas. The eastern part of Ballydermot North is in a topological basin and is underlain with thick shell marl. This sub-soil is being exposed on the bog surface in places. This area is rapidly vegetating with pioneer Bog Cotton-dominated poor fen. The western side is rapidly developing scrub and Birch woodland. The old sod-peat cutaway along the west side is developing pioneer Heather vegetation and open Birch scrub, with smaller amounts of Soft-rush-dominated poor fen and scrub where the peat is thinner. *Sphagnum* sod moss was formerly harvested from an area of high bog in the south-west part of the site. The remaining high bog in this section is extensively drained and dominated by

[3] Categories in brackets refer to the current BnM classification system for vegetation communities, along with an equivalent Heritage Council habitat classification or Fossitt Code, where relevant.

Heather. There is also some remnant high bog along the western boundary. This high bog is well drained and therefore degraded and dry with low cover of *Sphagnum*.

Ballydermot South

The BnM Ballydermot work area consisting of offices, a yard and a large workshop are located in the southeastern corner of the sub-section. The southern boundary of the site contains areas of remnant poor quality raised bog along with some extensive areas of Birch woodland. An area of Birch woodland (WN7) runs along the southern boundary of Ballydermot South, and is dominated by Birch, with frequent Scot's Pine (*Pinus sylvestris*) and Rowan (*Sorbus aucuparia*) along with lesser amounts of Hawthorn (*Crataegus monogyna*) and Wild Cherry (*Prunus avium*).

A large area of remnant raised bog (PB1) occurs in the western area of this sub-section (Cloonroosk Bog). Old cutaway borders the raised bog area along its southern and western boundary. This cutaway has completely re-vegetated. The high bog was drained in the past but has been restored. It still retains typical raised bog characteristics (that at present qualify as the Annex I EU Habitats Directive habitats – 'active raised bog' (7110) and 'degraded raised bogs still capable of regeneration' (7120)). (Number codes refer to EU habitat classification system – European Commission 1996). Some of the Annex I active raised bog habitat is still intact.

The majority of the former production area on the eastern side is dominated by bare peat that is beginning to develop pioneer vegetation. Linear strips of vegetation have already developed along the edges of some larger drains that run parallel to the former production fields. The vegetation in these areas mainly comprised of Birch scrub (oBir and cBir) along with some Heather.

The northern most part of this area contains some sections of cutaway. These areas appeared to be relatively young vegetation communities and contained a mix of Birch scrub and poor fen (oBir & pJeff) in the drier areas with some Bog Cotton and Marsh Arrowgrass dominated communities (pJeff, pTrig and pEang) also developing in the wettest areas. In the north-west corner of the site an area of pioneer poor fen with some open water areas was located.

Alder Buckthorn (*Frangula alnus*) is found in the southern Birch woodland margins of Cloonroosk Bog. This species is a nationally rare Red List plant species. *Sphagnum pulchrum*, a moss species with a restricted distribution, is present on Cloonroosk Bog.

3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Ballydermot Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC).

Multiple mammal species have been recorded on or within 1 Km of the bog including Irish Hare (*Lepus timidus subsp. Hibernicus)*, Fox (*Vulpes vulpes*), Eurasian Badger (*Meles meles*), Red Squirrel (*Sciurus vulgaris*), Pine Marten (*Martes martes*) and European Otter (*Lutra lutra*). Amphibian species Common Frog (*Rana temporaria*) has been recorded from the bog.

The butterfly species Dingy Skipper (*Erynnis tages*), Large Heath (*Coenonympha tullia*) and Wall (*Lasiommata megera*) have all been recorded during BnM surveys.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Heron (*Ardea cinerea*), Mallard (*Anas plathrhynchos*), Kestrel (*Falco tinnunculus*), Skylark (*Alauda arvensis*), Wood Pigeon (*Columba palumbus*), Meadow Pipit (*Anthus pratensis*), Pheasant (*Phasianus colchicus*), Hooded Crow (*Corvus cornix*), Blue Tit (*Cyanistes caeruleus*), Wren (*Troglodytes troglodytes*) and Pied Wagtail (*Motacilla alba yarrellii*) have all been recorded during BnM ecology surveys. NBCD records indicated that Whooper Swan have previously been recorded at Ballydermot.

NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km square (N62) within which Ballydermot Bog is located include; Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Partridge (*Perdix perdix*). Grey Wagtail (*Motacilla cinerea),* Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola)* and Yellowhammer (*Emberiza citrinella*).

Red-listed[5] listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Red Kite (*Milvus milvus*) and White-tailed Eagle (*Haliaeetus albicilla*). Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

NBDC holds records for the invasive mammal species American Mink (*Mustela vison*).

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Ballydermot Bog. The nearest EU Designated sites to Ballydermot Bog are as follows:

- The Long Derries, Edenderry SAC (Site Code: 000925) – 3.8 km northeast
- River Barrow and River Nore SAC (site code: 002162) – 12 km south

A number of non-statutory designated sites also occur in the wider area around Ballydermot Bog:

- The Long Derries, Edenderry pNHA (Site code: 000925) – 3.8 km northeast
- The Grand Canal pNHA (NPWS Site Code: 002104) – 5.6 km north

See drawing *BNM-ECO-26-14-23: Proximity to Designated Sites* in the accompanying map book.

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.

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

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

There are no Ramsar sites located in proximity to Ballydermot Bog. The nearest Ramsar sites are Pollardstown Fen located approximately 14.1km southeast and Raheenmore Bog located approximately 16.9km west of Ballydermot Bog.

3.5 Hydrology and Hydrogeology

Ballydermot bog forms part of the Barrow Catchment (Catchment ID: 14) as defined by the EPA under the Water Framework Directive (WFD). The majority of the bog lies within the Figile_SC_010 sub-catchment, with the western extent falling into the Figile_SC_020 sub catchment. The southern extent of Ballydermot South lies within the Slate_SC_010.

The Clonbrown (EPA code: 14C32) flows in a northerly direction along the eastern bog boundary, flowing into the Figile River (EPA code:14F01), a tributary of the River Barrow (EPA code: 14B01). Two further tributaries of the Figile River, the Clonmel 14 (EPA code: 14C56) and Ballygarrett 14 (EPA code: 14B30) arise in the south-western margins of Ballydermot North.

GSI data indicates that the northern section of Ballydermot Bog lies entirely within a locally important aquifer – bedrock which is 'Moderately Productive only in Local Zones', whilst the southern section lies within a Regionally Important Aquifer – 'Karstified (diffuse)'. An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows.

Ballydermot Bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Map viewer). Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site.

Quaternary sediment maps show that Ballydermot Bog is generally underlain by cutover raised peat. This combination of sediment is common in the wider context surrounding the site.

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 Ballydermot 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 bi-annual basis by BnM 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.

Ballydermot Bog has a partially pumped drainage regime, with one pump present in the central section of Ballydermot South. Ballydermot has one surface water outlet to the Barrow catchment. This outlet is directed to the Ballygarrett 14 watercourse (EPA code: 14B30), a tributary stream of the Figile River (14F01). This river is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds, associated surface water emission points and monitoring and sampling locations are detailed in drawing *BNM-ECO-26-14-02: Structures and Sampling,* along with *BNM-ECO-27-23-WQ01: Water Quality Map* included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Ballydermot 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme Water Quality Monitoring

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat also 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*., 2017). 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) 2022-2027 (DHLGH, 2024) 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 BnM 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 Ballydermot has been completed. This discharge will have improved 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 watercourse receptors and the Figile_SC_010 sub-catchment and will support the future status of the watercourses achieving Good Status.

Water quality monitoring will be established. 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 for additional rehabilitation.

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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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the longterm warming effect of continued CO_2 emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Ballydermot 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. The majority of the bog will develop as Birch woodland on drier areas and peripheral headlands. Wetland mosaics are expected to develop on shallow peat with open water, reed swamp, fen and wet woodland habitats with alkaline emission factors. Part of this bog is expected to develop regenerating wet deep peat vegetation on deep peat areas.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Ballydermot Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare peat in the former production area of Ballydermot Bog is assessed as **local importance (lower value)**.

The revegetated former production area dominated by birch scrub/woodland and marginal habitats including woodland, scrub, pioneer cutaway habitats, fen, calcareous grassland, remnant raised bog, and wetlands may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

Cloonroosk Bog (70 ha) can be rated as having **National Importance** due to the presence of Annex I habitats. It still retains typical raised bog characteristics (that at present qualify as the Annex I EU Habitats Directive habitats – 'active raised bog' (7110) and 'degraded raised bogs still capable of regeneration' (7120)).

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Ballydermot Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity, and other general topics over the years about Ballydermot Bog within Allen bog group, including Ballydermot 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.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Ballydermot Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Ballydermot Bog.

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

4.2 Topics raised by Consultees

N/A Yet as consultation has not commenced.

4.3 BnM response to topics raised during consultation

N/A Yet as consultation has not commenced.

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5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands formerly used for industrial peat production, in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is already significant potential for the creation of wet cutaway habitats at Ballydermot Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Ballydermot Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). this will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- Cloonroosk Bog (70 ha) in the southwest of the bog qualifies as the Annex I EU Habitats Directive habitats ‘active raised bog’ (7110) and ‘degraded raised bogs still capable of regeneration’ (7120). However, it is not expected that the former production area 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, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

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- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and BnM). Reducing pressures due to former peat extraction activities at Ballydermot 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 BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs including Timahoe South and Lodge Bog (2022-2023), Timahoe North (2025) and have previously carried out re-wetting and rehabilitation at Lullymore Bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Ballydermot Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Ballydermot bog is part of the Ballydermot Bog within Allen bog group.
- The local environmental conditions of Ballydermot Bog mean that intensive drain blocking is the most suitable rehabilitation approach for this site. Ballydermot Bog while largely comprising shallower peat does retain some deep peat reserves in places.
- The key goals and outcomes of rehabilitation set by BnM. BnM have defined the key goal and outcome of rehabilitation at Ballydermot Bog as **environmental stabilisation**, **optimising residual peat re-wetting,** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Wind Farm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Ballydermot Bog. In areas associated with proposed wind farm infrastructure, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- The cutaway has started developing pioneer cutaway peatland vegetation, although the majority of the bog is dominated by bare peat. Rehabilitation is proposed to enhance residual peat re-wetting in these areas while taking account of future infrastructure and land-uses.
- Rehabilitation of Ballydermot Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent. At Ballydermot North there is potential for alkaline fen habitats to develop in topographical depressions which have a significant calcareous influence from the underlying shell marl. Large parts of Ballydermot North and Ballydermot South lie in topographical basins. There is some potential to develop some wetland habitats in these areas by blocking main outfalls and raising the water-level somewhat. There are small pockets of deeper in Ballydermot North and large areas of deep peat in the eastern section of Ballydermot South. These areas have the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised.

- **Potential land-use:** It is expected that BnM will update and finalise the draft rehabilitation plan for Ballydermot when a decision is made in relation to the wind farm planning application. BnM remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC license. The targeted rehabilitation measures set out in this Rehabilitation Plan will be implemented following completion of the construction phase of the proposed Ballydermot Wind Farm in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM 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.
- **Turbary.** There is some active turbary/turf cutting along the western margins.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to BnM Archaeological Liaison Officer and the National Museum of Ireland (Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Ballydermot 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 Ballydermot Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial drainage activities.

Rehabilitation is generally defined by BnM 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 a naturally functioning raised bog ecosystem; and
- Mitigation of key emissions (e.g. potential suspended solids run-off).

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

- Rewetting of residual peat in the area originally drained for industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat forming habitats. 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 BnM 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 Longford Pass 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 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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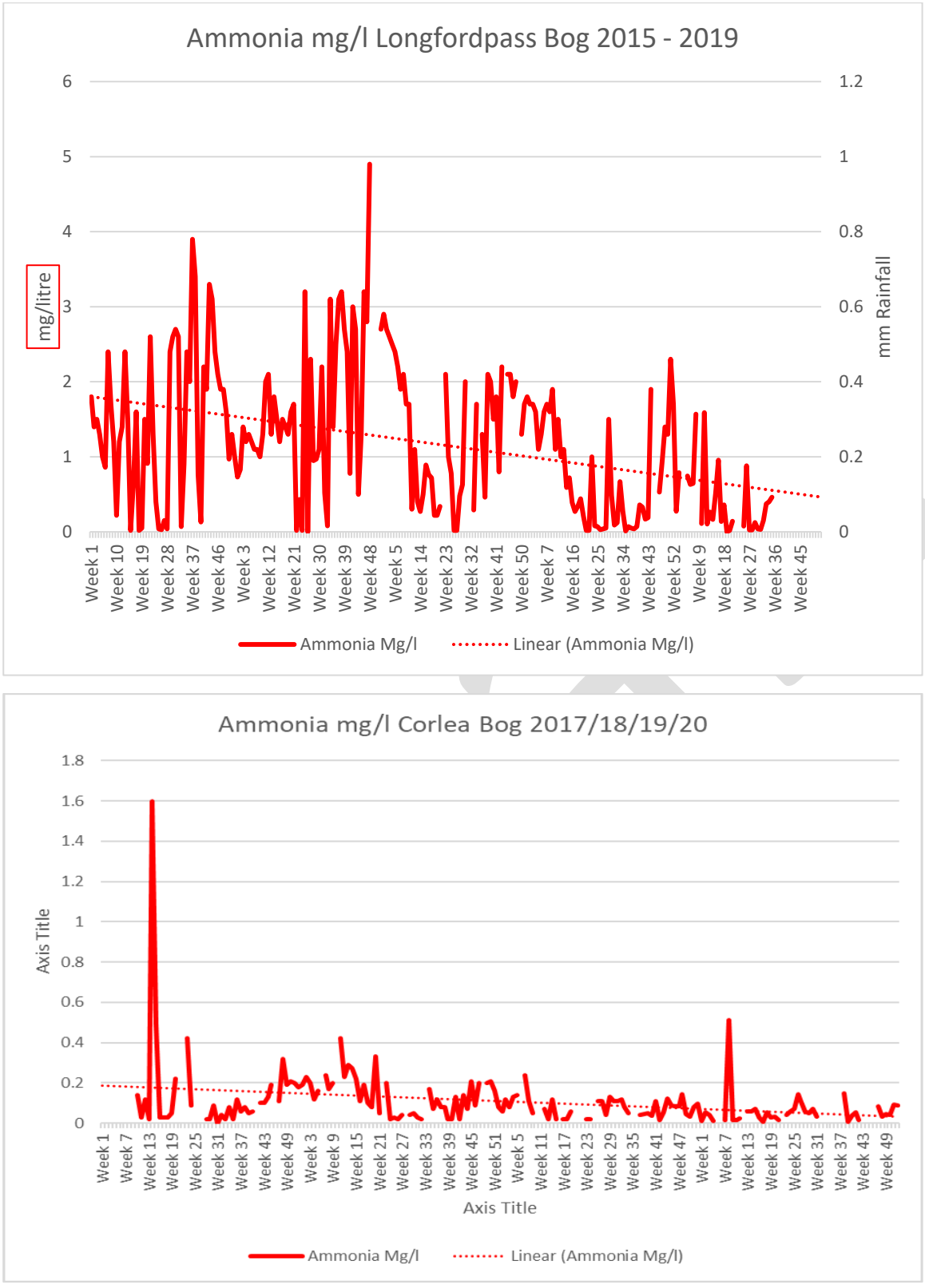


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

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

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and 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 based on environmental characteristic. Hydrological modelling indicates depressions that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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 and LiDAR Surface Maps, these are included in the accompanying Mapbook as the drawings referenced below:

BNM-ECO-26-14-21: Aerial Imagery 2000

BNM-ECO-26-14-22: Aerial Imagery 2020

BNM-ECO-26-14-04: Peat Depths

BNM-ECO-26-14-03: LiDAR Map

BNM-ECO-26-14-09: Depression Analysis

The restoration and rehabilitation measures are provisionally outlined in drawing titled *BNM-ECO-26-14-20: Standard Rehabilitation Measures* in the accompanying Mapbook.

These rehabilitation measures for Ballydermot Bog will include (see Table 8.1):

- Re-assessment of the pumping regime and removing pumps or reducing pumping if this is desired and has no significant external impact or impacts on proposed future land-uses. Initial hydrological modelling indicates that a part of the site will develop a mosaic of wetland habitats. 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 at outfalls and by adjusting piped drainage, where possible. More sustainable permanent gravity drainage solutions will be examined. Some pumping is likely to be retained on site. 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 of surrounding rivers.
- A widespread drain-blocking programme will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat and deeper residual peat.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking, modifying outfalls and managing water levels with overflows.
- Wetland measures including blocking outfalls and managing water levels with overflows.
- 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 rehabilitation measures at Ballydermot *Bog.*

Type*	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking, modifying outfalls and managing water levels with overflows	78.6
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	118.9
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway, modifying outfalls, targeted drain-blocking and managing water levels with overflows	245.1
Marginal land	MLT1	No work required	36.9
Silt Pond	Silt Pond	Silt Ponds	2.7
Rehab Complete	Rehab Complete	Rehab Complete	68.1
Ballydermot Wind Farm	Wind Farm Infrastructure + Buffer	Wind Farm infrastructure areas including turbine bases, carparks, internal access roads and turning points, crane hard stand and peat and spoil areas.	121.3
	Renewables Footprint	Areas associated with the proposed Ballydermot Wind Farm where rehabilitation measures will be appropriately sequenced including temporary construction compounds, enhancement areas; peatland restoration, scrub/woodland	126.6
Constraint	Constraint	Access track, BnM works centres, turbary areas, retained drainage infrastructure.	83.2
Total Area			**881.2**

**Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.*

8.1 Completed and Ongoing

- The site is predominantly comprised of bare peat with colonisation of pioneer vegetation. Several sections have already developed vegetation cover and are developing a mosaic of typical cutaway peatland habitats.
- A relatively large area of remnant raised bog, Cloonroosk Bog (~70 ha) in the south-west corner of Ballydermot South was rehabilitated in 2014 to block the drains. This bog was partially drained by BnM in error in 2013/14.

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

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Ballydermot Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.

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- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out
- 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) is to be 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.
- Appropriate Assessment (AA) of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed rehabilitation plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- 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.

8.4 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 9 below).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC License is surrendered.

8.5 Timeframe

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions.
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation**: Decommission silt-ponds, if necessary.

8.6 Budget and costing

BnM 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

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the BnM Annual Report (BnM 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a ‘standard’ rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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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.
- 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.
- Monitoring results will be maintained, trended 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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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 BnM 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.

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

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

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

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

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APPENDIX I. BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow Catchment and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied at old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly) via the BnM industrial railway. Many bogs have now been in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long term peat extraction activity reduced the peat reserves on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen - Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production, and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Killinagh in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Killinagh by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 & 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow piped outfall. Some cutaway at Lullymore used as a spread-ground for sod peat was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries SAC is located south of Ticknevin Bog. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by BnM. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation is ongoing.

A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC License Ref. P0503-01, and current, indicative Peat Production Status, is outlined in Table Ap-1.

Table Ap-1: Allen - Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning. .		
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since 1950s Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Glashabaun South	569	Peat extraction since before 1975 Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss *Sphagnum* inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Lullybeg	271	Peat extraction since before 1975 Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2004	Draft 2026
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group - amenity	1992	Draft 2026
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019 Majority of bog still has relatively deep peat	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production. Cloncannon bog remnant – zoned for biodiversity Mostly bare peat. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2019	Draft 2026
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection	N/A	N/A
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab complete

See Drawing number *BNM-ECO-26-14-24: Bog Group Map,* included in the accompanying Mapbook which illustrates the location of Ballydermot Bog and the Allen-Lullymore Bog Group in context to the surrounding area.

APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Ballydermot North** **Ballydermot South**	**Area (ha):**	978 ha of total 4,725 ha
Works Name:	Ballydermot	**County:**	Offaly/Kildare
Recorder(s):	MMC & DF	**Survey Date(s):**	8/09/2011

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (BP)
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II) also Marsh Arrow Grass (pTrig), Bog cotton (pEang) and Reed-mace (pTyph).
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway.)
- Pioneer calcareous grassland (gCal) (developing on old track)
- Purple Moorgrass-dominated grassland (gMol) (developing on margins of site).
- Gorse scrub (eGor) (developing on margins of site).
- Access routes (railways and paved tracks and associated verges)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated.) (Codes refer to Heritage Council habitat classification, Fossitt 2000, See Appendix II.)
- Rank dry meadow-type grassland (GS2) (found at southern margin).
- Raised bog (PB1) (dried remnant being invaded by scrub)

Description of site

This sub-section is part of Ballydermot Bog and is located in west Kildare, 4 km north of Rathangan. A minor public road (Edenderry to Rathangan bog road) forms the eastern boundary and this report covers the BnM property south of the Figile River. The Ballydermot BnM works centre is located in the south eastern corner of the sub-section. The BnM railway system is extensive throughout this area. Ballydermot is sub-divided into Ballydermot North and Ballydermot South.

Ballydermot North

The northern and southern boundaries are marked by railway embankments. A Works area is located towards the centre of the bog and is accessed via a long track from the east (Rathangan-Edenderry Road). The site is drained by several long arterial drains orientated east-west between several series of production fields. These drains are located in deep embankments and are lined with high peat fields (remnant sod-peat cutting strip). These high peat fields have developed mature (and relatively tall) Birch woodland in places along the drains (some sections of which are dry), which other

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sections have scrub and dry Heather (dHeath). Some former production bog with bare peat is divided by these strips of Birch woodland and scrub.

Ballydermot North is somewhat more variable in that there is a relatively large area of production-related cutaway towards the centre of the site. This is located on a mound within the bog and some of this land has been planted with conifers. This plantation does not seem to have been developed by Coillte. The remainder of the production-related cutaway (old sod-peat cutaway) is developing a somewhat similar way to other old sod peat sites such as Clonsast and Garryhinch, although the peat seems to be quite thin in places. The main habitats are pioneer dry heath (dHeath) and open Birch scrub with smaller amounts of Soft-rush-dominated poor fen and scrub where the peat is thinner.

The southern and eastern parts of the site were in active production until recently and are therefore dominated by bare peat. The eastern part of the site is in a topological basin and is underlain with thick shell marl. This sub-soil is being exposed on the bog surface in places. There was no significant development of pioneer cutaway vegetation in this area, apart from some scattered Soft Rush and Marsh Arrowgrass along the edges of the drains.

Sphagnum sod moss is being harvested from some high bog in the south-west part of the site. The remaining high bog in this section is extensively drained and dominated by Heather.

There is some remnant high bog along the western boundary. This high bog is somewhat degraded and dry. It has been well-drained and the overall *Sphagnum* cover is low.

Ballydermot South

This is the most southerly third of the sub-section. The BnM Ballydermot work area consisting of offices, a yard and a large workshop are located in the south eastern corner of the sub-section. The southern boundary of the site contains areas of remnant raised bog along with some extensive areas of Birch woodland. The remnant area of raised bog was dry, degraded and dominated by Heather.

The area of Birch woodland (WN7) that runs along the southern boundary of Ballydermot South is dominated by Birch but it also contains frequent Scot's Pine and Rowan along with lesser amounts of Hawthorn and Wild Cherry. The tallest Birch and Scot's Pine had a max height of 15m and a dbh of 300mm. The ground flora consisted of Heather, Bramble and Bracken.

The western area of this sub-section contained a very large area (approx 61ha) of remnant raised bog (PB1). Old cutaway borders the raised bog area along its south and west. This cutaway has completely re-vegetated with Heather, Bog Asphodel, Deer Grass, Bog Cotton, Scots Pine, Birch and some *Sphagnum*. A strip of BnM sod peat production is located along its eastern side. The high bog is in moderate condition with the dome still visible. However, this entire area is drying out and no pool systems were located. The vegetation comprised of Heather, Bog Asphodel, Deer Grass, *Cladonia portentosa*, Bog Cotton, Cross-leaved Heath, Round-leaved Sundew and Bog Rosemary along with *Sphagnum austinii*, *S. cuspidatum*, *S. capilifolium* and *S. subnitens*. Scot's Pine are seeding from the nearby Birch woodland onto this area of raised bog.

The majority of the former production area is bare peat. However, linear strips of vegetation have developed along the edges of some larger drains that run parallel to the former production fields. The vegetation in these areas mainly comprised of Birch scrub (oBir and cBir) along with some Heather (dHeath).

The northern most part of this area contained some sections of cutaway. These areas appeared to be relatively young and contained a mix of Birch scrub and poor fen (oBir & pJeff) in the drier areas with some Bog Cotton and Marsh Arrowgrass dominated communities (pJeff, pTrig and pEang) also developing in the wettest areas. In the north-west corner of the site an area of pioneer poor fen with some open water areas was located. Bottle Sedge and Reed-Mace was present in this area along with Soft Rush, Marsh Arrow Grass and Bog Cotton. A pump is located close to this area and it would seem likely that a significant area of wetland may develop here if the pump was disabled.

Basil Thyme and Blue Fleabane

Basil Thyme and Blue Fleabane were noted at several locations along the northern railway. Basil Thyme has not been recorded at this site before and would not be a typical species of cutaway bog. This species was probably unlikely to have

been present on the site prior to the development of the cutaway. The exposed gravel along the railway embankments is a perfect habitat for this species. One of its main known populations in Co. Offaly is located close by at the Long Derries cSAC, Edenderry. This site was a BnM gravel pit and material from this site was used to make railway embankments. The spread of Basil Thyme from the Long Derries along the BnM railway network has been recorded in the past (Feehan pers. comm. 2011).

In the long-term, it could be expected that these railway embankments will re-vegetate with grassland and scrub as they go out of use, which will not favour this species. Occasional track maintenance is likely to be beneficial for this species as it will keep the gravel embankments exposed and prevent development of dense vegetation, which would be unsuitable for this species. Other BnM operations are not likely to have a significant impact on the status of this species. One possible solution is to develop some of the main railway line as an amenity walkway when production ceases. A suitable management regime to maintain the habitat of these rare plant species could easily be developed in association with the development and maintenance of these walkways. This will be considered within the wider context of the Derrygreenagh and Ballydermot Bogs, which are viewed as strongholds for the species in east Offaly. Consultation and licensing will be required with NPWS.

Forestry and potential forestry on site

There is a small amount of conifer plantation present in Ballydermot North. This was planted on old sod peat cutaway and consists of mostly Lodgepole Pine. This plantation was developed on some of the highest ground in this section. It is poor-moderate in development overall and significant sections are in check. There seems to be significant competition with Heather in some of the plantation. It is not listed as being owned by Coillte. It is likely that this forestry plantation pre-dates Coillte forestry development on cutaway and was developed by Tom Barry.

The most southern third of the site (Ballydermot Sth) may contain some areas that may be suitable for a plantation, however some of the more northern parts of this areas will likely be liable to re-wet as it is pumped.

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

The nearest designated site to this sub-section of Ballydermot is 2.5 km SE to the Grand Canal pNHA (NPWS site code 002104)

The Long Derries SAC (site code 000925) is located 3km to the north east.

Adjacent habitats and land-use

Wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), scrub (WS1), Birch woodland (WN7), cutaway bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

Watercourses (major water features on/off site)

- There were no significant natural watercourses on site. Old drains pre-dating the development of BnM drained the bog. Large deep drainage channels were dug (east-west orientation) when the site was developed for sod-peat and mostly drain the site towards the east (road side), where a large drain directs water north towards the Figile River.

Peat type and sub-soils

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The majority of the peat exposed at this site is fen peat. There is some *Sphagnum*-moss peat production (for Environmental section) on dried out remnant high bog in Ballydermot South. The largest area of remaining sod-peat cutaway has somewhat more acidic peat as the regeneration is dominated by Heather (although the layer of peat is quite thin in places).

A substantial portion of the eastern side of the site is underlain with a thick layer of shell marl. The central higher section of Ballydermot North is underlain with mixed silt and gravel.

Fauna biodiversity

Birds

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

- Kestrel (along Figile River)
- Other more common birds noted included Meadow Pipit, Pheasant, Wood Pigeon, Skylark, Greycrow, Blue Tit (in conifer woodland), Wren, (in conifer woodland) and a flock of 10 Pied Wagtail (cutaway).
- Local staff reported that Mallard and Heron are frequently observed on the bog.

Mammals

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

- Hare
- Fox
- Badger
- Local staff note that Hare and Fox are the most common animals seen, but that deer have never been observed on the bog.

Other species

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

- Small Tortoiseshell
- Frog
- Meadow Brown

Fungal biodiversity

Brown Birch Bolete, Safron Milk Cap

Activities on the site

Activities on the site include:

- Standard BnM operations related to milled peat production.
- Commercial *Sphagnum*-moss sod peat production.

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- There is some private sod peat cutting in one section adjacent to the main road and the access to Ballydermot North.

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

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

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

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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 Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2026-2030

The All-Ireland Pollinator Plan 2026-2030 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2020, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM 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 BnM'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.

14 BnM commitments

BnM 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.

In line with BnM'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. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. 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.

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APPENDIX VI. 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 license under section 95 of the EPA Acts. This is achieved by BnM 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	Ballydermot Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

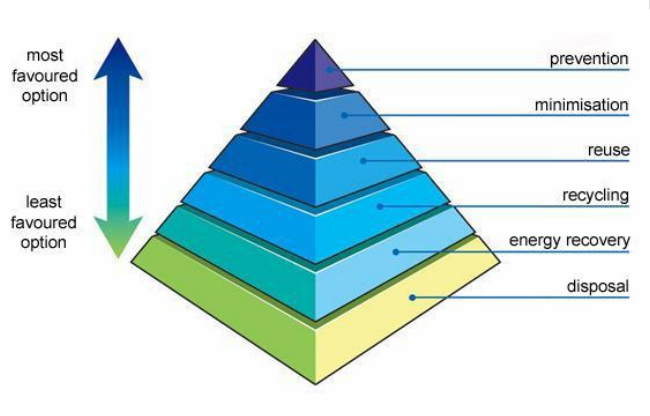
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

Rehabilitation: Rehabilitation is defined in general by BnM 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, BnM 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 acrotelm – 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.

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APPENDIX VIII. 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 IPC Licence's Ref. P0503-01 in the Allen-Lullymore Group of Bogs in Counties Offaly and Kildare.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.
- 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.

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- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.
- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

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APPENDIX IX. 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 X. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

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



Code of Practice

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Code of Practice

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

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

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

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

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

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



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

---

2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

---

3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index

Revision	Date	Description of change	Approved
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Ballydermot Bog
Rehab Plan
GIS Map Book
2026

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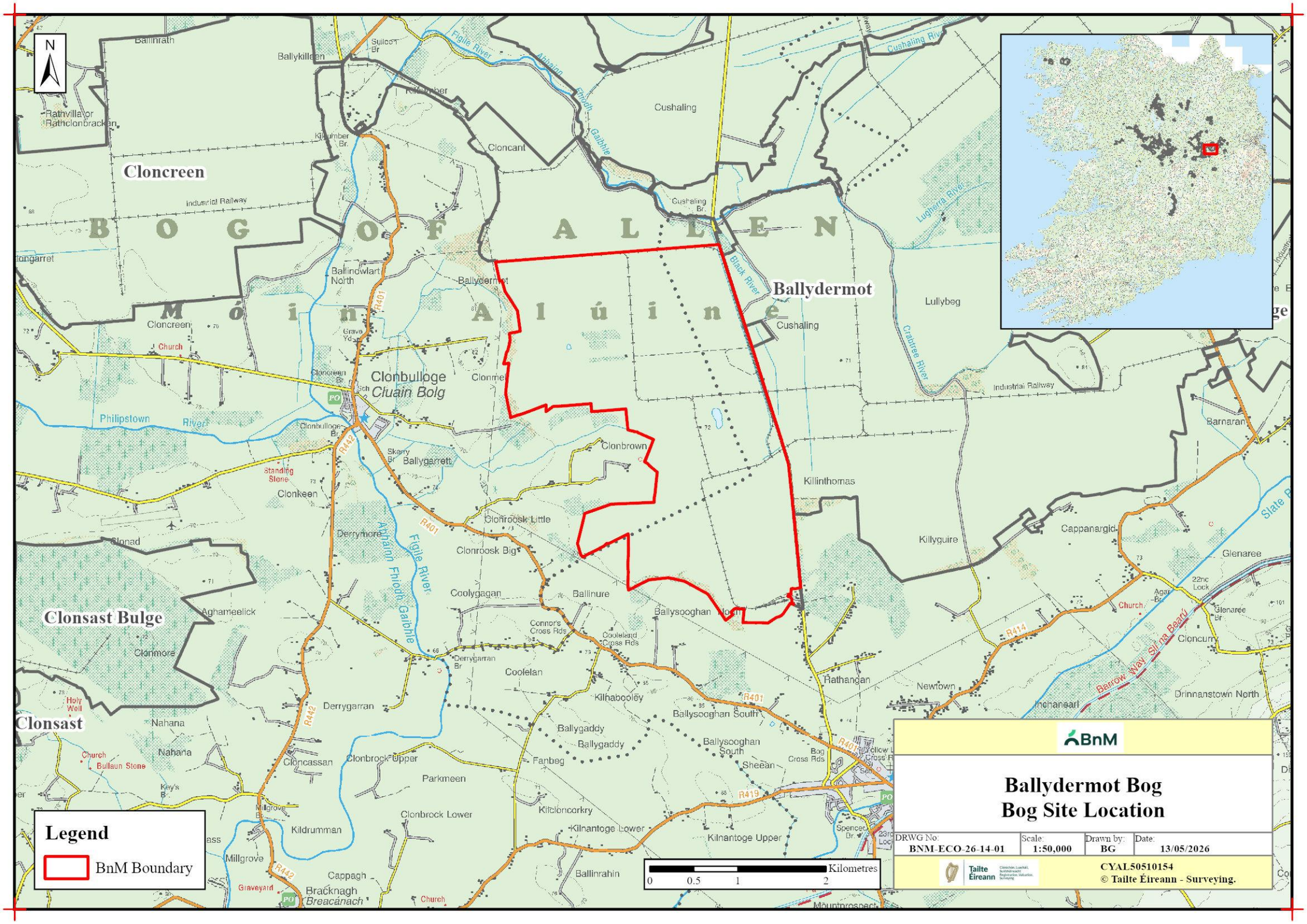
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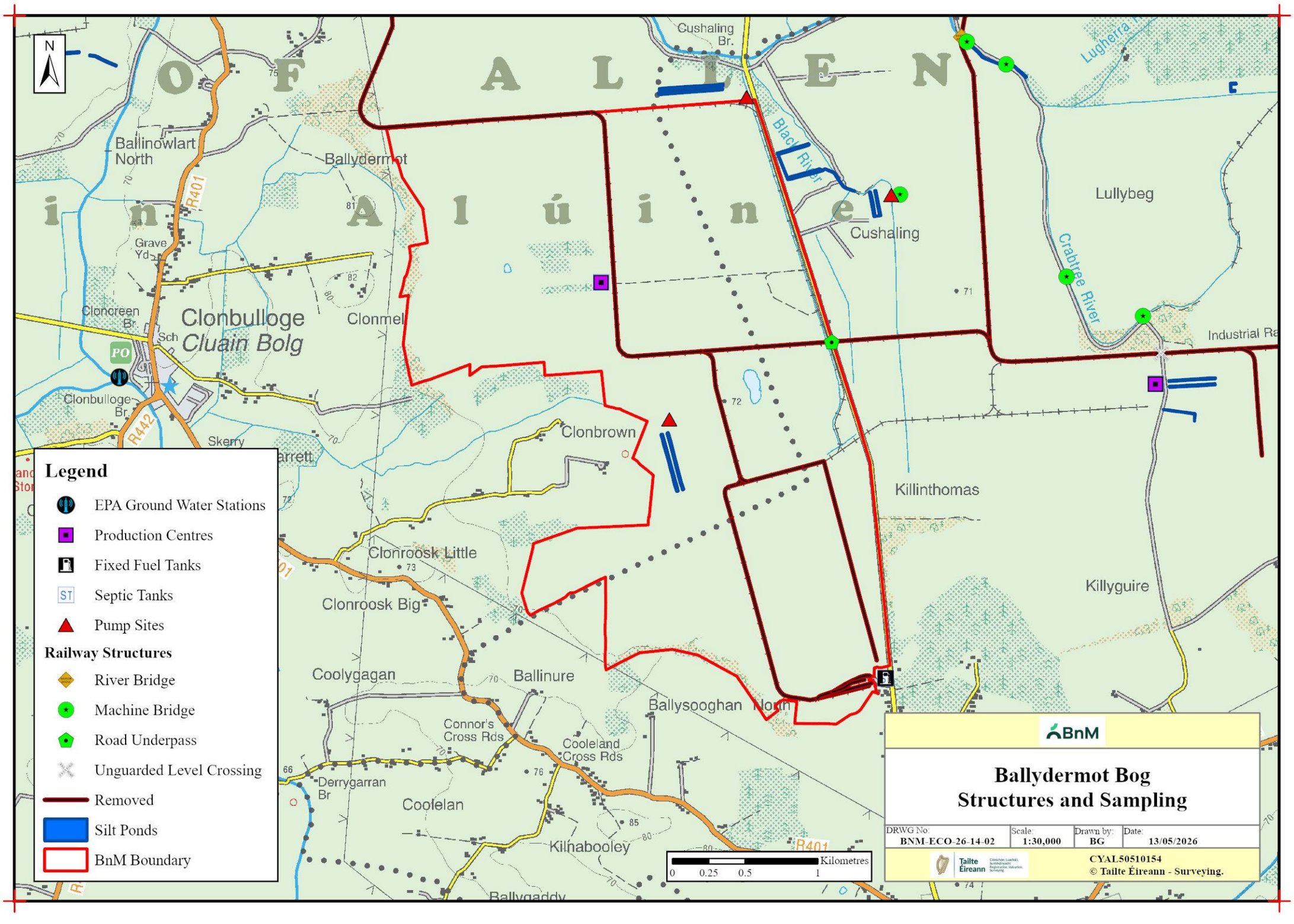
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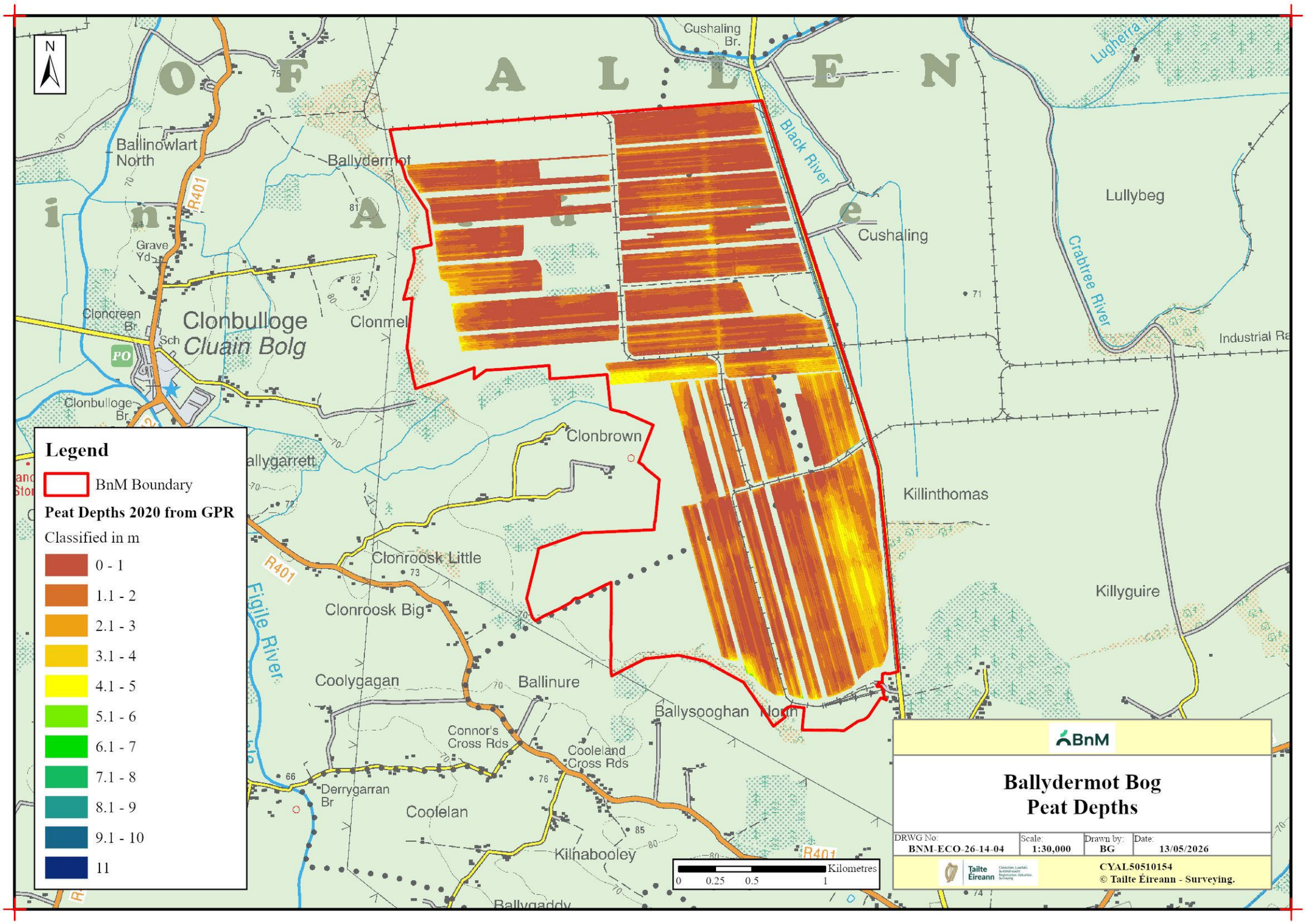
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R442
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Clonbrown
Cushaling Br.
Black River
Cushaling
Lullybeg
Crabtree River
Industrial Ra
Killinthomas
Killyguire
Clonroosk Little
Clonroosk Big
Coolygagan
Ballinure
Ballysooghan North
Connor's Cross Rds
Cooleland Cross Rds
Derrygarran Br
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Legend
EPA Ground Water Stations
Production Centres
Fixed Fuel Tanks
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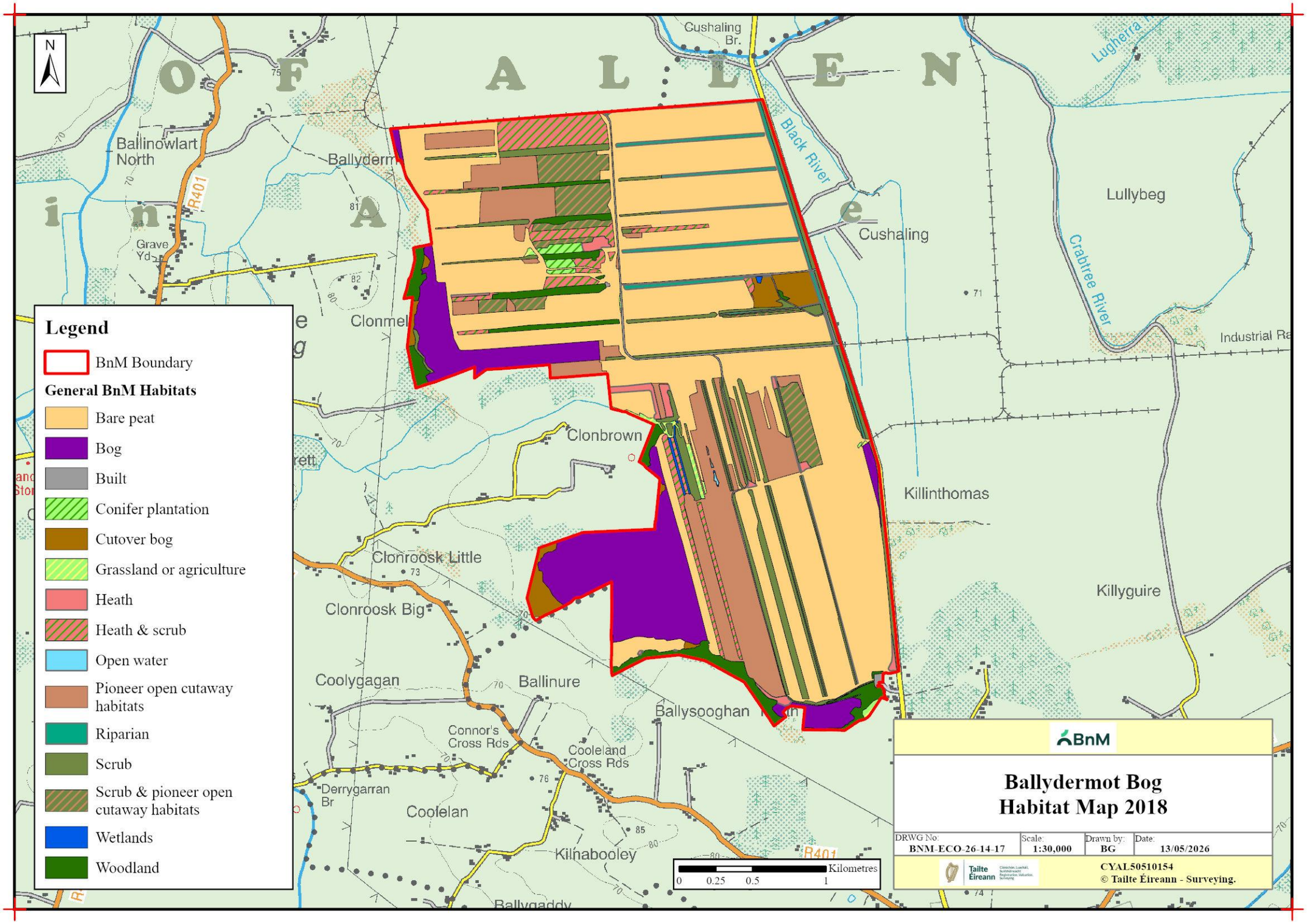
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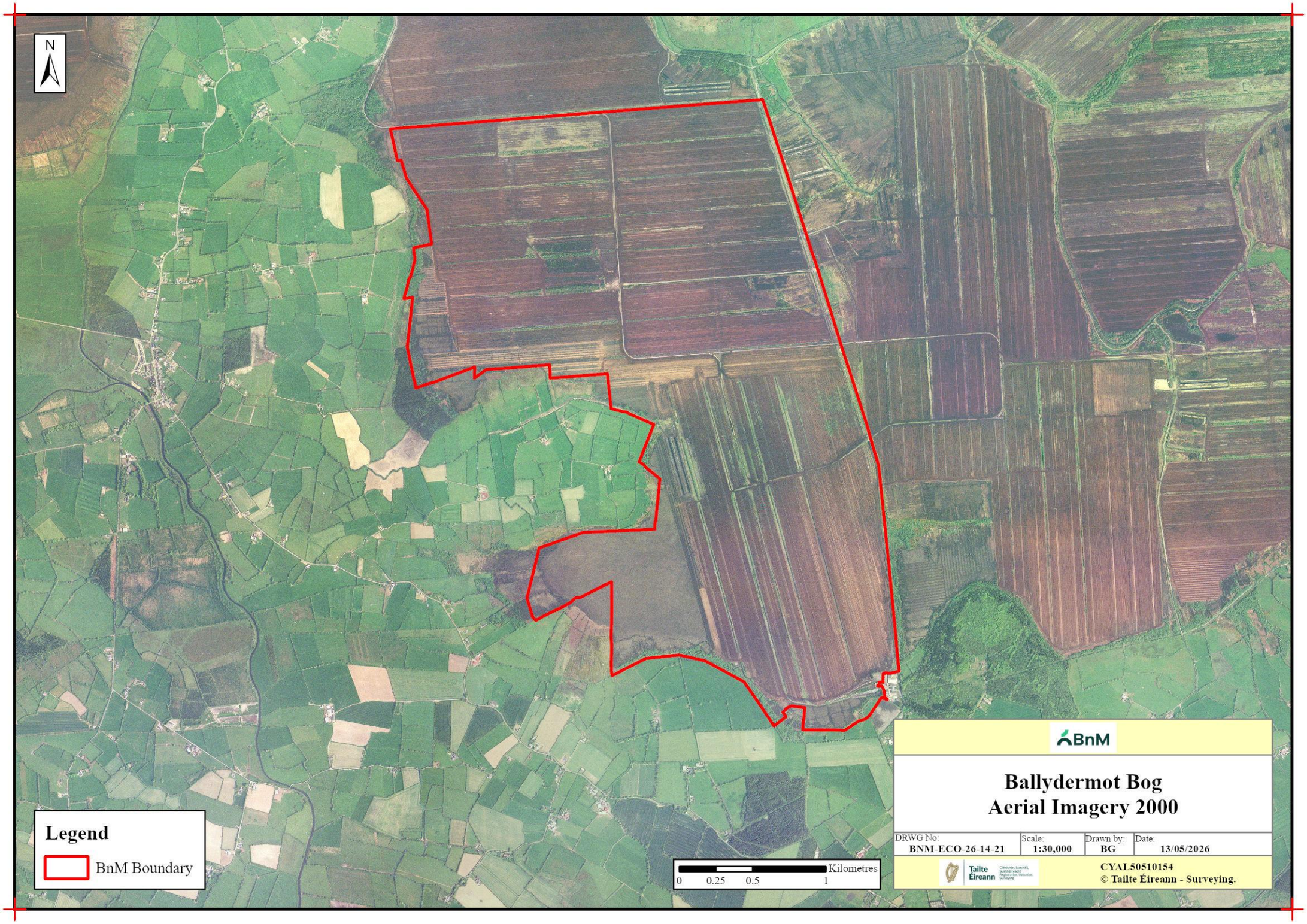
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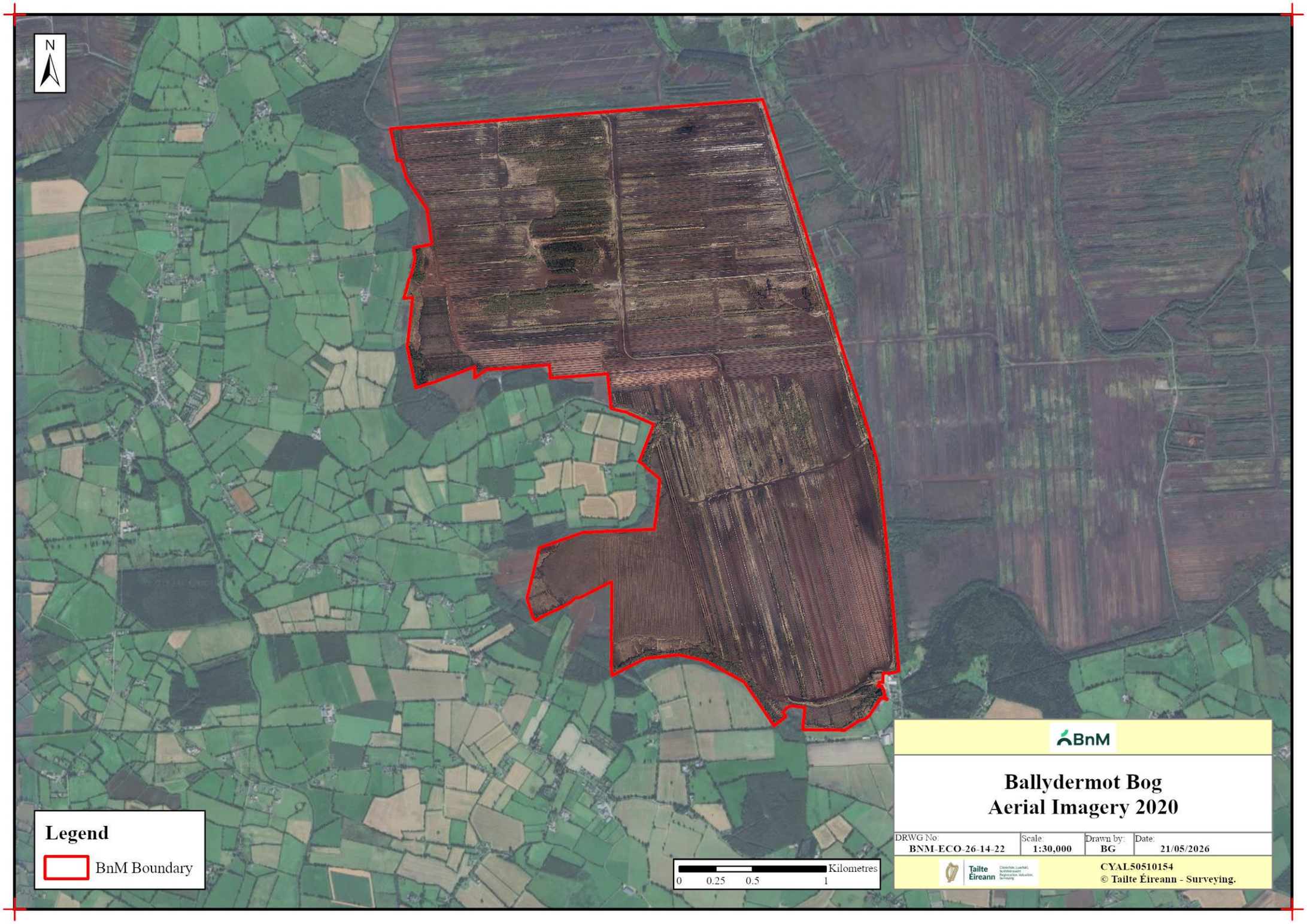
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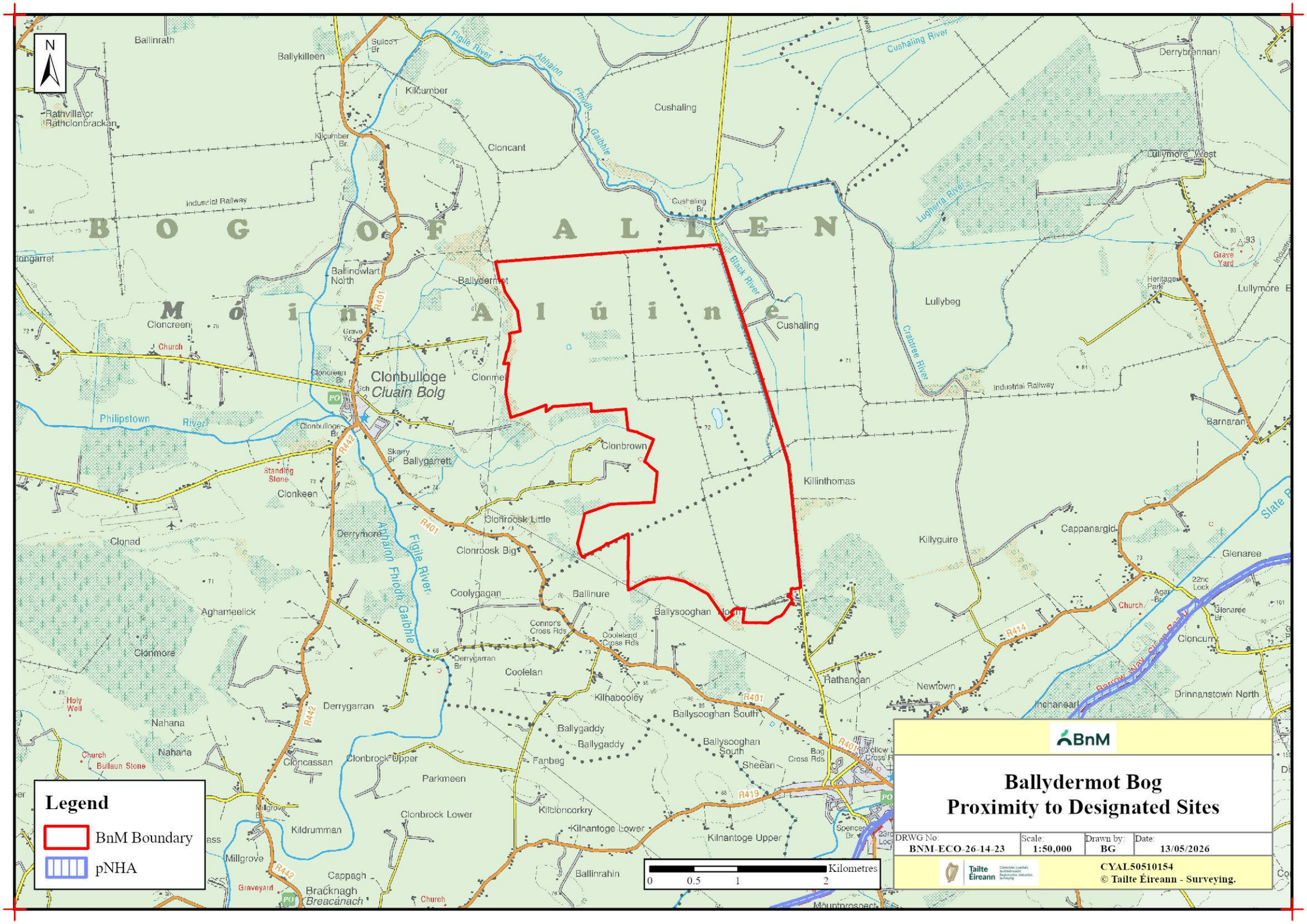
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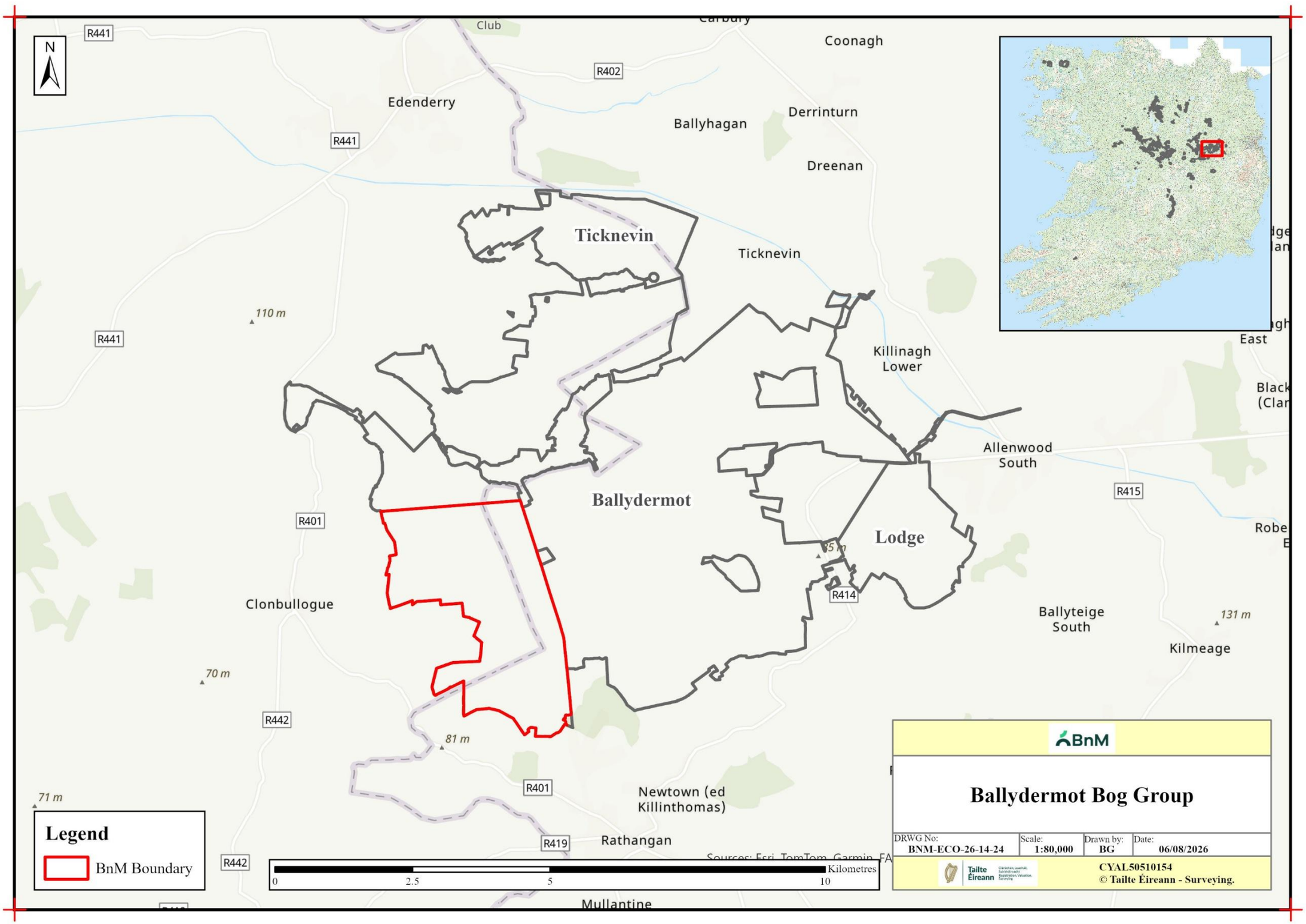
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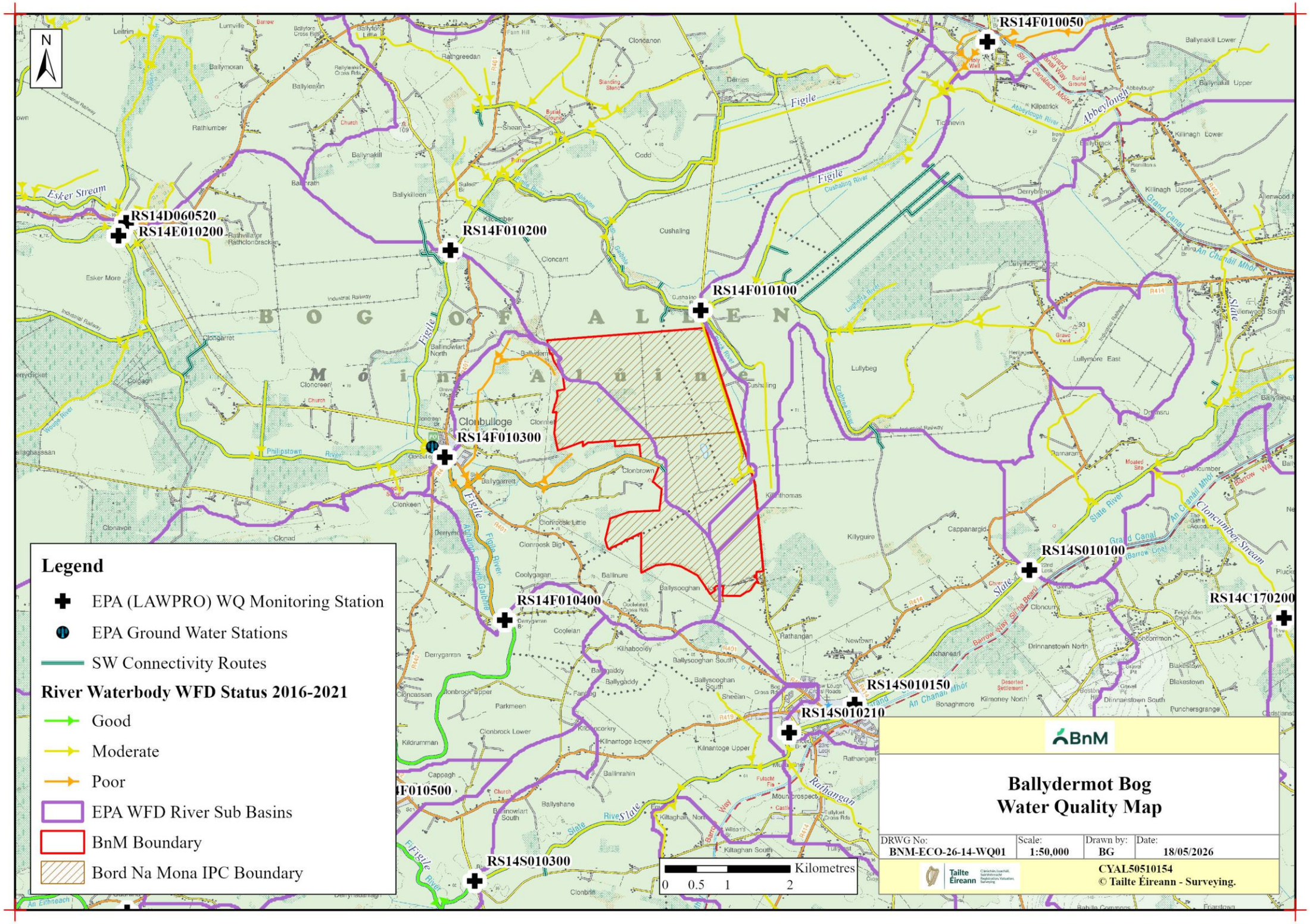
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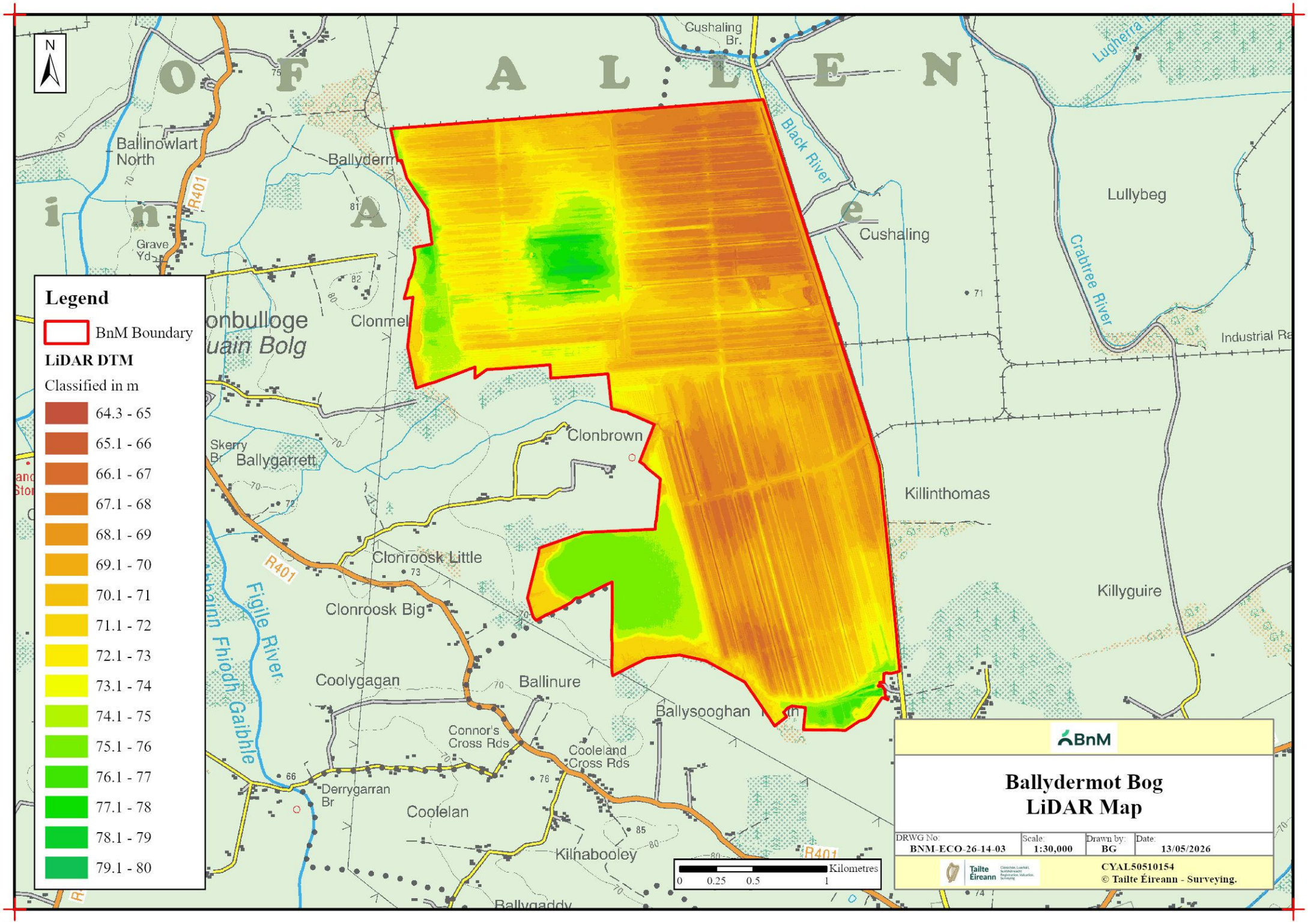
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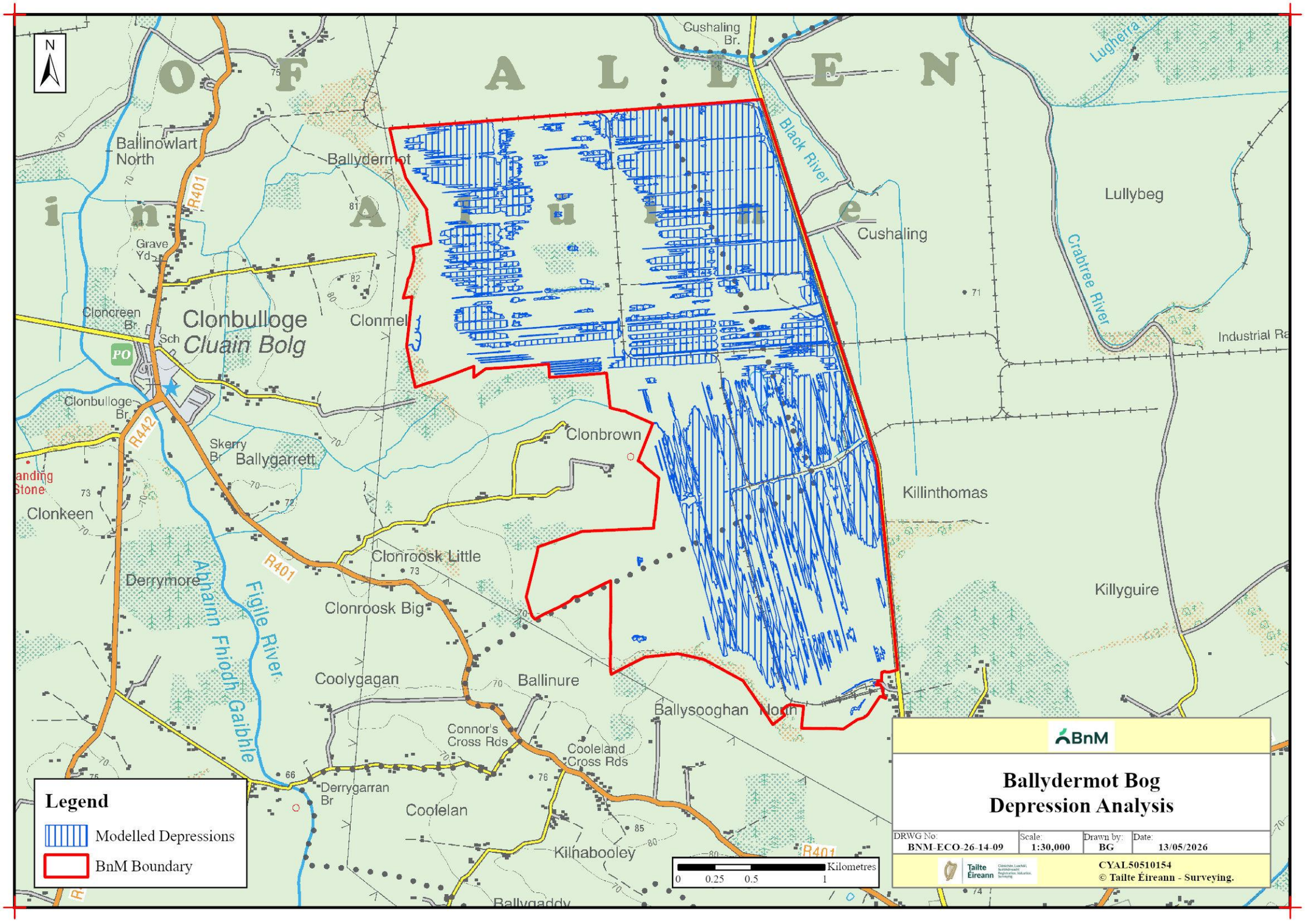
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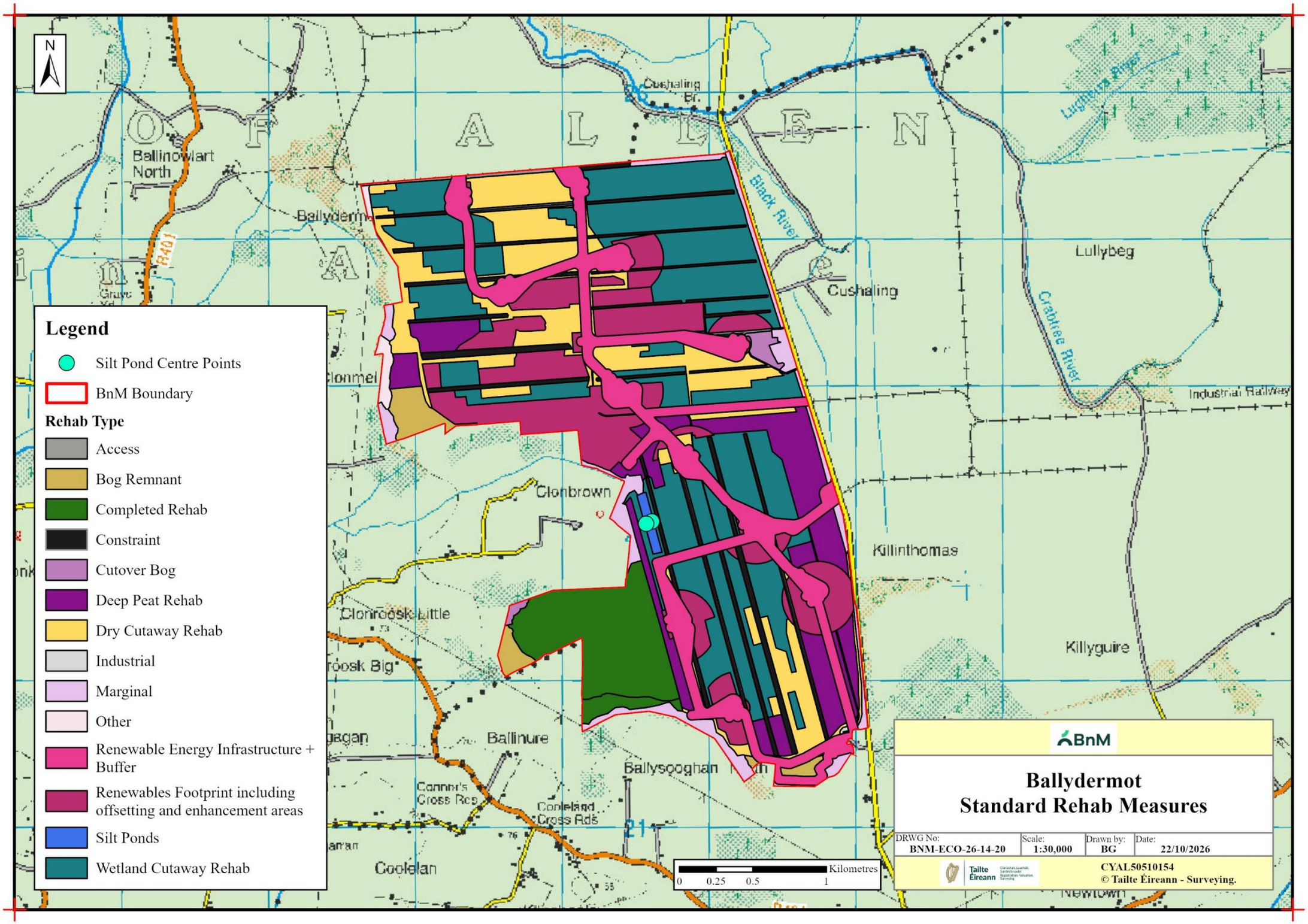
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Cluain Bolg
Clonmel
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PO
Clonbulloge Br
R442
Skerry Br
Ballygarrett
Clonkeen
Clonbrown
Cushaling Br.
Black River
Cushaling
Lullybeg
Crabtree River
Killinthomas
Killyguire
Clonroosk Little
Clonroosk Big
Derrymore
Abhainn Fhiodh Gaibhle
Figile River
Coolygagan
Ballinure
Ballysooghan North
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Cooleland Cross Rds
Derrygarran Br
Coolelan
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Date: 13/05/2026
CYAL50510154
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Rehabilitation Maps


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Black River
Cushaling
Lullybeg
Crabtree River
Lugnaquilla River
Industrial Railway
Clonbrown
Killinthomas
Clonroosk Little
Killyguire
Ballinure
Ballysooghan
Connor's Cross Rds
Coolelan Cross Rds
Coolelan
Newtown
Legend
Silt Pond Centre Points
BnM Boundary
Rehab Type
Access
Bog Remnant
Completed Rehab
Constraint
Cutover Bog
Deep Peat Rehab
Dry Cutaway Rehab
Industrial
Marginal
Other
Renewable Energy Infrastructure + Buffer
Renewables Footprint including offsetting and enhancement areas
Silt Ponds
Wetland Cutaway Rehab
0 0.25 0.5 1 Kilometres
BnM
Ballydermot
Standard Rehab Measures
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Barnaran Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

Draft

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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 BnM Energy Ltd agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Barnaran Bog upon cessation of peat production and complements 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 Barnaran Bog.

BnM have defined the key rehabilitation outcome at Barnaran Bog as environmental stabilisation.

Any consideration of any other future after-uses for Barnaran Bog 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.

BnM are planning to develop a potential renewable energy project at Barnaran Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

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Non-technical summary

- BnM (formerly Bord na Móna) is planning to rehabilitate Barnaran Bog, located approximately 8.8km (kilometres) to the south-east of Edenderry and 6 km west of Allenwood, within Co. Kildare.
- Barnaran is part of the Allen-Lullymore bog group and is a sub-section of a larger unit called Ballydermot Bog.
- Barnaran Bog was in industrial peat production since before 1975 and supplied turf for fuel and energy and latterly milled peat for electricity production.
- BnM Industrial Peat harvesting fully ceased at Barnaran Bog in 2020. The majority of the bog is now developing pioneer and maturing habitats.
- BnM are planning to develop a potential renewable energy project at Barnaran Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The wind farm planning boundary overlaps Barnaran Bog and has been integrated into the rehabilitation plan.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing vegetation and promoting re-establishment of more typical cutaway peatland communities such as Birch woodland, Reedbeds, fen habitat and *Sphagnum*-rich embryonic bog communities.
- It will take some time for vegetation and habitats to fully develop at Barnaran, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog 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.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats, like *Sphagnum* rich embryonic bog communities are expected to develop on deeper peat, whilst wetland, fen and scrub habitats will develop on shallower peat. In time a naturalised peatland can be restored.
- It will take some time for vegetation and habitats to fully develop at Barnaran Bog, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- The development of a range of habitats at Barnaran 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 and wetland habitats.

- This peatland rehabilitation plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

Draft

1. INTRODUCTION

BnM operates under an IPC Licence issued and administered by the EPA within the Allen bog group (Ref. P0503-01). 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 Allen Bog Group comprises 2 main sub-groups: Allen-Clonsast and Allen-Lullymore. Barnaran is a part of the Allen-Lullymore bog group. Further details on the bogs within the Allen-Lullymore bog group are outlined in Appendix I.

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Barnaran Bog, and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are **NOT** proposed as part of this draft Barnaran rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Barnaran will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

> "*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 document covers the area of **Barnaran Bog.** Parts of Barnaran Bog around the margins of the site are currently being used by domestic turf cutters who have turbary rights. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting and turbary issues on Barnaran Bog. Nevertheless, BnM 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.

There are known rights of way around the margins of Barnaran Bog. Where a public right of way or similar burden exists on BnM 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.

BnM are planning to develop a potential renewable energy project at Barnaran Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). This proposed wind farm project is located within Barnaran Bog as well as the adjacent bogs of Blackriver, Blackwater, Codd, Derrybrennnan, Glashabaun, Killinagh, Lodge, Lullybeg, Lullymore and Ticknevin. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm has been taken into account in the preparation of this Rehabilitation Plan. Where proposed wind farm infrastructure overlaps with areas identified for rehabilitation, the timing and sequencing of rehabilitation measures will be coordinated with the proposed development. Accordingly, these areas are treated as a temporal consideration in relation to the implementation of rehabilitation measures.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Barnaran Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Barnaran Bog 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. Agricultural grassland and access routes occur around the margins of the bog.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA – '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan*' (EPA, 2020).

The ecological information and general information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2011 to 2026 inclusive) and monitoring and desktop analysis, form the basis for the development of this 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on BnM Peatlands – Preliminary Study Nov 2022;
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

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.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.

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- 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, *et. al* (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- 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 2022-2027;
- BnM Annual Report 2025;
- 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 BnM's rehabilitation and biodiversity action plan activities and are contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Barnaran Bog was surveyed in 2011. Habitat maps were updated in 2015. Additional ecological walkover surveys and visits have taken place in between 2015 and 2026, in advance of the preparation of this rehabilitation plan. 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 (2019), while mosses and liverworts nomenclature follows identification keys published by the Atherton *et al*. (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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3. SITE DESCRIPTION

Barnaran Bog is located in west Kildare approximately 8.8km to the south-east of Edenderry, 6km to the west of Allenwood and 2.6km northeast of Rathangan in County Kildare. Barnaran bog is a sub-section of a larger unit called Ballydermot Bog. Barnaran bog is located to the south of a mineral island at Lullymore, that stands out amongst the surrounding bogs. A local road runs from the Lullymore Heritage Centre to the mineral island forming the northern boundary of this sub-section of bog. A section of the R414 runs through the site to the east, and a BnM track forms the western boundary of the site.

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland and other bogs in the wider Ballydermot Bog which are owned and managed by BnM.

Barnaran Bog has a gravity drainage regime, and no pumps were installed within this bog. The bog is drained by several large deep drains orientated east-west that separate series of fields. Scrub and birch woodland have developed across much of the former production area, with small areas of pioneer poor fen.

Areas of bare peat with pioneer vegetation developing exist in the north-east section, the south-east corner and the south-western section.

There are several sections of remnant high bog (PB1) around the margins of the site at the southern boundary. These have generally been cut for sod peat, and some areas are privately managed. Ownership of these areas is currently being reviewed.

See Drawing number *BNM-ECO-26-14-01: Site Location Map*, included in the accompanying Mapbook[1], which illustrates the location of Barnaran Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

The majority of Barnaran bog was in milled peat production from before 1975 until 2020. Barnaran Bog was originally a sod production bog that was subsequently converted to a milled peat production bog and was used to supply fuel to Edenderry Power Station. Areas that were in production up until 2020, predominantly comprise bare peat with some development of pioneer vegetation particularly the northeast section, the southeastern corner and the southwest section. Areas which came out of peat production earlier have well developed mature habitats including, scrub, an area of developing bog woodland and *Sphagnum* rich poor fen habitat in the northwest section of the site.

3.1.2 Current land-use

All industrial peat production at Barnaran Bog ceased in 2020.

There are several small sections of remnant raised bog along the southern and northeastern, western and southwestern margins of Barnaran bog. The majority are degraded and have been cut privately for sod peat over the years, but they all still retain some typical raised bog characteristics. It is noted that there is some private sod-

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Barnaran Bog Map Book

peat production around the margins of some of these raised bog remnants, both inside and outside the ownership of BnM.

There is an extensive BnM industrial railway network throughout this area. This railway has been decommissioned.

Agricultural grassland and access routes occur around the margins of the bog.

BnM are planning to develop a potential renewable energy project at Barnaran Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project is located within Barnaran Bog as well as the adjacent BnM bogs. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm infrastructure **partially** overlaps with the Barnaran Bog (see drawing *BNM-ECO-26-14-20: Standard Rehab Measures*); these (infrastructure) areas have been treated as a constraint in the rehabilitation plan.

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

  a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

  b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

xxv. All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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 in these areas 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.

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In respect of Barnaran Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPS).

As the primary employer in many Midland counties, BnM 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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying bedrock geology[2] at Barnaran Bog comprises primarily Waulsortian Limestones (massive, unbedded lime-mudstone), Allenwood Formation (thick-bedded limestone, locally peloidal), with Ballyadams Formation (crinoidal wackestone/packstone limestone) underlying a small part of the west of the bog along the boundary.

Quaternary sediment maps indicate that Barnaran is primarily underlain by peat, with till derived chiefly from Limestone. The site is underlain with a mix of limestone till and marl/lacustrine clay sub-soils.

3.2.2 *Peat type and depths*

Much of Barnaran Bog is now cutaway, and the majority of the original raised bog has now been removed. Barnaran is considered to be a shallow peat cutover bog, and in general has between 0.5 m - 1.5 m of residual fen or minerotrophic peat remains. Remnants of deeper peat remain in some areas with residual peat of deeper than 2m, most notably within the north-eastern, south-eastern and south-western areas of the site.

3.3 Key Biodiversity Features of Interest

3.3.1 Current habitats

Barnaran bog has areas of cutaway of varying ages. Areas that have more recently come out of peat production are dominated by bare peat with some development of pioneer vegetation, whilst areas that have come out of peat production earlier have now developed scrub/woodland and well-developed pioneer habitat including

[2] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0

heather communities and fen. In the northwestern section of the bog, along the route of the former railway line, calcareous grassland (gCal) has developed.

The majority of Barnaran Bog comprises dry cutaway on shallow peat with establishing Downy Birch dominated scrub and Birch Woodland, grassland and heather dominated vegetation. Wetter sections are developing fen, wet scrub and some embryonic *Sphagnum*-rich vegetation particularly in the north-western section north of the industrial railway line (now removed).

Colonisation of pioneer vegetation is ongoing gradually within the sections where peat production ceased most recently, most notably within the north-eastern, south-eastern corner and south-western areas of the site are comprised of bare peat and pioneer vegetation mosaics. The extent of pioneer vegetation development in former industrial bare peat areas has not significantly changed since industrial peat production ceased in 2020.

The different cutaway habitats developing across the bog reflect the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the development of cutaway habitats. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All bogs have hydrological gradients from wet to dry habitats. Barnaran is a shallow peat cutover bog with some areas with residual peat. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and groundwater has a stronger influence.

There is biodiversity interest in the marginal habitats fringing the former production area which are relatively well developed and diverse, supporting habitats such as scrub and pine scrub, conifer plantation, Birch woodland and remnant raised bog. The southern boundary of the site is a mixture of heather dominated vegetation, poor fen and scrub, pine scrub, birch woodland and remnant sections of raised bog. The sections of raised bog are dry and degraded and have been colonised by Scot's Pine (*Pinus sylvestris*) and Birch (*Betula* spp.) trees. There are areas of mature Birch woodland (WN7) and scrub to the north-west of the cutaway as well as in the north-eastern corner of the site. This woodland (WN7) is dominated by Birch but also contained significant amounts of Sitka Spruce (*Picea sitchensis*).

The Lullybeg 14 (EPA code: 14L13) watercourse flows in a south-westerly direction along the north-western boundary of Barnaran bog and subsequently flows north discharging to the Lullymore_East (EPA code: 14L11) watercourse which subsequently flows to the Figile River (EPA code: 14F01).

The most common habitats[3] present in the former production areas at Barnaran include:

- Poor fen communities mostly dominated by Soft Rush (pJeff)
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway.)
- Bare peat (0-50% cover) (BP)
- Minor development of calcareous grassland (gCal) (on old railway track)

The most common habitats[4] found around the margins of the site include:

[3] Codes refer BnM classification of pioneer habitats of production bog

[4] Codes refer to Heritage Council habitat classification, Fossitt 2000.

- Purple Moorgrass-dominated grassland (gMol)
- Gorse scrub (eGor)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated.)
- Rank dry meadow-type grassland (GS2) (found at southern margin)
- Raised bog (PB1) (dried remnants being invaded by scrub)
- Cutover bog (PB4) (small area formerly used to harvest peat)

See Drawing number *BNM-ECO-26-14-17: Habitat Map 2018*, included in the accompanying Mapbook, which illustrates the habitats at Barnaran Bog. See Appendix II for more details on the ecological survey of the bog.

3.3.2 Species of conservation interest

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

Evidence of widespread mammal species has been recorded on or in close proximity to the bog including Badger (*Meles meles*), Irish Hare (*Lepus timidus* subsp*. hibernicus*), Otter (*Lutra lutra*), Pine Marten (*Martes martes*), Red Squirrel (*Sciurus vulgaris*), Red Fox (*Vulpes vulpes*) and American Mink (*Neovison vison*).

The former railway track gravel beds support populations of Basil Thyme (*Clinopodium acinos*) and Blue Fleabane (*Erigeron acris*). Both are Red-listed species with Blue Fleabane listed as "Least Concern" and Basil Thyme listed as 'Near Threatened' on Irelands Red List (Wyse Jackson *et al*., 2016). Several populations are present on railway tracks throughout the wider Ballydermot bog group or on areas of exposed gravel that are associated with the railway tracks as part of the 'weed' or recolonising flora. These species are not typical bog species and are likely to have come on to the former production bog from nearby eskers or gravel pits. The presence these species enhances the rare flora resource of Co. Kildare.

Round-leaved wintergreen (*Pyrola rotundifolia*) was recorded in one area of fen and open birch dominated scrub north of a *Sphagnum* rich poor fen habitat. This species is listed as Near Threatened on Irelands Red List (Wyse Jackson *et al*., 2016). The presence of Round-leaved wintergreen is significant and enhances the rare flora resource of Co. Kildare.

Alder Buckthorn (*Frangula alnus*) is found in the west half of the northwest section of the bog, south of the Lullybeg 14 (EPA code: 14L13) watercourse which flows along the north-western boundary of Barnaran bog. This was the first confirmed record of Alder Buckthorn on cutaway bog, from July 2015. It is also located along the drainage network adjacent to a section of cutover bog east and south of the access track within the western section of the central portion of the site. This species is a nationally rare Red Listed plant species.

Several notable bird species have been noted during BnM ecological surveys at Barnaran including, Snipe (*Gallinago gallinago*), Greenshank (*Tringa nebularia*), Kestrel (*Falco tinnunculus*). Other more common birds recorded at the bog during BnM surveys include Wren (*Troglodytes troglodytes*), Pied wagtail (*Motacilla alba yarrellii*), Swallow (*Hirundo rustica*), Robin (*Erithacus rubecula*) Blackbird (*Turdus merula*), Magpie (*Pica pica*), Rook (*Corvus frugilegus*) and Hooded Crow (*Corvus cornix*).

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NBDC records for red-listed[5] bird species of conservation concern recorded in the 10km square (N62 and N72) within which Barnaran Bog is located include, Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Partridge (*Perdix perdix*). Grey Wagtail (*Motacilla cinerea),* Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Red Grouse *(Lagopus lagopus)*, Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola)* and Yellowhammer (*Emberiza citrinella*).

Red-listed[6] listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Nightjar *(Caprimulgus europaeus)*, Red Kite (*Milvus milvus*) and White-tailed Eagle (*Haliaeetus albicilla*). Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

NBDC has records for butterfly species of conservation interest Marsh Fritillary *(Euphydryas aurinia)* and Dingy Skipper *(Erynnis tages)* from Barnaran Bog. The following threatened butterfly species have been recorded in the wider area of the bog: Dark Green Fritillary *(Speyeria aglaja)*, Grayling *(Hipparchia semele)*, Large Heath *(Coenonympha tullia)*, Heath *(Coenonympha pamphilus)* and Wall *(Lasiommata megera)*.

3.3.3 Invasive species

There are BnM records for American Mink (*Neovison vison*) and there are also records from NBDC/BSBI for Canadian Waterweed (*Elodea canadensis*) recorded from Barnaran bog, both of which are regarded as high impact invasive species.

NBDC holds records from the bog for the invasive mammal species Greater White-toothed Shrew (*Crocidura russula*) which are regarded as medium impact invasive species.

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs, and although spatial overlap with the proposed rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Barnaran Bog. No SPAs occur within 25km of the site. The nearest EU Designated sites to Barnaran Bog are as follows:

- The Long Derries, Edenderry SAC (Site code: 000925) - 5.2km north
- Mouds Bog SAC (Site code: 002331) – 7.6km southeast
- Pollardstown Fen SAC (Site code: 000396) - 8.4km southeast
- Ballynafagh Lake SAC (Site code: 001387) - 9km northeast
- Ballynafagh Bog SAC (Site code: 000391) - 10.4km northeast

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

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

- River Barrow and River Nore SAC (Site code: 002162) - 12km southwest

There are no Natural Heritage Areas (NHAs) in close proximity to Barnaran bog.

- Hodgerstown Bog NHA (Site code: 001393) - 10km northeast
- Carbury Bog NHA (Site code: 001388) – 10.1km north
- Black Castle Bog NHA (Site code: 000570) – 13.8km northwest

A number of non-statutory designated sites i.e. proposed Natural Heritage Areas (pNHAs) also occur in the wider area around Barnaran Bog:

- Grand Canal (pNHA) (Site Code: 002104) - 1.3km southeast (at its closest point)
- The Long Derries, Edenderry pNHA (Site code: 000925) – 5.2km north
- Mouds Bog pNHA (Site code: 002331) – 7.6km southeast
- Pollardstown Fen pNHA (Site code: 000396) - 8.4km southeast
- Curragh (Kildare) pNHA (Site code: 000392) - 8.5km southeast
- Ballynafagh Bog pNHA (Site code: 000391) - 10.4km northeast
- Ballynafagh Lake pNHA (Site code: 001387) – 10.7km northeast
- Donadea Wood pNHA (Site code: 001391) - 14.3kn northeast.

See drawing *BNM-ECO-26-14-23: Proximity to Designated Sites* in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar sites located in proximity to Barnaran Bog. The nearest Ramsar site is Pollardstown Fen located approximately 8.4km to the south-east of Barnaran Bog.

3.5 Hydrology and Hydrogeology

Barnaran Bog is located within the Barrow (Catchment ID: 14) catchment as defined by the EPA under the Water Framework Directive (WFD). The northern part of the bog is in the Figile_SC_010 sub-catchment, whilst the southern part is in the Slate_SC_010.

There are a number drains within Barnaran Bog that drain the site. The Lullybeg 14 (EPA code: 14L13) watercourse flows in a south-westerly direction along the north-western boundary of Barnaran bog and subsequently flows north discharging to the Lullymore_East (EPA code: 14L11) watercourse which subsequently flows to the Figile River (EPA code: 14F01).

Barnaran Bog has a gravity drainage regime and is relatively drier compared to some of the other Ballydermot Bogs, which have been partially pumped. Bogs with gravity drainage are generally less likely to develop wetland habitats than those whose drainage has been managed through pumping.

In the case of Barnaran, hydrological modelling (*BNM-ECO-26-14-09: Depression analysis*) indicates that the majority of the bog is in a 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.

GSI data indicates that Barnaran Bog is primarily underlain by Waulsortian Limestones (massive unbedded lime-mudstone), Allenwood Formation (thick-bedded limestone, locally peloidal), with Ballyadams Formation (crinoidal wackestone/packstone limestone) underlying a small part of the west of the bog along the boundary.

Waulsortian Limestones (massive, unbedded lime-mudstone), underly the east of the bog and are classified as a locally important aquifer (bedrock which is moderately productive only in local zones); the other rock units are considered to be regionally important aquifers - karstified (diffuse). An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying regionally important abstractions (e.g. large public water supplies), or 'excellent' yields (>400 m^3/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.

Barnaran Bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Map viewer). Groundwater vulnerability for the area surrounding Barnaran Bog is variable between areas of high, moderate and low vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution.

Quaternary sediment maps show that Barnaran Bog is generally underlain by cutover raised peat. This combination of sediment is common in the wider context surrounding the site.

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 Barnaran 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 bi-annual basis by BnM 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.

Barnaran Bog has one surface water outlet from previously active peat extraction catchments, which discharges to the Lullybeg 14 watercourse (EPA code: 14L13), a tributary stream of the Figile River (EPA code: 14F01). This

river is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds and associated surface water emission are detailed on the accompanying structures map along with water quality map. See Drawing number *BNM-ECO-26-14-02: Structures and Sampling*, along with Drawing number *BNM-ECO-26-14-WQ01: Water Quality Map* included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Barnaran 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme - Water Quality Monitoring

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already partially revegetated in areas that have come out of peat production earlier, however bare peat areas still occur in areas that were in peat production up until 2020. 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*., 2017). Bog rehabilitation is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) 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 BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Barnaran Bog has been completed. This discharge will have improved 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 waterbody receptors i.e. the Figile River (IE_SE_14F010600) and the Figile_SC_010 sub-catchment and will support the future status of the waterbodies achieving ‘good’ status. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

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

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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 monitoring for pH, suspended solids, total solids, total phosphorus, total ammonia, colour, and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the cutaway drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al*. 2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al*. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther *et al*. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Barnaran 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. The majority of the bog is expected to develop as Birch woodland on drier areas and peripheral headlands. Wetland mosaics are expected to develop on shallow peat with open water, reed swamp, fen and wet scrub and woodland habitats with alkaline emission factors. Part of this bog is expected to develop regenerating wet deep peat vegetation on deep peat areas.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Barnaran Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare peat areas in the former production area of Barnaran Bog are assessed as **local importance (lower value)**.

The revegetated former production area dominated by Birch scrub/woodland and marginal habitats including woodland, scrub, pioneer cutaway habitats, fen, calcareous grassland, and remnant raised bog, may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Barnaran Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity and other general topics over the years about Allen bog group, including Barnaran 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.
- Bord na Móna Biodiversity Action Plan 2016-2021 review – held in Lullymore in 2018.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Barnaran Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Barnaran Bog or the programme in general.

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

4.2 Topics raised by Consultees

N/A - consultation has not commenced.

4.3 BnM response to topics raised during consultation

N/A - consultation has not commenced.

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5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what BnM want to achieve by implementing the rehabilitation at Barnaran Bog. These include:

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect planned renewable energy infrastructure or areas required for this proposed project.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies, where possible. Re-wetting and maintaining water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is some potential for the creation of wet cutaway habitats at Barnaran Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Barnaran Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. The site has already developed pioneer and maturing cutaway habitats and much of the site is stabilised across areas that have come out of peat production earlier. Areas that remained in peat production until 2020 are still largely bare peat, however they are beginning to revegetate with pioneer vegetation.
- 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, the majority of the bog is shallow peat and only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog 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 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 BnM). Reducing pressures due to former peat extraction activities at Barnaran 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 BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g. Timahoe South and Lodge Bog) in 2022-2023, have previously carried out re-wetting and rehabilitation at Lullymore Bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area entire area of Barnaran Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Barnaran bog is part of the Allen-Lullymore bog group.
- The local environmental conditions of Barnaran Bog mean that wetland creation along with some deep peat measures are the most suitable rehabilitation approach for this site. Barnaran Bog has a gravity bog drainage regime and still has some areas of residual deep peat; the majority of the site comprises shallow cutaway areas, some of which are already developing as wetland, heather dominated vegetation and birch scrub.
- BnM have defined the key goal and outcome of rehabilitation at Barnaran Bog as **environmental stabilisation**, and **optimising residual peat re-wetting,** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Wind Farm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Barnaran Bog. In areas associated with proposed wind farm infrastructure, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- Cutaway habitats at Barnaran are already developing a mosaic of birch scrub/woodland, grassland, wetland, dry heather dominated communities and cutaway peatland habitats. Some areas of cutaway are largely stabilised already. A portion of the site has bare peat beginning to develop pioneer habitats. Rehabilitation is proposed to enhance residual peat re-wetting across the site, while taking account of current land-uses.
- Rehabilitation of Barnaran Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas.
- The majority of this bog has been cutaway. Most of the bog is estimated to have between 0.5m - 2m of peat remaining, with some areas with residual peat of deeper than 2 m. A mosaic of dry cutaway and wetland habitats are the most compatible habitat that can be developed on shallow peat in response to re-wetting. Deeper peat is likely to develop embryonic sphagnum rich deep peat vegetation. There are areas of intact raised bog remaining in the north-westernmost area of the site and along the southern margins.

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- Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent. At nearby Lullybeg there are ecological indicators of alkaline water chemistry present in the wetlands, such as Saw Sedge. This is an indication that fen habitats may develop at this site in mosaic with other habitats. The western side of the site is somewhat lower and has the potential to act as a basin. There is some potential to develop some wetland habitats in this area by blocking main outfalls and raising the water-level somewhat. There is some deeper peat towards the southern end of the site that would have the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised.
- **Potential land-use.** It is expected that BnM will update and finalise the draft rehabilitation plan for Barnaran when a decision is made in relation to the wind farm planning application. BnM remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC license. The targeted rehabilitation measures set out in this Rehabilitation Plan will be implemented following completion of the construction phase of the proposed Ballydermot Wind Farm in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM sites and the surrounding landscape. Care must be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remains 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.
- **Turf-cutting.** The area of remnant of intact raised bog where turf cutting is ongoing will not be subject to rehabilitation measures. This is largely due to the limited effectiveness of rehabilitation measures in these areas. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned.

6.2 Key Assumptions

- It is assumed that BnM 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:

- Areas subject to turf cutting are excluded.
- The longer-term development of stable naturally functioning habitats at Barnaran 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 Barnaran Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 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 BnM 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 a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g. potential suspended solids run-off).

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 increase in the area of potentially peat forming habitats. 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 BnM 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 Longford Pass 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 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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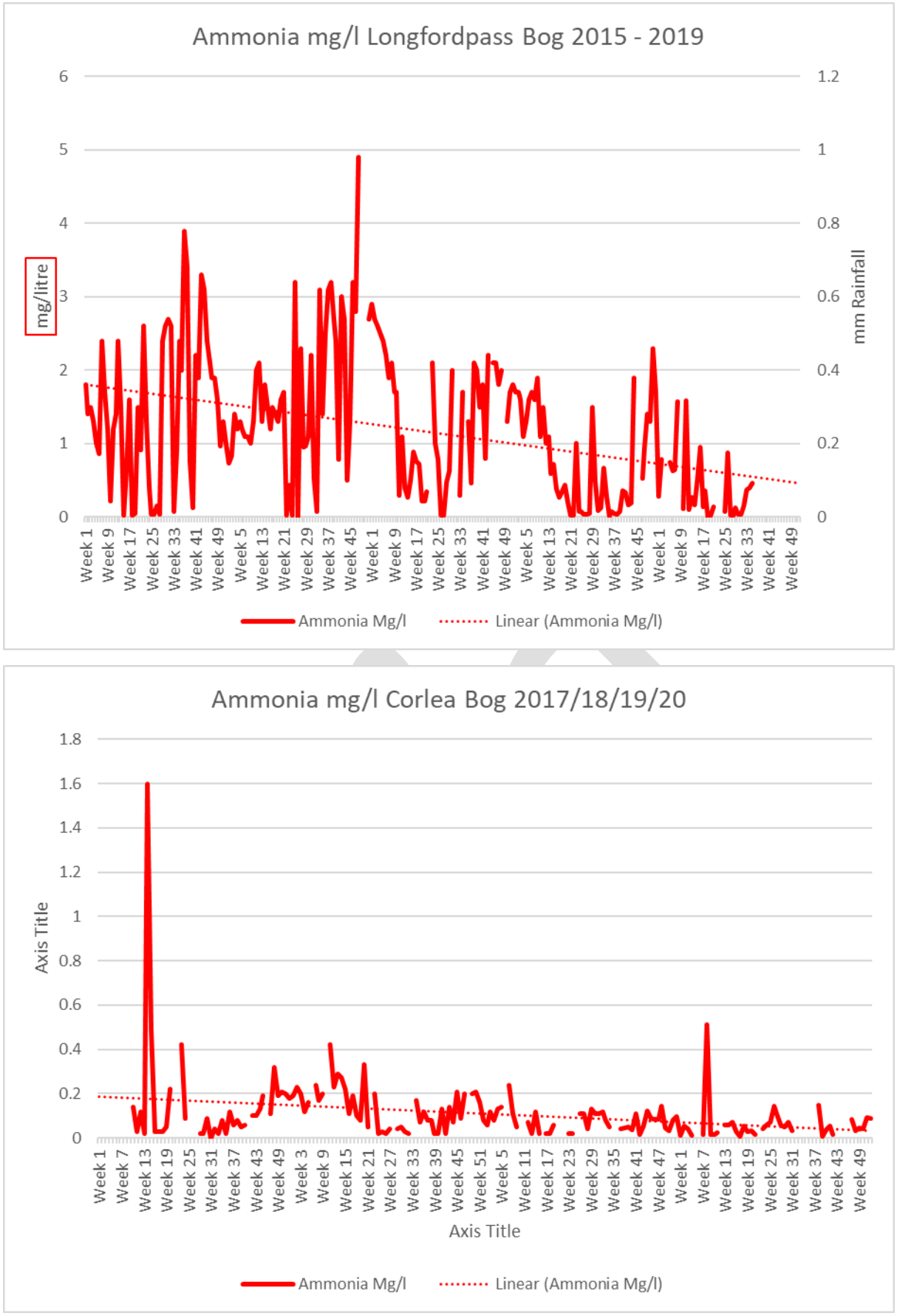


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

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

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and 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 based on environmental characteristics. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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 and LiDAR surface maps, these are included in the accompanying mapbook as the drawings referenced below:

BNM-ECO-26-14-21: Aerial Imagery 2000

BNM-ECO-26-14-22: Aerial Imagery 2020

BNM-ECO-26-14-04: Peat Depths

BNM-ECO-26-14-03: LiDAR Map

BNM-ECO-26-14-09: Depression Analysis

The restoration and rehabilitation measures are provisionally outlined in drawing titled *BNM-ECO-26-14-20: Standard Rehabilitation Measures* in the accompanying mapbook.

These rehabilitation measures for Barnaran Bog will include (see Table 8.1):

- Initial hydrological modelling indicates that a part of the site will develop a mosaic of wetland habitats. 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 at outfalls and by adjusting piped drainage, where possible. 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 of surrounding rivers.
- A widespread drain-blocking programme will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat and deeper residual peat.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking, modifying outfalls and managing water levels with overflows.
- Wetland measures including blocking outfalls and managing water levels with overflows.
- 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).

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Table 8.1 Types of and areas for rehabilitation measures at Barnaran Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking, modifying outfalls and managing water levels with overflows	65.9
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	95.1
Wetland cutaway	WLT1	Modifying outfalls, targeted drain-blocking and managing water levels with overflows within low lying areas and depressions on shallow peat.	133.9
Marginal land	MLT1	No work required	47.0
Silt Pond	Silt Pond	Silt Ponds	1.6
Ballydermot Wind Farm	Wind Farm Infrastructure + Buffer	Wind Farm infrastructure areas including turbine bases, carparks, internal access roads and turning points, crane hard stand and peat and spoil areas.	84.4
	Renewables Footprint	Areas associated with the proposed Ballydermot Wind Farm where rehabilitation measures will be appropriately sequenced including a temporary construction compound and enhancement areas; scrub planting.	15.6
Constraint	Constraint	Access tracks, turf cutting, bog remnant, watercourses, retained drainage infrastructure.	42.7
Total Area			**486.4**

Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

8.1 Completed and Ongoing

- The site is predominantly comprised of developed vegetation cover and are developing a mosaic of typical cutaway peatland habitats. Small parts of the site have already re-wetted naturally. Natural re-colonisation of the cutaway so far has been quite effective.
- Bare peat areas with colonisation of pioneer vegetation within the cutaway parts of the site are shrinking as pioneer vegetation develops and consolidates.

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

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Barnaran Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.
- A drainage management assessment of the proposed rehabilitation measures will be 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 will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.

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- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.
- A review of remaining milled peat stocks is to be carried out.
- 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) will be 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.
- Appropriate Assessment (AA) of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implementation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in Section 9.
- 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.

8.4 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 9 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.

8.5 Timeframe (to be adjusted when finalised)

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **>Year 3 post finalisation**: Decommission silt-ponds, if necessary.

8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning. This is updated every year - for more information see the BnM Annual Report (BnM, 2025).

BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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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 has been 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.
- Monitoring results will be maintained, trended 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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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 BnM 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.

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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 have 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.

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APPENDIX I. BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow catchment, and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and Timahoe South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied an old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly, via the BnM industrial railway. Many bogs were in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long-term peat extraction activity reduced the peat depth on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen-Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Lullymore in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Lullybeg by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 and 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow piped outfall. Some cutaway bog at Lullymore, used as spread grounds for sod peat up until recently, was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly Conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries, Edenderry SAC (site code: 000925) is located in the Lullymore Bog sub-group. Glashabaun Bog (northern sub section) overlaps the SAC and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is an esker and BnM used the site in the past to extract gravel for the construction of railway embankments across BnM bogs. Rare plants including Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations.

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation is ongoing.

A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC Licence Ref. P0503-01, and current, indicative peat production status, is outlined in Table Ap-1.

Table Ap-1 Allen-Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since 1950s Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Glashabaun South	569	Peat extraction since 1950s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss *Sphagnum* inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023
Lullybeg	271	Peat extraction since the 1930's. Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2004	Draft 2026
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group - amenity	1992	Draft 2026
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019 Majority of bog still has relatively deep peat	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production. Cloncannon bog remnant – zoned for biodiversity	2019	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Mostly bare peat. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.		
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection	N/A	N/A
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab Complete

See Drawing number *BNM-ECO-26-14-24: Bog Group Map*, included in the accompanying Mapbook which illustrates the location of Barnaran Bog and the Allen-Lullymore Bog Group in context to the surrounding area

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Barnaran**	**Area (ha):**	440ha of total 4,725 ha
Works Name:	Ballydermot	**County:**	Kildare
Recorder(s):	MMC & DF	**Survey Date(s):**	05/09/2011, 2015

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff)
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway.)
- Pioneer calcareous grassland (gCal) (developing on old track)
- Purple Moorgrass-dominated grassland (gMol) (developing on margins of site).
- Gorse scrub (eGor) (developing on margins of site).
- Access routes (railways and paved tracks and associated verges)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated.) (Codes refer to Heritage Council habitat classification, Fossitt 2000, See Appendix II.)
- Bare peat
- Rank dry meadow-type grassland (GS2) (found at southern margin).
- Raised bog (PB1) (dried remnant being invaded by scrub)
- Cutover bog (PB4) (small area formerly used to harvest peat).

Description of site

This sub-site is part of Ballydermot Bog and is located in west Kildare 6 km west of Allenwood, to the south of a mineral island that stands out amongst the surrounding bogs. The site is located to the south of a mineral island that stands out amongst the surrounding bogs. A road runs from the heritage centre to the mineral island forming the northern boundary of this sub-section of bog. A section of the R414 runs through the site to the east, agricultural land forms a boundary along the majority of the site and a BnM track forms the western boundary of the site.

Overall, the topography of the site is flat, comprising primarily areas of cutaway of varying ages. Occasional high fields or riparian strips are present that are mostly vegetated with open Birch scrub. This sub-section is dry for the most part with only one wet area contained within it.

A significant area of relatively mature cutaway is located to the north west of the site, which is dominated by tall Birch scrub (cBir and oBir). This area is dominated by a mix of open and closed Birch with a maximum height of 12m. Other sections of younger cutaway are also present within this area contain a mix of poor fen vegetation (mainly Soft Rush with occasional Bog Cotton) and pioneer scrub (eBir) occasional small gravel hills were also scattered throughout these areas and were vegetated with vegetation such as Sweet Vernal Grass, Colts Foot, Yorkshire Fog, Birch seedlings and Creeping Bent Grass (gCal and DisCf). The scrub areas are species poor and are mostly Birch with small amounts of Willow. The shrub layer under the Birch contains Bramble, Ivy, Purple Moor Grass and Broad Buckler Fern. To the west of this area a small area of degraded

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raised bog was located, this area consisted of a mixture of Gorse and Birch scrub, bare peat and dry heather dominated vegetation. Sod peat harvesting had been carried out in this area in recent years.

A small area of pioneer poor fen has been developing along the mid-eastern boundary. This area consisted of Bottle Sedge, Soft Rush and bare peat.

The southern boundary of the site was mixture of Birch woodland and remnant sections of raised bog. The sections of raised bog were dry and degraded and were becoming colonised by Scot's Pine and Birch trees. The Birch woodland was mature and consisted of Birch, Willow, Scot's Pine and Oak with an under storey of Bramble.

The north western corner of the sub-section, to the north of the railway line, has been out of production for a number of years (>20) and was mostly comprised of closed Birch Scrub with some narrow stretches of dry heather dominated vegetation that had developed on old stock piles.

The railway that crosses this sub-section contained a large area (approximately 10m either side of the track) of dry grassland (gCal). This area of grassland was species rich and including Glaucous Sedge, Knapweed, Ox-eye Daisy, Wild Carrot, Cocksfoot, Yarrow, False Oat-grass, and Purple Moor-grass. Occasional Birch trees were also establishing. Peacock, Common Blue and Large Heath butterflies were observed in this area of the site. The railway line contained several Basil Thyme plants growing along its route.

A large section of mature Birch woodland is located in the north-eastern corner of the site. This woodland (WN7) was dominated by Birch but also contained significant amounts of Sitka Spruce. This area may have been a conifer plantation at one stage but is now completely dominated by Birch with an under storey of Bramble.

At several locations around this sub-section previous excavations along drains showed that sand and gravel underlies this area.

Basil Thyme

Basil Thyme is a rare plant that is typically found on esker and arable habitats, on sandy and gravel soils. Its distribution is midlands-based. It has only been recorded in 18 10 km gird squares in Ireland in the past 20 years. It is listed as 'Near Threatened' on Irelands Red List (Wyse Jackson et al., 2016).

Basil Thyme was noted along the railway embankment at several locations and seemed to have a widespread distribution over 300 m of railway track, although there were large sections of the track where it was absent. The overall population was estimated at 150-200 plants.

Basil Thyme has not been recorded at this site before and would not be a typical species of cutaway bog. This species was probably unlikely to have been present on the site prior to the development of the cutaway. The exposed gravel along the railway embankments is a perfect habitat for this species. One of its main known populations in Co. Offaly is located close by at the Long Derries cSAC, Edenderry. This site was a BnM gravel pit and material from this site was used to make railway embankments. The spread of Basil Thyme from the Long Derries along the BnM railway network has been recorded in the past (Feehan pers. comm. 2011).

In the long-term, it could be expected that these railway embankments will re-vegetate with grassland and scrub as they go out of use, which will not favour this species. Occasional track maintenance is likely to be beneficial for this species as it will keep the gravel embankments exposed and prevent development of dense vegetation, which would be unsuitable for this species. Other BnM operations are not likely to have a significant impact on the status of this species. A suitable management regime to maintain the habitat of these rare plant species could easily be developed in association with the development and maintenance of these walkways. This will be considered within the wider context of the Derrygreenagh and Ballydermot Bogs, which are viewed as strongholds for the species in east Offaly. Consultation and licensing will be required with NPWS.

Forestry and potential forestry on site

There is no forestry within this sub-section of the site, however forestry may be an option for some sections of the site.

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

None

Adjacent habitats and land-use

- Improved grassland (GA1) used by grazing livestock (on mineral soil);
- Wet grassland (GS4) (on bog margin)
- Tillage (BC1) (on mineral soil);
- Cutover bog (PB4)

Watercourses (major water features on/off site)

- The Crabtree River flows along the north western boundary of this sub-section of the site.
- The Slate River flows past the eastern boundary of the site.

Peat type and sub-soils

Sand and gravel appear to form the sub-soils in this sub-section.

Fauna biodiversity

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

- Green Shank (1) in the silt ponds to the west of the sub-section.
- Kestrel.
- Snipe
- Pied Wagtail (15) in a flock along the southern edge of the site.
- Other more common birds included Blackbird, Rook, Magpie, Grey Crow, Wren, Robin and Swallow.

Mammals

- Fox
- Badger

Other

- Meadow Brown, Peacock, Common Blue and Small Heath butterflies were observed.

Fungal biodiversity

Brown Birch Bolete and *Lactarius* sp.

Activities on the site

Activities on the site include:

- Turf cutting along the edges at some locations.
- Grazing is practiced on some of the wet grassland areas along the edge of this sub-section.

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References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

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

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. 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 spread and 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

In addition to the above, best 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 V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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 Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2026-2030

The All-Ireland Pollinator Plan 2026-2030 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

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11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2020, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM lands. The Bord na Móna

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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 BnM'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.

14 BnM commitments

BnM 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.

In line with BnM'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 2026. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2026. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. 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.

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APPENDIX VI. 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 BnM 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, stockpile covering, pumps, septic tanks and fuel tanks.

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

Item	Description	Barnaran Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Not relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

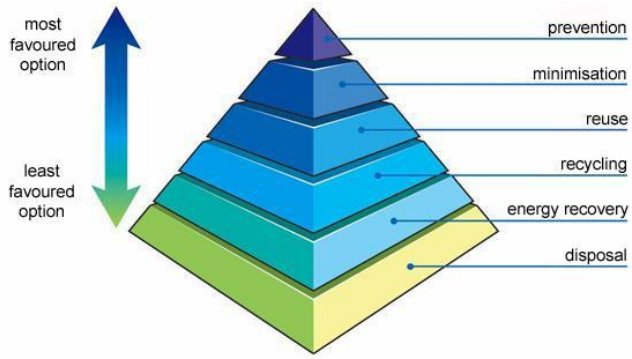
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 cutover 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

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

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER, 2004).

Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, BnM 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 acrotelm – 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 BnM 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.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

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 IPC Licence Ref. P0503-01, Allen-Lullymore bog group.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.
- 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.

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- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.
- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

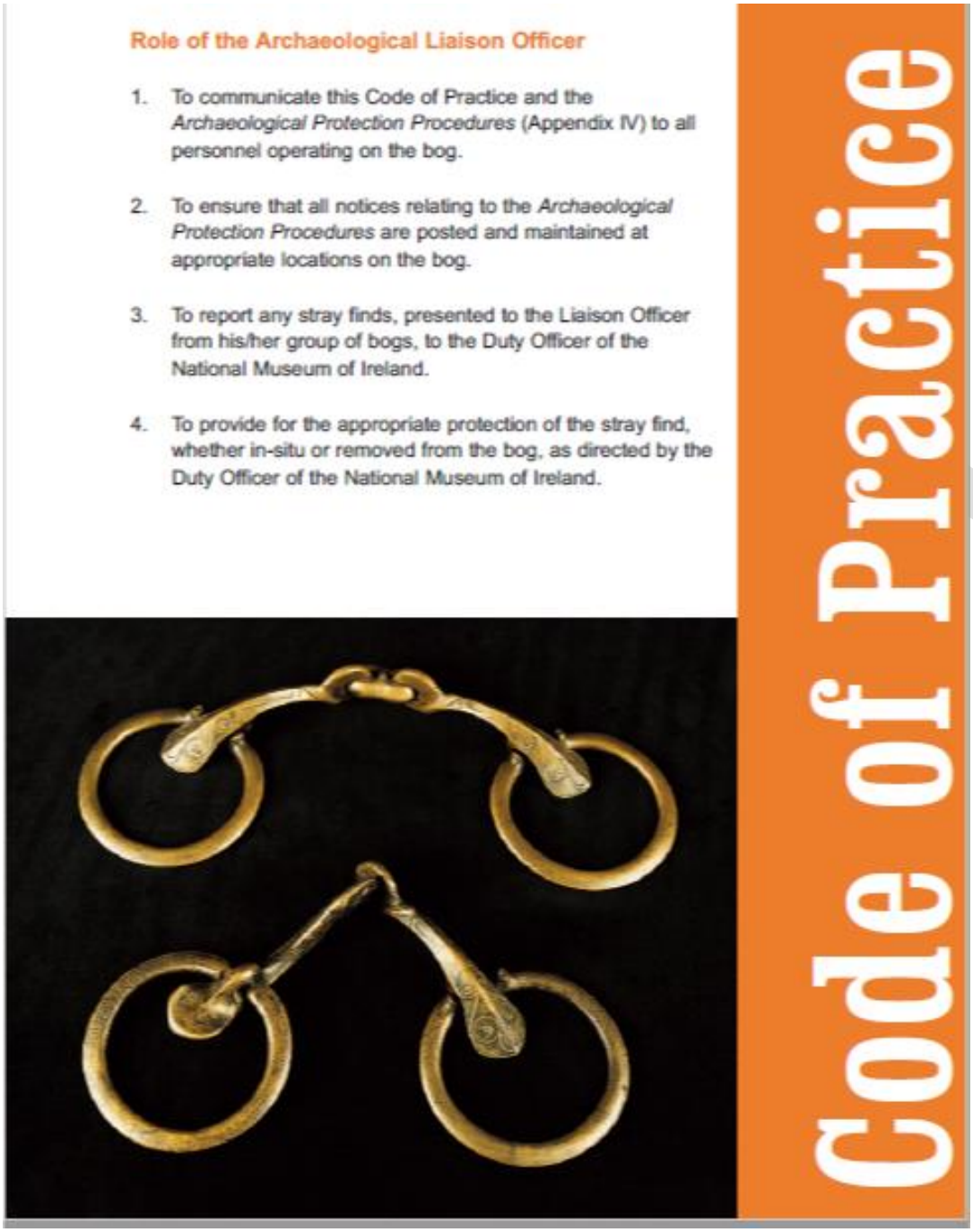
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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- 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/resources/faqs/environment--you/faq-listing/ 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 X. 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.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Barnaran Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet	
Document Name:	Barnaran Bog Rehab Plan GIS Map Book 2026
Document File Path:	
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This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
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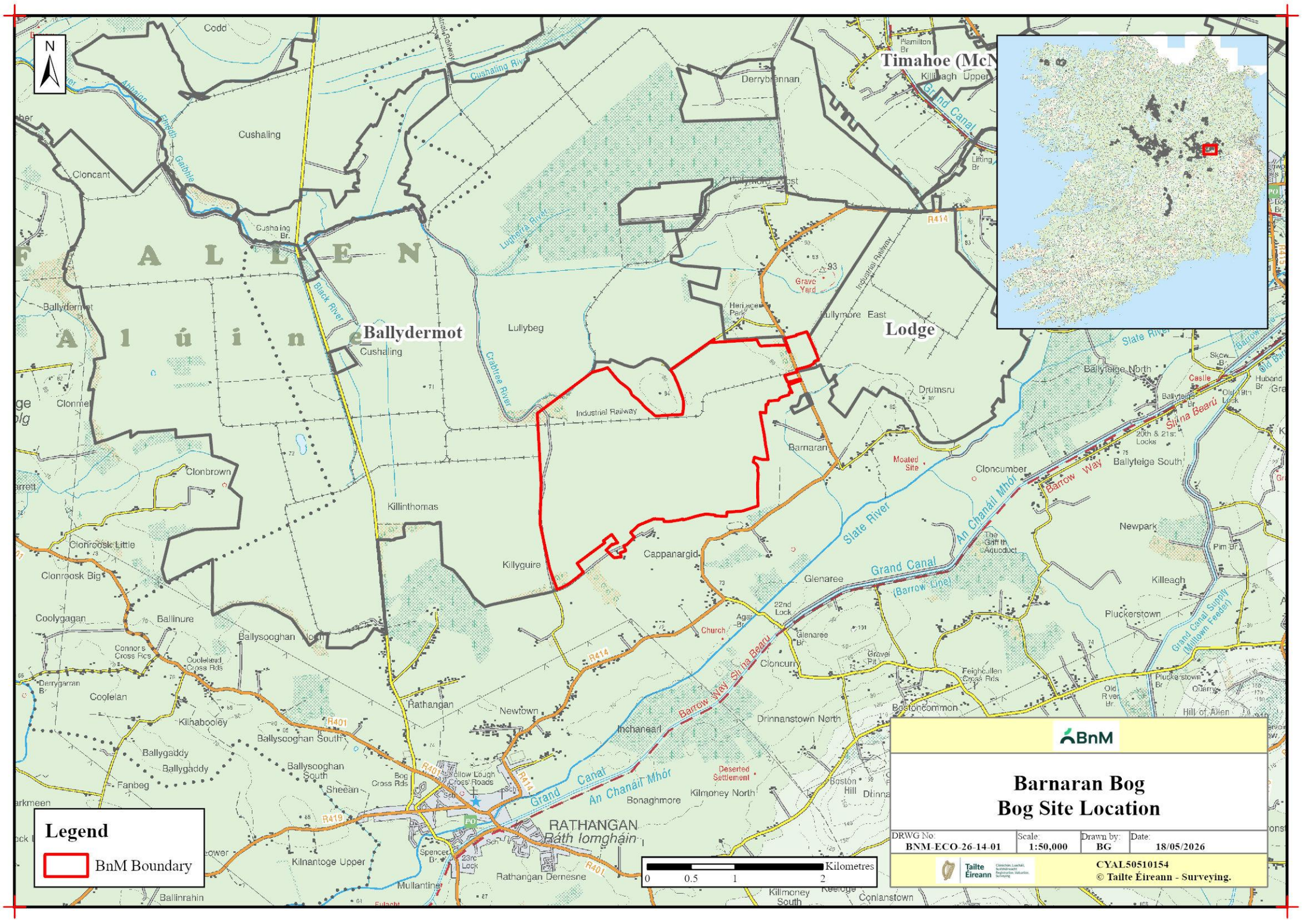
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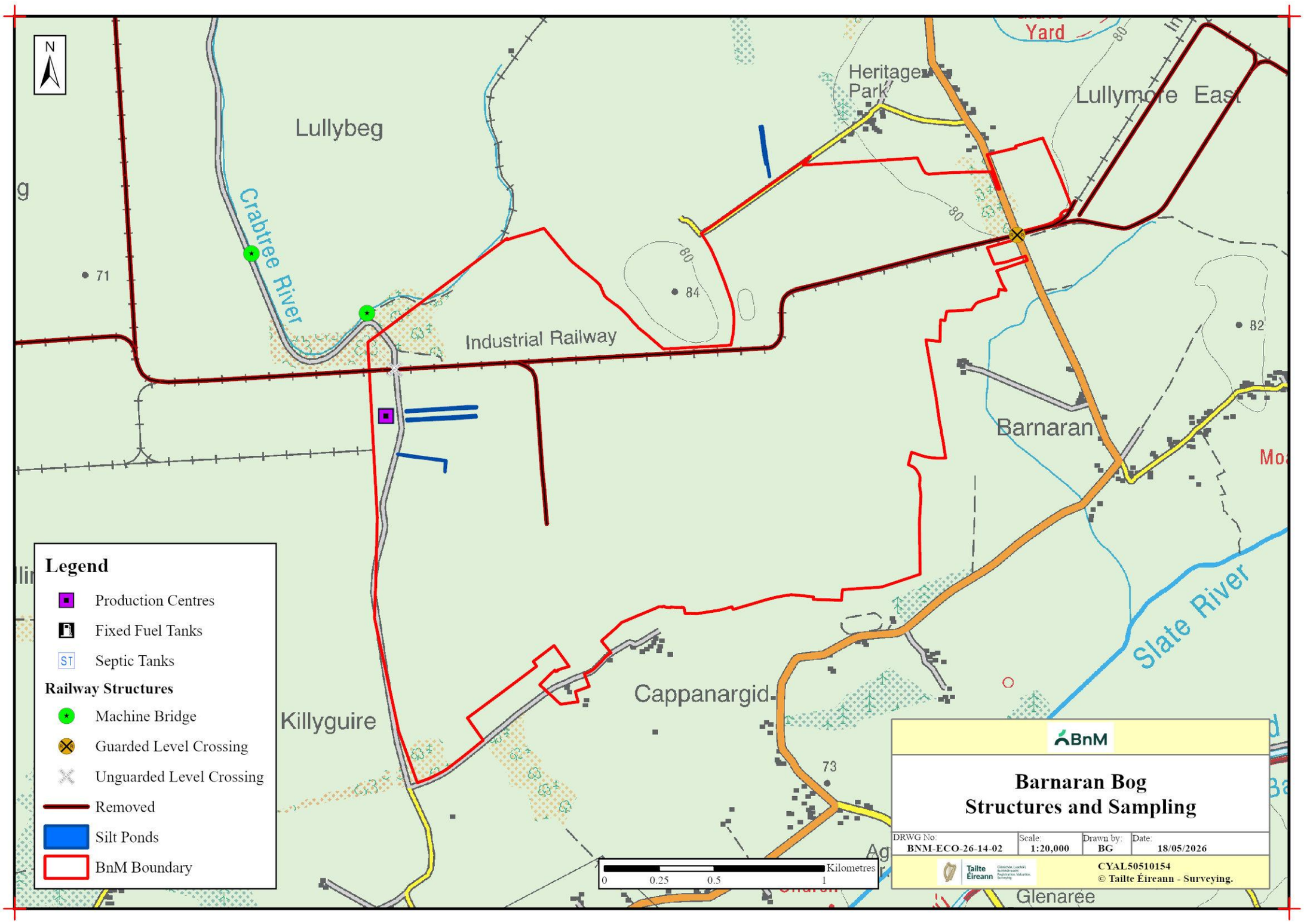
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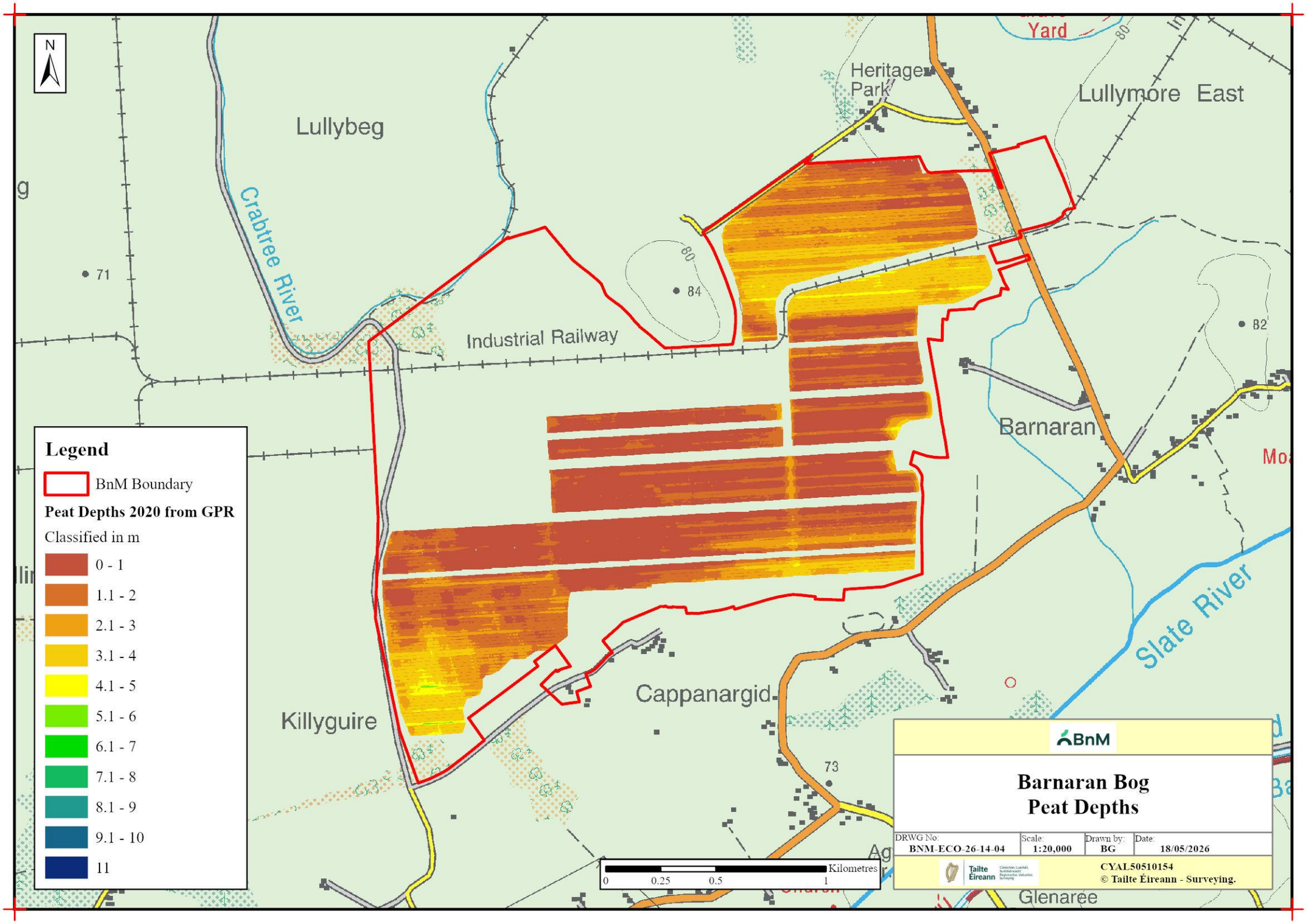
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N
Lullybeg
Crabtree River
Industrial Railway
Heritage Park
Yard
Lullymore East
Barnaran
Cappanargid
Killyguire
Slate River
Glenaree
71
84
82
73
80
Legend
Production Centres
Fixed Fuel Tanks
ST
Septic Tanks
Railway Structures
Machine Bridge
Guarded Level Crossing
Unguarded Level Crossing
Removed
Silt Ponds
BnM Boundary
0
0.25
0.5
1
Kilometres
BnM
Barnaran Bog
Structures and Sampling
DRWG No: BNM-ECO-26-14-02
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Date: 18/05/2026
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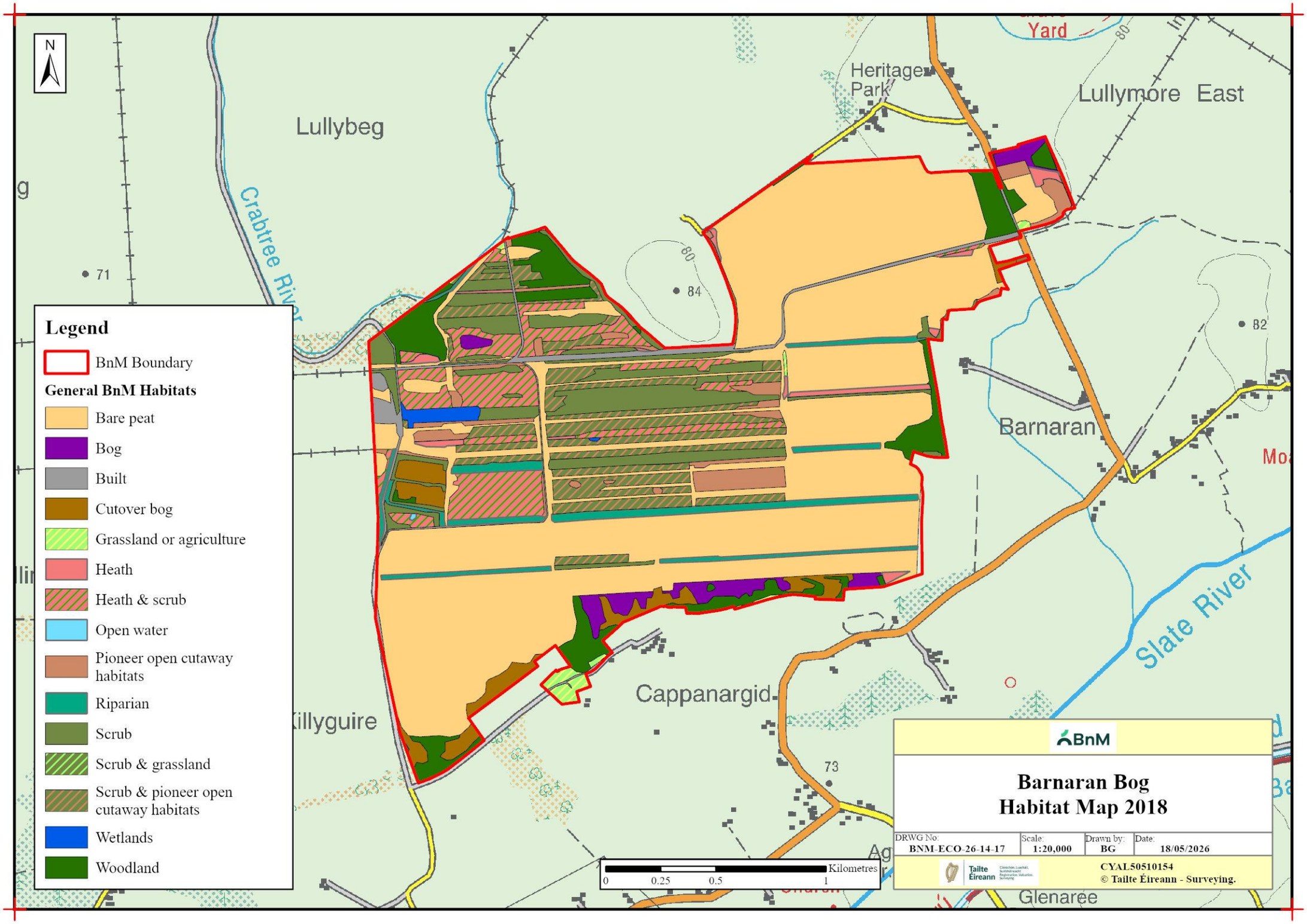
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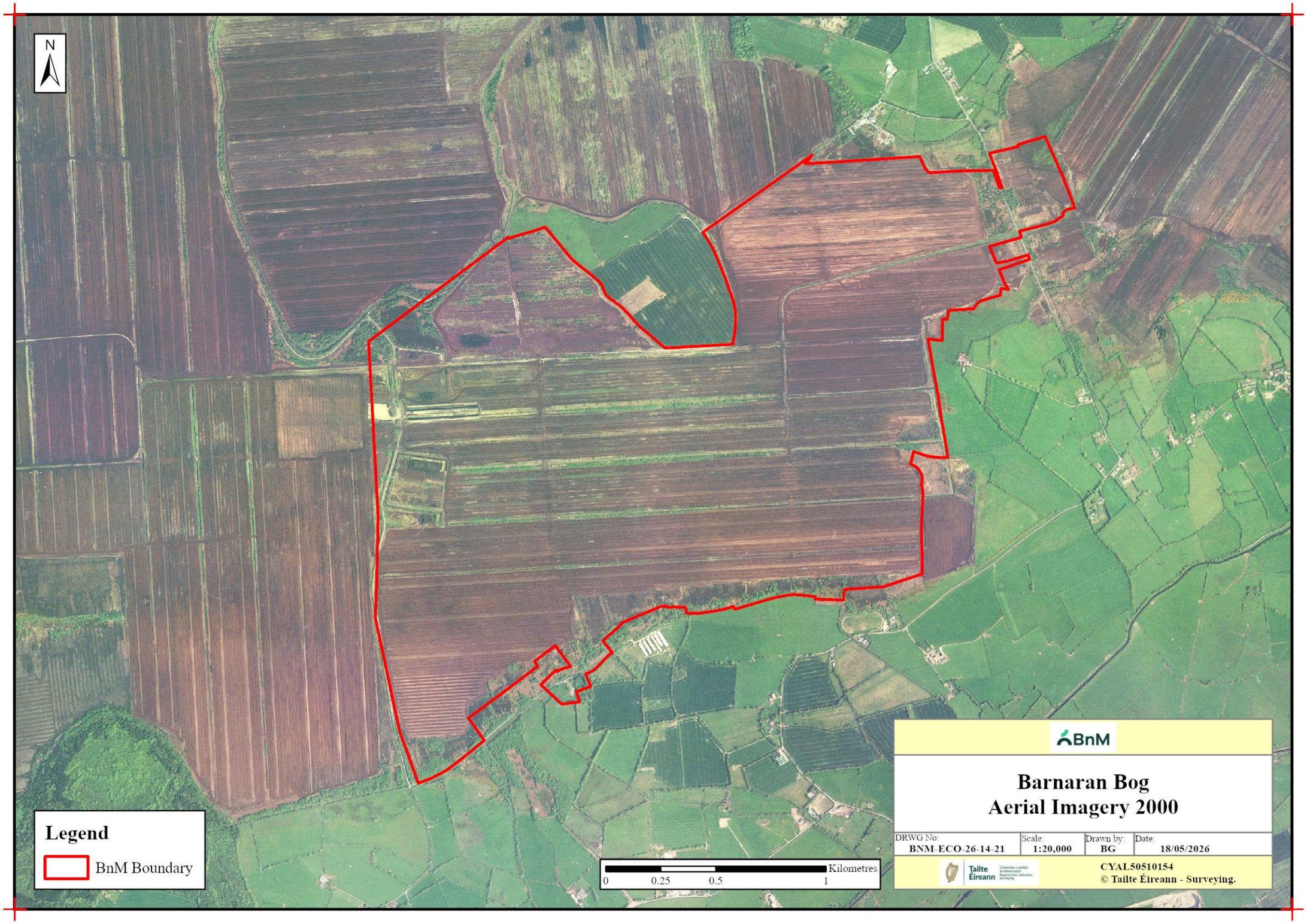
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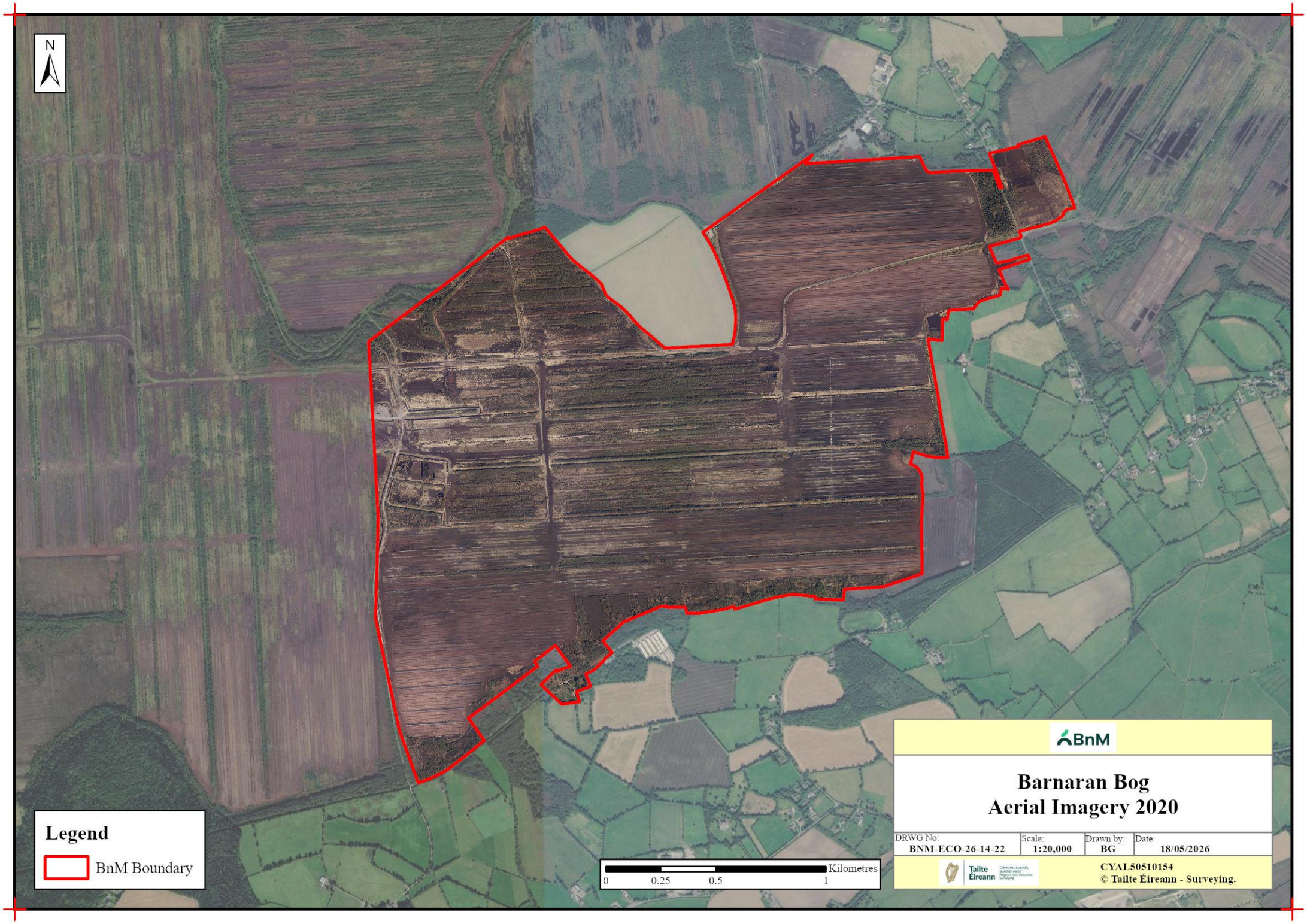
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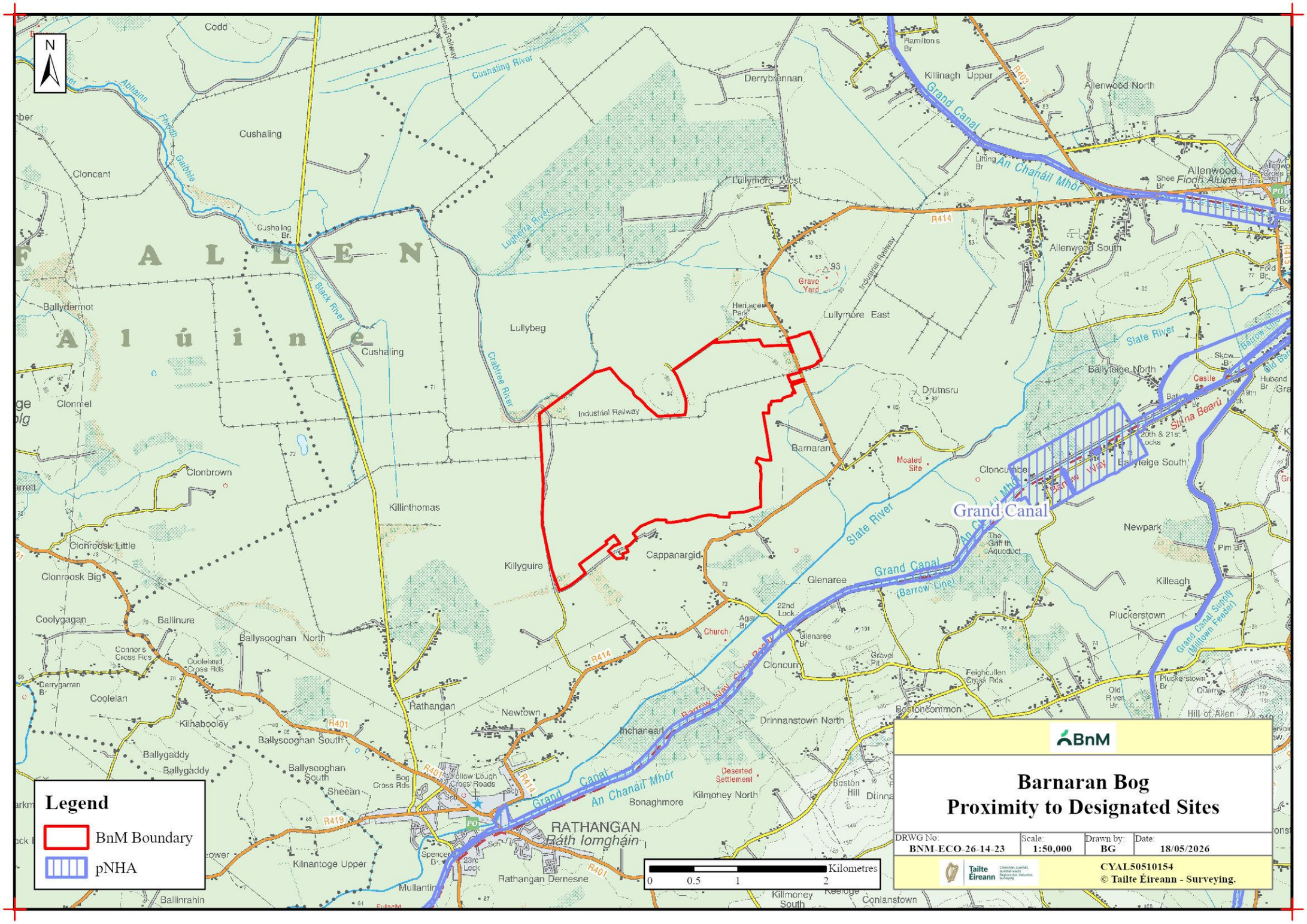
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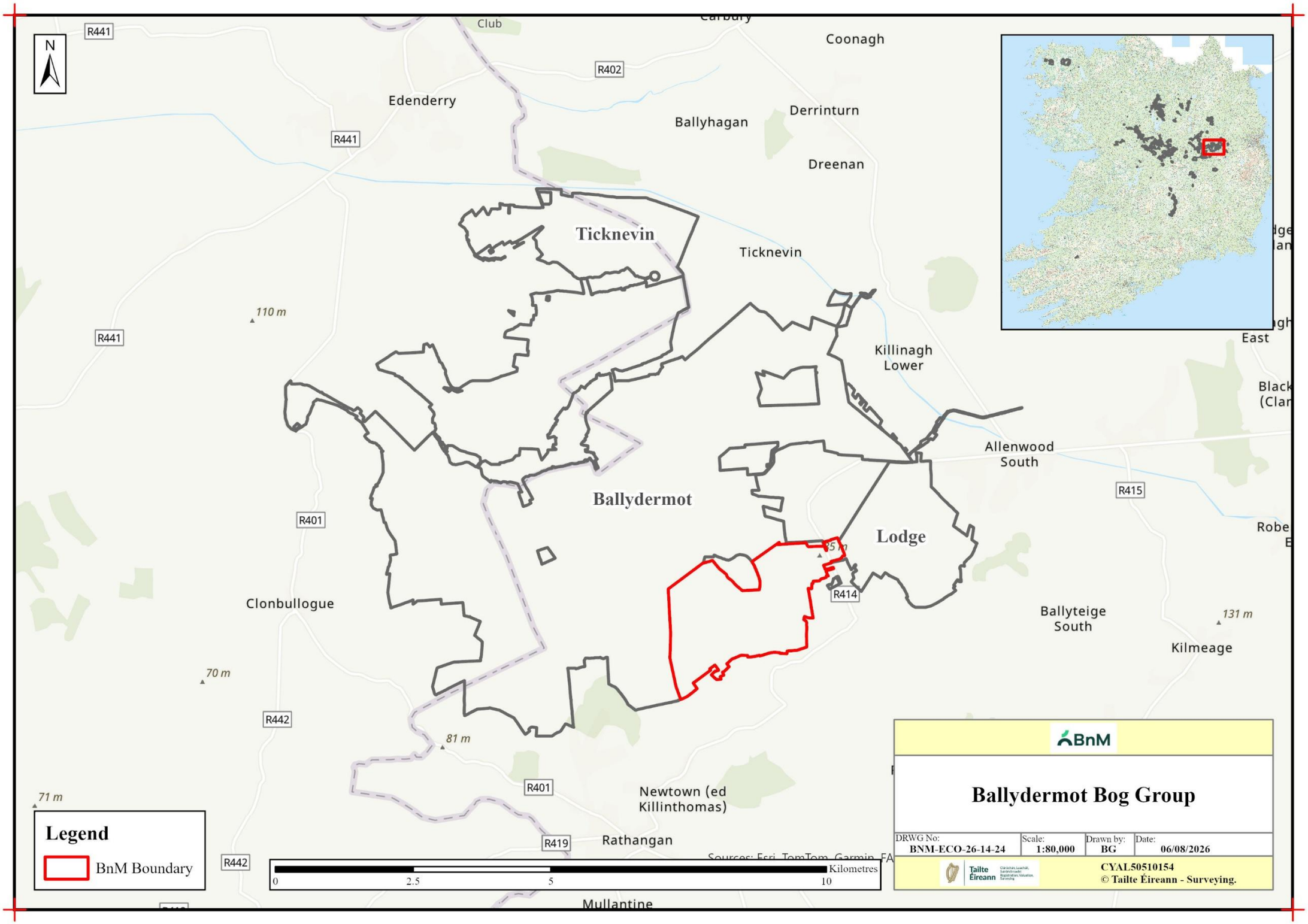
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BNM-ECO-26-14-24: Bog Group Map

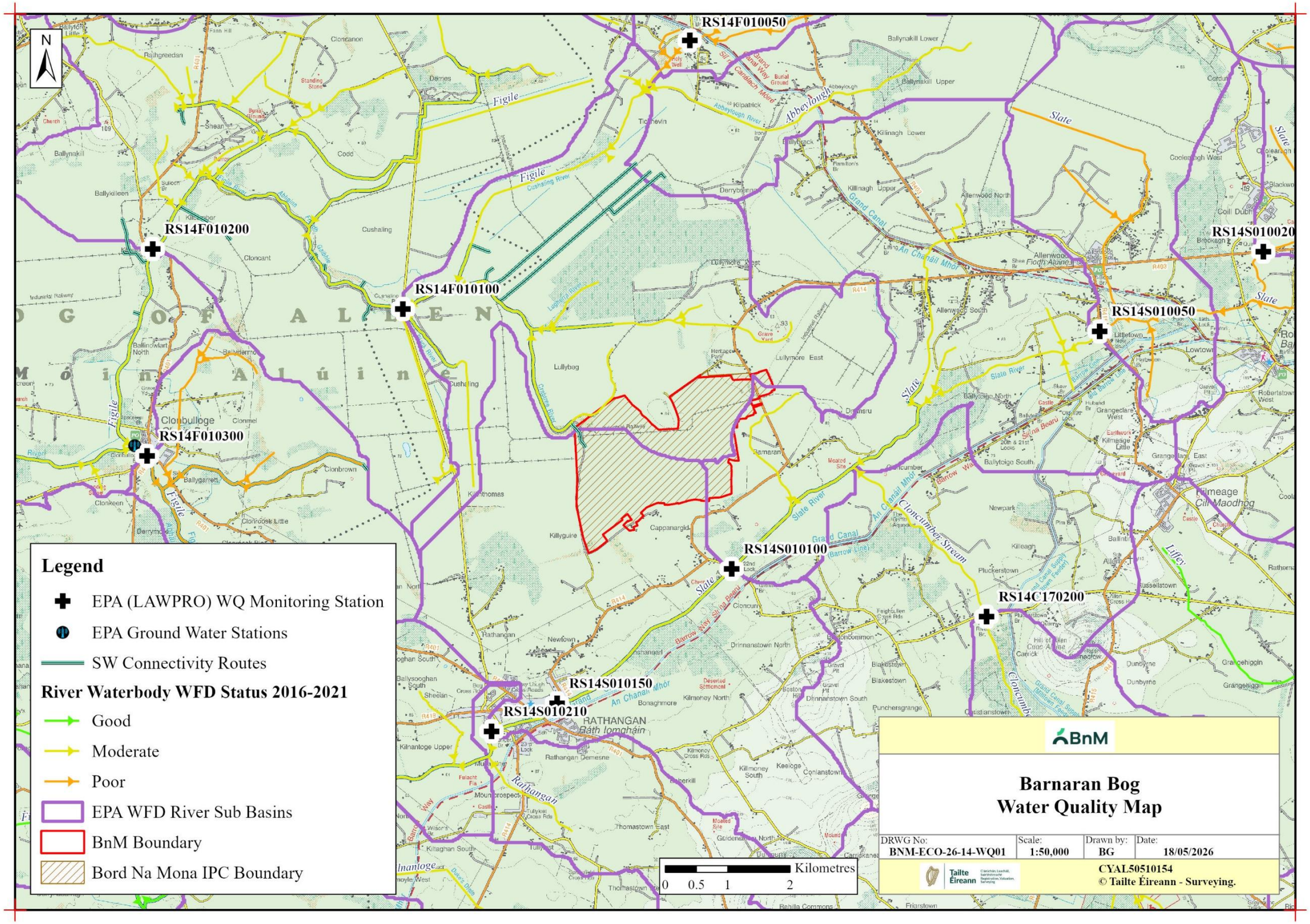
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Hydrology / Topography Maps

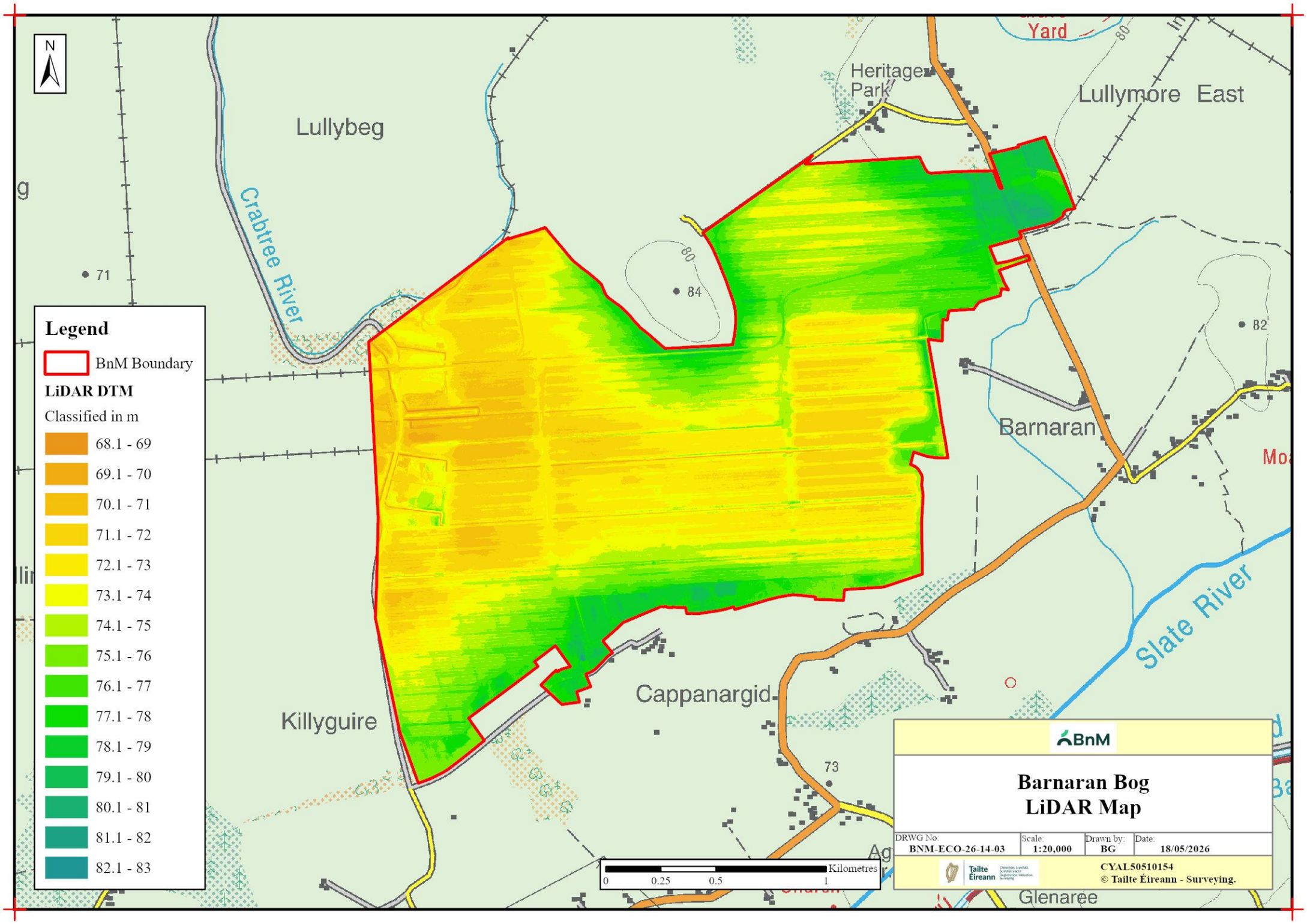
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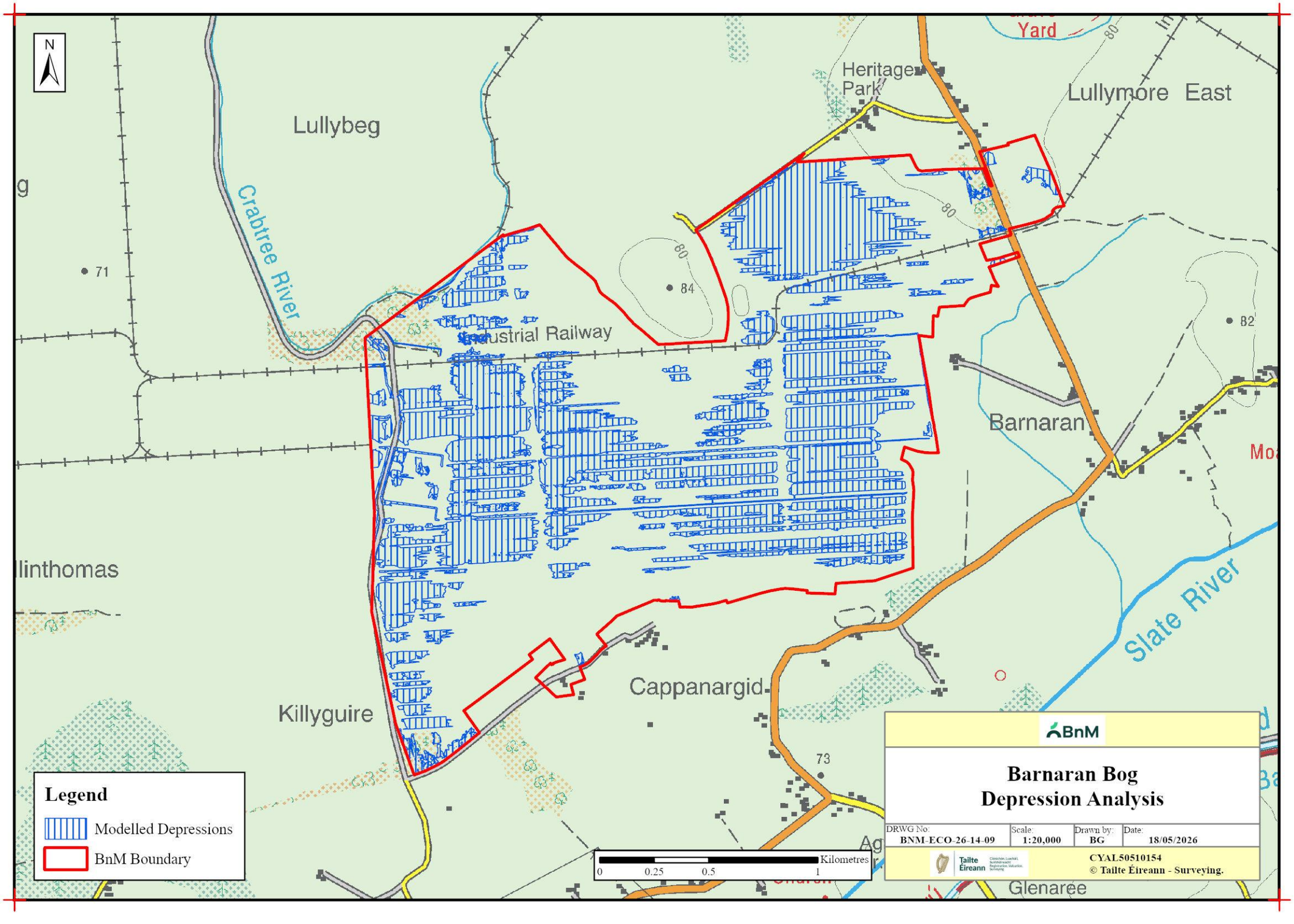
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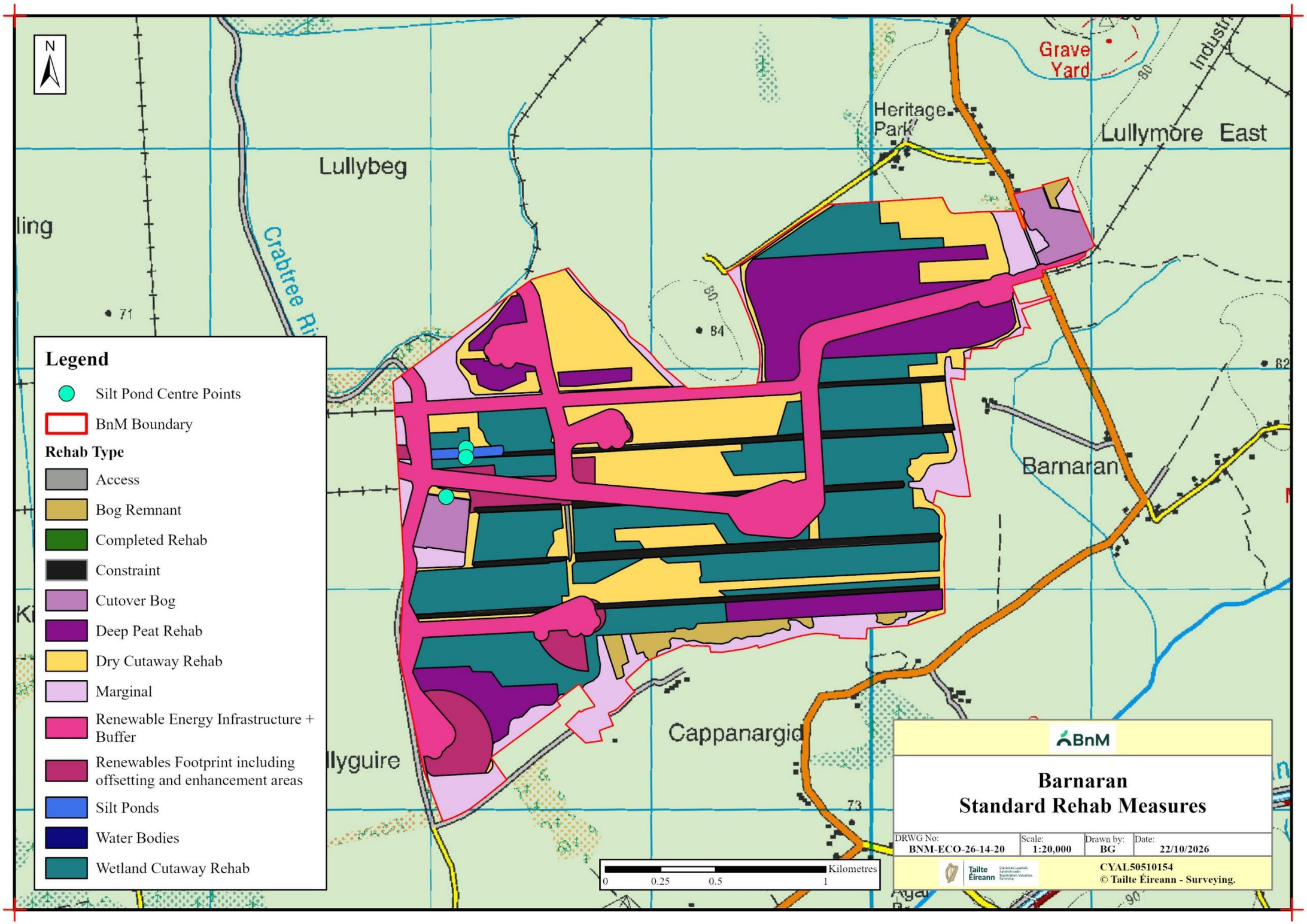
BNM-ECO-26-14-03: LiDAR Map

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Lullybeg
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Heritage Park
Yard
Lullymore East
Barnaran
Industrial Railway
Cappanargid
Killyguire
Slate River
Glenaree
71
84
82
73
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Kilometres
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0.25
0.5
1
Legend
Modelled Depressions
BnM Boundary
BnM
Barnaran Bog
Depression Analysis
DRWG No: BNM-ECO-26-14-09
Scale: 1:20,000
Drawn by: BG
Date: 18/05/2026
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Rehabilitation Maps


N
Lullybeg
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ling
71
84
80
82
73
Grave Yard
Heritage Park
Lullymore East
Barnaran
Cappanargid
llyguire
Legend
Silt Pond Centre Points
BnM Boundary
Rehab Type
Access
Bog Remnant
Completed Rehab
Constraint
Cutover Bog
Deep Peat Rehab
Dry Cutaway Rehab
Marginal
Renewable Energy Infrastructure + Buffer
Renewables Footprint including offsetting and enhancement areas
Silt Ponds
Water Bodies
Wetland Cutaway Rehab
0 0.25 0.5 1 Kilometres
BnM
Barnaran
Standard Rehab Measures
DRWG No: BNM-ECO-26-14-20
Scale: 1:20,000
Drawn by: BG
Date: 22/10/2026
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Blackriver Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

Draft

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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 BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Blackriver Bog upon cessation of peat production and complements 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 Blackriver Bog.

BnM have defined the key rehabilitation outcome at Blackriver Bog as environmental stabilisation.

*This rehabilitation plan for Blackriver Bog has been updated but not fully finalised. As such it remains a **draft** rehabilitation plan until it is fully finalised. BnM expect to finalise this rehabilitation plan in the future as part of its overall peatland rehabilitation programme.*

Any consideration of any other future after-uses for Blackriver Bog 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.

BnM are planning to develop a potential renewable energy project at Blackriver Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

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Name(s):		PE	MMC	
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Non-technical summary

- BnM (formerly Bord na Móna) is planning to rehabilitate Blackriver Bog, a sub-section of a larger unit called Ballydermot Bog located in Co. Kildare, approximately 6km to the south-east of Edenderry and on the Offaly – Kildare boundary.
- Blackriver is part of the Allen - Lullymore bog group.
- Blackriver Bog was in industrial peat production since before 1975 and supplied turf for fuel and energy and latterly milled peat for electricity production. BnM Industrial peat harvesting has now fully ceased at Blackriver Bog as of 2020. The majority of the bog is now developing pioneer and maturing habitats.
- BnM are planning to develop a potential renewable energy project at Blackriver Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing vegetation and promoting re-establishment of more typical cutaway peatland communities such as Birch woodland, Reedbeds, fen habitat and *Sphagnum*-rich embryonic bog communities.
- It will take some time for vegetation and habitats to fully develop at Blackriver, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- Blackriver Bog has a partially pumped drainage system and has a typical basin type topography. This means that wetland habitats are likely to develop across the site. Areas with deeper residual peat have the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog 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.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats, like poor fen and *Sphagnum* rich embryonic bog communities will develop on deeper peat, and wetlands with reedbeds and birch woodland will develop on shallower peat. In time a naturalised peatland can be developed.
- It will take some time for vegetation and habitats to fully develop at Blackriver Bog, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- The development of a range of habitats at Blackriver Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape.
- This peatland rehabilitation plan does not outline future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed

development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM operates under an IPC Licence issued and administered by the EPA to extract peat within the Allen bog group (Ref. P0503-01). 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 Allen Bog Group comprises 2 main sub-groups: Allen-Clonsast and Allen-Lullymore. Blackriver is located within the Allen-Lullymore bog group. Further details on the bogs within the Allen-Lullymore bog group are outlined in Appendix I.

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Blackriver Bog, and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are **NOT** proposed as part of this draft Blackriver rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Blackriver will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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 document covers the area of **Blackriver Bog.** Parts of Blackriver Bog around the margins of the site are currently being used by domestic turf cutters who have turbary rights. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting and turbary issues on Blackriver Bog. Nevertheless, BnM 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.

There are known rights of way around the margins of Blackriver Bog. Where a public right of way or similar burden exists on BnM 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.

BnM are planning to develop a potential renewable energy project at Blackriver Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). This proposed wind farm project is located within Blackriver Bog as well as the adjacent BnM bogs of Ballydermot, Barnaran, Codd, Derrybrennnan, Glashabaun, Killinagh, Lodge, Lullybeg, Lullymore and Ticknevin. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm has been taken into account in the preparation of this Rehabilitation Plan. Where proposed wind farm infrastructure overlaps with areas identified for rehabilitation, the timing and sequencing of rehabilitation measures will be coordinated with the proposed development. Accordingly, these areas are treated as a temporal consideration in relation to the implementation of rehabilitation measures.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Blackriver Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Blackriver Bog 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 or issues such as ecological restriction zones.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA – '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan*' (EPA, 2020).

The ecological information and general information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2011 to 2026 inclusive) and monitoring and desktop analysis, form the basis for the development of this rehabilitation plan for the bog along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the BnM 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022;
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling

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.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
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- 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.
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- 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.
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- 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, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- 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 2022-2027;
- BnM Annual Report 2025;
- 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 BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Blackriver Bog was surveyed in 2011. Habitat maps were updated in 2017. Additional ecological walkover surveys and visits have taken place in between 2017-2025, in advance of the preparation of this rehabilitation plan. 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 (2019), while mosses and liverworts nomenclature follows identification keys published by Atherton *et al*. (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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3. SITE DESCRIPTION

Blackriver Bog is located in west Kildare approximately 4 kilometres to the north of Rathangan. The Offaly/Kildare County boundary occurs along its northern margins. Blackriver bog is a sub-section of a larger unit called Ballydermot Bog and is located in west Kildare/Offaly between Rathangan and Edenderry. Blackriver bog is located towards the centre of Ballydermot and is situated along the east side of the Rathangan-Edenderry Road (L3001).

The majority of Blackriver bog was in milled peat production from before 1975 until 2020. The bog has a partially pumped drainage regime; a single pump was installed within the centre of the bog to help with the drainage of the site. It is drained by several large deep drains orientated north-south lined with scrub that separate a series of fields.

There are several sections of remnant high bog (PB1) around the western and northern margins of the site. These have generally been cut for sod peat and are privately managed. Ownership of these areas is currently being reviewed. The high bog along the northern margin is generally degraded by drainage and dominated by heather.

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland and other bogs in the wider Ballydermot Bog which are owned and managed by BnM.

See Drawing number *BNM-ECO-26-14-01: Site Location Map*, included in the accompanying Mapbook[1] , which illustrates the location of Blackriver Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Blackriver Bog was originally a sod production bog that was subsequently converted to a milled peat production bog and was used to supply fuel to Edenderry Power Station. Blackriver was in production from before 1975 until 2020. At the time of cessation of industrial peat production, the majority of the site comprised bare peat.

A BnM industrial railway network occurred through the centre of the site, east west direction and within the eastern part of the north section of Blackriver Bog and provided a link to Edenderry Power Station. This railway has been decommissioned.

3.1.2 Current land-use

All industrial peat production at Blackriver Bog ceased as of 2020. It is noted that there is some private sod-peat production around the margins of the high bog, both inside and outside the ownership of BnM.

There are several relatively large sections of remnant raised bog along the western and northern margins of Blackriver bog. The majority are degraded and have been cut privately for sod peat over the years, but they all still retain some typical raised bog characteristics.

There was hydrological management via pumping to support the former industrial peat production and its infrastructure. Pumping is ongoing during the decommissioning phase.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Blackriver Bog Map Book

BnM are planning to develop a potential renewable energy project at Blackriver Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project is located within Blackriver Bog as well as the adjacent BnM bogs. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm infrastructure **partially** overlaps with Blackriver Bog (see drawing number BNM-ECO-26-14-20: Standard Rehab Measures); these (infrastructure) areas have been treated as a constraint in the rehabilitation plan.

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

  a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

  b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

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xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

xxv. All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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 in these areas 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.

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supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

In respect of Blackriver Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPS).

As the primary employer in many Midland counties, BnM 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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying bedrock geology[2] at Blackriver Bog comprises primarily Ballyadams Formation (crinoidal wackestone/packstone limestone) across the central section of the bog, with the northwestern section underlain by Lucan Formation (dark limestone & shale (`calp)) and the southeastern corner underlain by Allenwood Formation (thick-bedded limestone, locally peloidal).

Quaternary sediment maps indicate that Blackriver is underlain by cutover peat, with pockets of till derived chiefly from limestone occurring in the wider area outside of the bog margins.

3.2.2 *Peat type and depths*

Much of Blackriver Bog is now cutaway, and the majority of the original raised bog has been removed. Blackriver is considered to be a shallow peat cutover bog, and in general between 0.5m - 1.5m of residual fen or minerotrophic peat remains. There are also some areas with peat of deeper than 2 m, most notably within the southern portion of the site.

3.3 Key Biodiversity Features of Interest

The different cutaway habitats developing across the bog reflect the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All sites have hydrological gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and ground-water has a stronger influence.

The majority of Blackriver Bog comprises pioneer vegetation and bare peat mosaics. More established areas are developing a mosaic of typical cutaway peatland habitats and some mature scrub habitats. Some of these areas contain developing wetlands. Areas that have more recently come out of industrial peat production (in 2020) are dominated by bare peat and are beginning to develop pioneer vegetation.

Pioneer habitats have developed across the former production area and include pioneer poor fen communities dominated by Soft Rush (*Juncus effusus*), Common Cottongrass (*Eriophorum angustifolium*) and Marsh Arrowgrass (*Triglochin palustris*). There has been minor development of wetland cutaway communities including

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

Carex rostrata community (pRos), *Phragmites australis* community (pPhrag). Birch scrub (oBir) with Purple Moorgrass (*Molinia caerulea*) dominated grassland and dry Heather (*Calluna vulgaris*) dominated vegetation has developed in drier parts of the former production area. There are also several patches of more established Birch scrub/woodland.

Some of the marginal habitats are relatively well developed and diverse. Mature Birch woodland is found along the southern margins of the bog, adjacent to Kilmacthomas Wood, and has developed over the old face-back on deep peat. This zone has been colonised by mature Downy Birch (*Betula pubescens*), Scot's Pine (*Pinus sylvestris*), Oak (*Quercus petraea*), Rowan (*Sorbus aucuparia*), Guelder Rose (*Viburnum opulus*) and Holly (*Ilex aquifolium*). Alder Buckthorn (*Frangula alnus*) is also present. The ground cover is dominated by Heather (*Calluna vulgaris*) and Bilberry (*Vaccinium myrtillus*), Purple Moorgrass and Bracken (*Pteridium aquilinum*) are also present. Some hummocks of *Sphagnum* are present.

Diverse scrub and woodland are also found along the Crabtree River. This woodland and scrub are generally dominated by Birch and can be considered Birch woodland but there are patches with elements of Oak-Ash-Hazel woodland (WN2). Species such as Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) thickets, Purging Buckthorn (*Rhamnus cathartica*), Alder Buckthorn, Spindle (*Euonymus europaeus*) and Guelder Rose are found along the margins of the river and the woodland/access track through this area. Some of these more calcareous-loving species have developed on spoil taken from silt ponds that have been developed in this area of woodland.

There are several sections of remnant high bog (PB1) around the margins of the bog. These bog remnants are generally being cut for sod peat. The high bog along the northern margin is generally degraded by drainage, although there is *Sphagnum cuspidatum* within the drains. The majority of the high bog is sub-marginal ecotope in quality. There has been some subsidence towards the southern boundary adjacent to the former production area and this zone is dominated by Heather (marginal ecotope). There are several smaller patches of high bog with much higher *Sphagnum* cover (50%) that have been influenced by surface water drainage on the bog. High bog at the south-western end of the site has also been heavily drained. Some of this high bog may have regenerated after commercial sod peat production. Birch woodland (WN7) has developed along the margins of this section (adjacent to the road) and is spreading slowly over the bog.

The former railway track gravel beds support populations of Basil Thyme (*Clinopodium acinos*) and Blue Fleabane. Both species are nationally rare plant species, and Basil Thyme is also listed as Near Threatened in the Irelands Red List (Wyse-Jackson et al., 2016). Several populations are present on railway tracks throughout Blackriver or on areas of exposed gravel that are associated with the railway tracks as part of the 'weed' or recolonising flora. These species are not typical bog species and are likely to have come on to the former production bog from nearby eskers or gravel pits. The presence of these species enhances the rare flora resource of Co. Kildare.

3.3.1 Current habitats

The most common habitats[3] present in the former production areas at Blackriver include:

- Poor fen mosaics including pioneer *Juncus effusus* community (pJeff), pioneer *Triglochin palustris* community (pTrig), pioneer *Eriophorum angustifolium* community (fen) (pEang)

[3] Codes refer BnM classification of pioneer habitats of production bog

- Bare peat (0-50% cover) (BP)
- Scrub and woodland habitats dominated by birch (oBir, cBir, BirWD)
- Minor development of other wetland cutaway communities including *Carex rostrata* community (pRos), *Phragmites australis* community (pPhrag)
- *Calluna* dominated vegetation (PBh)

The most common habitats[4] found around the margins of the site include:

- Bog woodland (WN7)
- Scrub (WS1) (Blackthorn scrub and Birch scrub)
- Raised bog remnants (PB1)
- Cutover bog (PB4)
- Ash-Hazel woodland (WN2) (along Crabtree River)
- Dense Bracken (HD1)
- Improved grassland (GA1) (at northern end)

See Drawing number *BNM-ECO-26-14-17: Habitat Map 2018*, included in the accompanying mapbook, which illustrates the habitats at Blackriver Bog. See Appendix II for more detail on site, habitats and local features.

3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Blackriver Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC).

Multiple mammal species have been recorded on or within 1 Km of the bog including Red Fox (*Vulpes vulpes*), Irish Hare (*Lepus timidus subsp. hibernicus*), Badger (*Meles meles*), Otter (*Lutra lutra*), Pine Marten (*Martes martes*), Red squirrel (*Sciurus vulgaris*) and Pygmy Shrew (*Sorex minutus*).

The former railway track gravel beds support populations of Basil Thyme (*Clinopodium acinos*) and Blue Fleabane (*Erigeron acris*). Both species are nationally rare plant species in Irelands Red List (Wyse Jackson et al., 2016). Several populations are present on railway tracks throughout Blackriver or on areas of exposed gravel that are associated with the railway tracks as part of the 'weed' or recolonising flora. These species are not typical species of cutaway bog, and unlikely to have been present on the site prior to the development of the cutaway and are likely to have come on to the former production bog from nearby eskers or gravel pits. The exposed gravel along the former railway embankments is a perfect habitat for this species.

Alder Buckthorn (*Frangula alnus*) is found along the margins of Blackriver bog. This species is a nationally rare Red List plant species.

In addition, numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Several bird species have been recorded during BnM ecological surveys at Blackriver Bog including, Snipe (*Gallinago gallinago*), Wren (*Troglodytes troglodytes*), Meadow Pipit (*Anthus pratensis*), skylark (*Alauda arvensis*), Swallow (*Hirundo rustica*), Blue Tit (*Cyanistes caeruleus*), Pheasant (*Phasianus colchicus*), Wood Pigeon (*Columba palumbus*) and Hooded Crow (*Corvus cornix*).

[4] Codes refer to Heritage Council habitat classification, Fossitt 2000.

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NBDC records for red-listed[5] bird species of conservation concern recorded in the 10km hectad (N62) within which Blackriver Bog is located include; Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Partridge (*Perdix perdix*). Grey Wagtail (*Motacilla cinerea),* Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (Saxicola rubetra), Woodcock (*Scolopax rusticola)* and Yellowhammer (*Emberiza citrinella*).

Red-listed[6] listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Red Kite (*Milvus milvus*) and White-tailed Eagle (*Haliaeetus albicilla*). Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

NBDC has records for butterfly species of conservation interest Marsh Fritillary (*Euphydryas aurinia*) from Blackriver Bog. The following threatened butterfly species have been recorded in the wider surroundings of the bog: Dark Green Fritillary (*Speyeria aglaja*), Grayling (*Hipparchia semele*), Large Heath (*Coenonympha tullia*), Small Heath (*Coenonympha pamphilus*), Dingy Skipper (*Erynnis tages*) and Wall (*Lasiommata megera*).

Amphibians and reptiles recorded on the bog include Common Frog (*Rana temporaria*) and Slow-worm (*Anguis fragilis*) (2024).

3.3.3 Invasive species

American Mink (*Neovison vison*) have previously been recorded at Blackriver during BnM ecology surveys. This species is considered a high impact invasive species.

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs, and although spatial overlap with the proposed rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Blackriver Bog. No SPAs occur within 29km of the site.

One European Site; The Long Derries, Edenderry SAC (Site code: 000925), lies in close proximity (i.e. within a 5km radius at minimum) to Blackriver Bog. The Long Derries, Edenderry SAC (Site code: 000925) lies approximately 3km to the north of Blackriver Bog. The qualifying interest of this SAC comprises the priority habitat 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]'. The site contains several species of conservation interest including green-winged orchid (*Orchis morio*) and basil thyme (*Acinos arvensis*). The site also contains a notable transition between calcareous grassland and scrub to peatland habitats.

The next nearest European Designated sites to Blackriver Bog are as follows:

- Pollardstown Fen SAC (Site code: 000396) – 9.6km southeast

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

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

- Mouds Bog SAC (Site code: 002331) – 10.3km southeast
- River Barrow and River Nore SAC (Site code: 002162) – 11.2km southwest
- Ballynafagh Bog SAC (Site code: 000391) – 13.6km northeast
- Ballynafagh Lake SAC (Site code: 001387) - 13.6km northeast.

There are no Natural Heritage Areas (NHAs) or pNHA's (Proposed Natural Heritage Areas) in close proximity to Blackriver bog. A number of Natural Heritage Areas (NHAs) occur in the wider area around Blackriver Bog:

- Carbury Bog NHA (Site code: 001388) – 9km north
- Black Castle Bog NHA (Site code: 000570) – 10.6km northwest
- Hodgerstown Bog NHA (Site code: 001393) – 12.8km northeast.

A number of non-statutory designated sites i.e. proposed Natural Heritage Areas (pNHAs) also occur in the wider area around Blackriver Bog:

- Grand Canal (pNHA) (Site Code: 002104) – 2.2km southeast (at its closest point) and 4.7km to the north of Blackriver Bog
- The Long Derries, Edenderry pNHA (Site code: 000925) – also designated as an SAC (see above) – 3km north
- Curragh (Kildare) pNHA (Site code: 000392) – 9.1km southeast
- Pollardstown Fen pNHA (Site code: 000396) (also designated as an SAC) – 9.6km southeast
- Mouds Bog pNHA (Site code: 002331) (also designated as an SAC) – 10.3km southeast
- Ballynafagh Bog pNHA (Site code: 000391) (also designated as an SAC) – 13.6km northeast
- Ballynafagh Lake pNHA (Site code: 001387) (also designated as an SAC) – 13.6km northeast
- Ballina Bog pNHA (Site code: 000390) – 14.7km north.

See drawing *BNM-ECO-26-14-23: Proximity to Designated Sites* in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar sites located in proximity to Blackriver Bog. The nearest Ramsar site is Pollardstown Fen located approximately 9.6km to the south-east of Blackriver Bog.

3.5 Hydrology and Hydrogeology

Blackriver Bog is located within the Barrow (Catchment ID: 14) catchment as defined by the EPA under the Water Framework Directive (WFD). The northern part of the bog is in the Figile_SC_010 sub-catchment and the southern extent is in the Slate_SC_010 sub-catchment.

There are several drains/channelised streams within and around the margins of Blackriver bog that drain the site. The Figile River (EPA code: 14F01) flows in a westerly direction along the northern boundary of the site.

The following watercourses within and at the boundaries of Blackriver Bog drain to the Figile River at the northern end of the site:

- The Lullybeg 14 (EPA code: 14L13) watercourse flows in a northernly direction along the north-eastern boundary of Blackriver bog, where it enters the Lullymore_East (EPA code: 14L11) watercourse which subsequently becomes the Figile River.
- The Black River ((Lullybeg 14 (EPA code: 14L33)) also flows in a northerly direction within Blackriver bog itself; this watercourse has been channelized in deep embankments. .
- The Clonbrown watercourse (EPA code: 14C32) flows in a northerly direction to the Figile River along the western boundary of the site.

Blackriver Bog has a pumped drainage regime. There is a single pump located within the central area of the site along section no. 14_1783 of the Lullybeg 14 watercourse. This facilitates drainage from several discharge points. This pumped drainage regime was in place to support former industrial peat production and its infrastructure. Pumping is ongoing during the decommissioning phase.

Hydrological modelling (*BNM-ECO-26-14-09: Depression analysis*) indicates that the majority of the bog is in a 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.

GSI data indicates that Blackriver Bog is primarily underlain by primarily Ballyadams Formation (crinoidal wackestone/packstone limestone) across the central section of the bog, with the northwestern section underlain by Lucan Formation (dark limestone & shale (`calp)) and the southeastern corner underlain by Allenwood Formation (thick-bedded limestone, locally peloidal).

Geological Survey of Ireland (GSI) mapping identifies the nearest karst feature (enclosed depressions) as being located approximately 4.8km west of the bog. No data exists concerning depth to bedrock, however, there is a small area of bedrock approximately 7km north of the bog.

The Lucan Formation is classified as a locally important aquifer (bedrock which is moderately productive only in local zones); the Ballyadams Formation and Allenwood Formation are classified as regionally important aquifer (Karstified (diffuse)).

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying regionally important abstractions (e.g. large public water supplies), or 'excellent' yields (>400 m^3/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.

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters ('baseflow') and large (>2,000 m^3/d), dependable springs may be associated with these aquifers.

The majority of Blackriver bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Map viewer), whilst the north-easternmost part of the bog is located within an area of moderate groundwater vulnerability. Groundwater vulnerability for the area surrounding Blackriver Bog is variable between areas of high, moderate and low vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological

and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution.

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 Blackriver 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 bi-annual basis by BnM 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.

Blackriver Bog has a partially pumped drainage regime, with one pump present in the central section of the site. Blackriver Bog has one surface water outlet from previously active peat extraction catchments, which discharges to the Black River (EPA code: 14L33) which flows to the north to the Figile River (14F01). This river is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds and associated surface water emission are detailed on the accompanying structures map along with water quality map. See Drawing number *BNM-ECO-26-14-02: Structures and Sampling*, along with Drawing number *BNM-ECO-26-14-WQ01: Water Quality Map* included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Blackriver 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme - Water Quality Monitoring

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also 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*., 2017). Bog rehabilitation is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) 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 BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Blackriver has been completed. This discharge will have improved 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 waterbody receptors i.e. the Figile River (IE_SE_14F010600) and will support the future status of the waterbodies achieving Good Status. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

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

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.

3.7 Fugitive Emissions to air

There will be no fugitive emissions to air associated with the proposed rehabilitation of Blackriver Bog.

Rehabilitation of the cutaway peatland will seek to re-wet the dry peat where possible. Collectively, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled,

postponing rewetting increases the longterm warming effect of continued CO_2 emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Blackriver 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. The majority of the bog is expected to develop as regenerating wet deep peat vegetation on deep peat areas. Wetlands mosaics are expected to develop on shallow peat with open water, reed swamp and fen habitats with alkaline peatland emission factors. Birch woodland is expected to develop on the drier mounds and along peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Blackriver Bog can be rated as **local importance; lower value to local importance; higher value.** Bare peat areas and pioneer cutaway habitats in the former production area of Blackriver Bog are assessed as **local importance (lower value)**. Marginal habitats including woodland, scrub and bog remnants may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Blackriver Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity and other general topics over the years about Allen-Lullymore bog group, including Blackriver 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.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Blackriver Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Blackriver Bog or the programme in general.

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

4.2 Topics raised by Consultees

N/A - consultation has not yet commenced.

4.3 BnM response to topics raised during consultation

N/A - consultation has not yet commenced.

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5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect planned renewable energy infrastructure or areas required for this proposed project.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies, where possible. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is some potential for the creation of wet cutaway habitats at Blackriver Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Blackriver Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. The site has already developed pioneer and maturing cutaway habitats.
- 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, the majority of the bog is shallow peat and only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog 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 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 BnM). Reducing pressures due to former peat extraction activities at Blackriver 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 BnM).

- BnM are also carrying out rehabilitation measures in some nearby bogs including Timahoe South and Lodge Bog (2022-2023), and have previously carried out re-wetting and rehabilitation at Lullymore Bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area entire area of Blackriver Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Blackriver bog is part of the Ballydermot Bog within Allen-Lullymore bog group.
- Blackriver is a shallow peat cutover bog, and in general between 0.5m - 1.5m of residual fen or minerotrophic peat remains. There are also some areas with peat of deeper than 2 m, most notably within the southern portion of the site. The local environmental conditions of Blackriver Bog mean that wetland creation along with some deep peat measures is the most suitable rehabilitation approach for this site. Blackriver Bog has a partially pumped drainage regime.
- BnM have defined the key goal and outcome of rehabilitation at Blackriver Bog as **environmental stabilisation**, and **optimising residual peat re-wetting,** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Wind Farm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Blackriver Bog. In areas associated with proposed wind farm infrastructure, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- The cutaway is already developing a mosaic of birch scrub/woodland, grassland, wetland, Heather and cutaway peatland habitats. A significant portion of this cutaway is largely stabilised already. A portion of the site has bare peat. Rehabilitation is proposed to enhance residual peat re-wetting across the site, while taking account of current land-uses (e.g. amenity).
- Rehabilitation of Blackriver Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. The majority of this bog has been cutaway, and is estimated to have between 0m - 2m of peat remaining. Blackriver bog has a partially pumped drainage regime, which will need to be considered as part of the wider rehabilitation. A mosaic of wetland habitats are the most compatible habitat that can be developed in response to re-wetting. Several areas of remnant raised bog occur along the northwestern, western and southwestern margins.
- Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water

to some extent. Much of the central section of the bog is in a low-lying depression and has the potential to act as a basin. There is some potential to develop some wetland habitats in this area by blocking main outfalls and raising the water-level somewhat. There is some deeper peat towards the southern end of the bog that would have the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised.

- **Potential land-use.** The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing . It is expected that BnM **will revise and update** the rehabilitation plan for Blackriver when a decision is made in relation to the wind farm planning application. BnM remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC license. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM sites and the surrounding landscape. Care must be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM 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.
- **Turf-cutting.** Areas of remnant raised bog along the margins of the bog will not be subject to rehabilitation measures. This is largely due to turf cutting, and the small area that these parcels of land cover and the limited effectiveness of rehabilitation measures in these areas. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned.

6.2 Key Assumptions

- It is assumed that BnM 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:

- Areas subject to turf cutting are excluded.

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- The longer-term development of stable naturally functioning habitats at Blackriver 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 Blackriver Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 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 BnM 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 a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g. potential suspended solids run-off).

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 increase in the area of potentially peat forming habitats. 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 BnM 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.
- Removal of invasive Japanese knotweed from the site

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 Longford Pass 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 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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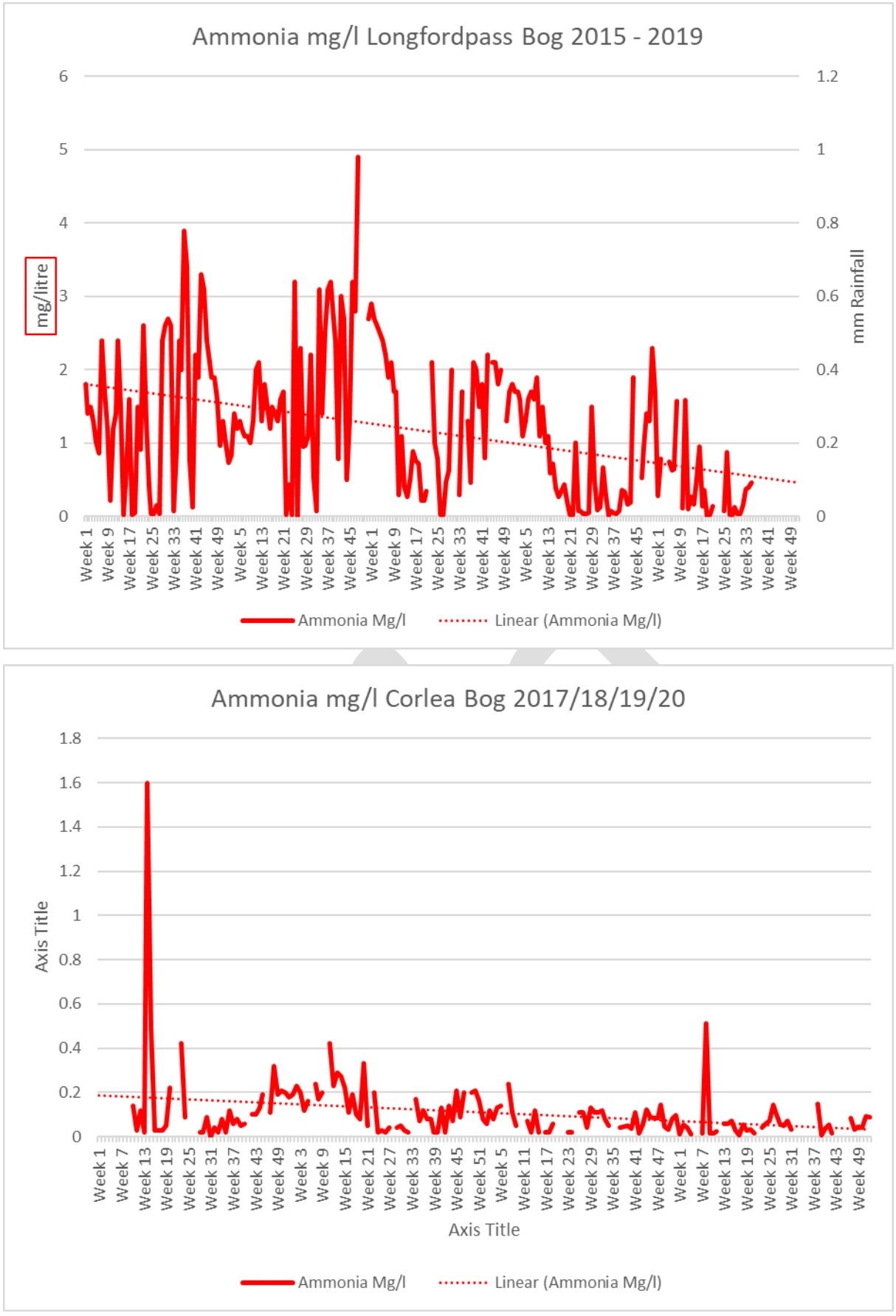


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected time-frames.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and 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 based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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 and LiDAR surface maps, these are included in the accompanying mapbook as the drawings referenced below:

BNM-ECO-26-14-21: Aerial Imagery 2000

BNM-ECO-26-14-22: Aerial Imagery 2020

BNM-ECO-26-14-04: Peat Depths

BNM-ECO-26-14-03: LiDAR Map

BNM-ECO-26-14-09: Depression Analysis

The restoration and rehabilitation measures are provisionally outlined in drawing titled *BNM-ECO-26-14-20: Standard Rehabilitation Measures* in the accompanying Mapbook.

These rehabilitation measures for Blackriver Bog will include (see Table 8-1):

- Re-assessment of the pumping regime and removing the pump, if this is desired and has no significant external impact or impacts on proposed future land-uses. Initial hydrological modelling indicates that a part of the bog will develop a mosaic of wetland habitats with some permanent deeper water if the pump is decommissioned. 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 at outfalls and by adjusting piped drainage, where possible. 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 of surrounding rivers.
- Much of the cutaway has already vegetated and stabilised. A targeted drain-blocking programme and hydrological management will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level.
- A widespread drain-blocking programme will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat and deeper residual peat.
- Areas of deeper bare peat within the southern area of the site will be targeted for more intensive drain-blocking.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking, modifying outfalls and managing water levels with overflows.

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- Wetland measures including blocking outfalls and managing water levels with overflows.
- 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 rehabilitation measures at Blackriver Bog.

Type	Code	Description	Area (Ha)*
Deep peat cutover bog	DPT1	Regular drain blocking, modifying outfalls and managing water levels with overflows	36.9
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	59.5
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway, targeted drain-blocking, modifying outfalls and managing water levels with overflows.	227.5
Marginal land	MLT1	No work required	35.7
Silt Pond	Silt Pond	Silt Ponds	3.7
Ballydermot Wind Farm	Wind Farm Infrastructure + Buffer	Wind Farm infrastructure areas including turbine bases, internal access roads and turning points, crane hard stand and peat and spoil areas.	113.1
	Renewables Footprint	Areas associated with the proposed Ballydermot Wind Farm where rehabilitation measures will be appropriately sequenced including temporary construction compounds and enhancement areas; scrub planting.	55.3
Constraint	Constraint	Access, turf cutting, bog remnant, watercourses, retained drainage infrastructure.	200.6
Total Area			**732.3**

*Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

8.1 Completed and Ongoing

- Several sections have already developed pioneer vegetation cover and are developing a mosaic of typical cutaway peatland and wetland habitats. Natural re-colonisation of the cutaway so far has been quite effective. Bare peat areas within the cutaway parts of the site are shrinking with colonisation of pioneer vegetation as it develops and consolidates.

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

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Blackriver Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).

- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.
- A drainage management assessment of the proposed rehabilitation measures will be 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 will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.
- A review of remaining milled peat stocks is to be carried out.
- 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) will be 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.
- Appropriate Assessment (AA) of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in Section 9.
- 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.

8.4 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 9 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.

8.5 Timeframe (to be adjusted when finalised)

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions.

- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation:** Decommission silt-ponds, if necessary

8.6 Budget and costing

BnM 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 BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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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.
- Monitoring results will be maintained, trended 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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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 BnM 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.

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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 have 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.

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APPENDIX I: BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow catchment, and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and Timahoe South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied an old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly, via the BnM industrial railway. Many bogs were in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long-term peat extraction activity reduced the peat depth on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen-Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Lullymore in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Lullybeg by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 and 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow piped outfall. Some cutaway bog at Lullymore, used as spread grounds for sod peat up until recently, was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly Conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries, Edenderry SAC (site code: 000925) is located in the Lullymore Bog sub-group. The Long Derries SAC is located south of Ticknevin Bog. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by BnM. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

Glashabaun Bog (northern sub section) overlaps the SAC and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is an esker and BnM used the site in the past to extract gravel for the construction of railway embankments across BnM bogs. Rare plants including Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations.

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation is ongoing.

A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC Licence Ref. P0503-01, and current, indicative peat production status, is outlined in Table Ap-1.

Table Ap-1 Allen-Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.		
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since 1950s Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Glashabaun South	569	Peat extraction since 1950s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning. .	2020	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss Sphagnum inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023
Lullybeg	271	Peat extraction since the 1930's. Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2004	Draft 2026
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group - amenity	1992	Draft 2026
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019 Majority of bog still has relatively deep peat	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production. Cloncannon bog remnant – zoned for biodiversity	2019	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Mostly bare peat. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.		
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection	N/A	N/A
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab complete

See Drawing number *BNM-ECO-26-14-24 titled Bog Group Map,* included in the accompanying Mapbook which illustrates the location of Blackriver Bog and the Allen – Lullymore Bog Group in context to the surrounding area.

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APPENDIX II: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Blackriver**	**Area (ha):**	778.5 ha (Blackriver production area)
Works Name:	Ballydermot	**County:**	Kildare
Recorder(s):	MMC & DF	**Survey Date(s):**	8/09/2011

Habitats present (in order of dominance)

The most common cutaway habitats present at this site include:

- Bare peat (BP) sod peat production areas
- Poor fen mosaics (pJeff/pTrig) (Codes refer BnM classification of pioneer habitats of production bog).
- Minor development of other poor fen communities dominated by Marsh Arrowgrass (pTrig) and Horsetail (pEq).
- Minor development of other pioneer cutaway communities such as Common Reed (pPhrag), rank grassland (gCo-An) and Heather dominated vegetation (Heather dominated vegetation).

Other habitats found around the margins of this site (not on production bog/cutaway) include:

- Bog woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000).
- Scrub (WS1) (Blackthorn scrub and Birch scrub)
- Raised bog remnants (PB1)
- Cutover bog (PB4)
- Ash-Hazel woodland (WN2) (along Crabtree River)
- Dense Bracken (HD1)
- Improved grassland (GA1) (at northern end)

Description of site

This sub-site is part of Ballydermot Bog and is located in west Kildare, 4 km north of Rathangan. Blackriver bog is located towards the centre of Ballydermot and is situated along the east side of the Rathangan-Edenderry Road. A Works centre is located along the eastern boundary of the site.

This bog was originally a sod peat bog that has since been converted to milled peat. It is drained by several large deep drains orientated north-south that separate series of fields. These drains are located in deep embankments on high fields. The embankments are vegetated with a mosaic of open Birch scrub (oBir) with Purple Moorgrass-dominated grassland or some dry heath (dHeath). There are also several patches of more established Birch woodland (cBir/BWD) developed along these drains.

There is also a railway network through the bog that connects the site with adjacent bogs and provides a link to Edenderry Power Station. Basil Thyme was recorded at several locations along this railway on the gravel embankment. Some of the

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railway is new or has been refurbished recently and provides perfect habitat for this species, particularly where the railway passes under the Rathangan-Edenderry Road.

Most of Blackriver is dominated by bare peat and there is very little development of cutaway habitats around the site. Blackriver was originally a sod peat production bog that was converted to milled peat.

Young pioneer habitats are developing on some of the gravel ridges that are being exposed with small sections of some fields going out of production. These pioneer habitats are dominated by tussocks of Soft Rush (pJeff /BP). Other grasses such as Creeping Bent and Yorkshire Fog are establishing along the drains. However, millers are still being driven through these areas so habitat development is poor.

Some fields through the site seem to be not available for production temporarily (perhaps due to drainage issues) and have developed minor cover of poor fen along the drains (visible from aerial photos). However, some of this vegetation has since been removed.

Part of the north-west section has been out of production for several years. This area is developing mostly pioneer poor fen communities dominated by Soft Rush (pJeff), Bog Cotton (pEang) and Marsh Arrowgrass (pTrig). There has been some open water collecting in some fields with associated development of wetland communities such as emergent Bog Cotton and Bottle Sedge. However, subsequent drainage seems to have let off some of this water and this area is likely to back into production in the near future (Check). Several fields in the central area have been used for Reed Canarygrass trials. This vegetation is still present in places, but also seems to have died away and been replaced by poor fen vegetation in other sections.

Some of the marginal habitats are relatively well developed and diverse. Mature Birch woodland (WN7) is found along the margin of Kilmacthomas Wood and has developed over the old face-bank on deep peat. This zone has been colonised by mature Birch, Scot's Pine, Oak, Rowan, Guelder Rose, Holly and Rowan. Alder Buckthorn is also present. The ground cover is dominated by Heather and Bilberry Purple Moorgrass and Bracken are also present. Some hummocks of *Sphagnum* are present.

Diverse scrub and woodland is also found along the Crabtree River north of the Works area. This woodland and scrub is generally dominated by Birch and can be considered Birch woodland but there are patches with elements of Oak-Ash-Hazel woodland (WN2). Species such as Ash, Hazel, Hawthorn, Blackthorn thickets, Purging Buckthorn, Alder Buckthorn, Spindle and Guelder Rose are found along the margins of the river and the woodland/access track through this area. Some of these more calcareous-loving species have developed on spoil taken from silt ponds that have been developed in this area of woodland.

There are several sections of remnant high bog (PB1) around the western and northern margin of the site. These are generally being cut for sod peat. The high bog along the northern margin is generally degraded by drainage, although there is *S. cuspidatum* within the drains. The majority of the high bog is sub-marginal ecotope in quality. There has been some subsidence towards the southern boundary adjacent to the production area and this zone is dominated by Heather (marginal ecotope). There are several smaller patches of high bog with much higher *Sphagnum* cover (50%) that have been influenced by surface water drainage on the bog. High bog at the south-western end of the site has also been heavily drained. Some of this high bog may have regenerated after commercial sod peat production. Birch and Pine are spreading over this area. There are ridges dominated by Heather while troughs contain species such as Deergrass, Bog Cotton, Bog Asphodel and Purple Moorgrass. There has been some regeneration of *S. capillifolium* and S. *papillosum* in these troughs. Birch woodland (WN7) has developed along the margins of this section (adjacent to the road) and is spreading slowly over the bog.

Basil Thyme and Blue Fleabane

Basil Thyme and Blue Fleabane were noted at several locations along the railway. Basil Thyme has not been recorded at this site before and would not be a typical species of cutaway bog. This species was probably unlikely to have been present

on the site prior to the development of the cutaway. The exposed gravel along the railway embankments is a perfect habitat for this species. One of its main known populations in Co. Offaly is located close by at the Long Derries SAC, Edenderry. This site was a BnM gravel pit and material from this site was used to make railway embankments. The spread of Basil Thyme from the Long Derries along the BnM railway network has been recorded in the past (Feehan pers. comm. 2011).

In the long-term, it could be expected that these railway embankments will re-vegetate with grassland and scrub as they go out of use, which will not favour this species. Occasional track maintenance is likely to be beneficial for this species as it will keep the gravel embankments exposed and prevent development of dense vegetation, which would be unsuitable for this species. Other BnM operations are not likely to have a significant impact on the status of this species. One possible solution is to develop some of the main railway line as an amenity walkway when production ceases. A suitable management regime to maintain the habitat of these rare plant species could easily be developed in association with the development and maintenance of these walkways. This will be considered within the wider context of the Derrygreenagh and Ballydermot Bogs, which are viewed as strongholds for the species in Offaly and Kildare. Consultation and licensing will be required with NPWS.

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

None

Adjacent habitats and land-use

Wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), scrub (WS1), Birch woodland (WN7), cutaway bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

Watercourses (major water features on/off site)

- Blackriver Bog drains towards the Figile River at the northern end of the site and is located in the South-Eastern Barrow catchment.
- The Crabtree River flows along the north-eastern boundary of Blackriver. White Clawed Crayfish was recorded from the Crabtree River during drainage works in the 1990's.
- The Black River flows through the site and has been channelized in deep embankments. Pumps pump drainage water into this drain and it flows towards the Figile River.

Peat type and sub-soils

The majority of the peat exposed at this site is fen peat.

A substantial portion of the western side of the site is underlain with a thick layer of shell marl. Further west there are ridges of gravel sub-soil being exposed under the peat.

Fauna biodiversity

Birds

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

- Snipe (3)
- Other more common birds noted included Meadow Pipit, Pheasant, Swallow, Wood Pigeon, Skylark, Grey Crow, Blue Tit (in Birch woodland), Wren, (in Birch woodland).

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- Local staff reported that Mallard and Heron are frequently observed on the bog.

Mammals

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

- Hare
- Fox
- Local staff note that Hare and Fox are the most common animals seen, but that deer have never been observed on the bog.

Other species

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

- Frog
- Red Admiral (SW corner)

Activities on the site

Activities on the site include:

- Standard BnM operations related to milled peat production.
- There is a significant amount of private sod peat cutting of high bog around the western and northern margins of Blackriver.
- There has been some timber harvesting in Birch woodland developing along access to cutover bog in the south-west part of Blackriver.

References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

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

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. 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 spread and 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

In addition to the above, Best 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 V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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 Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2026-2030

The All-Ireland Pollinator Plan 2026-2030 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2020, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM lands. The Bord na Móna

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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 BnM'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.

14 BnM commitments

BnM 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.

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. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. 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.

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APPENDIX VI. 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 BnM 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	Blackriver Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

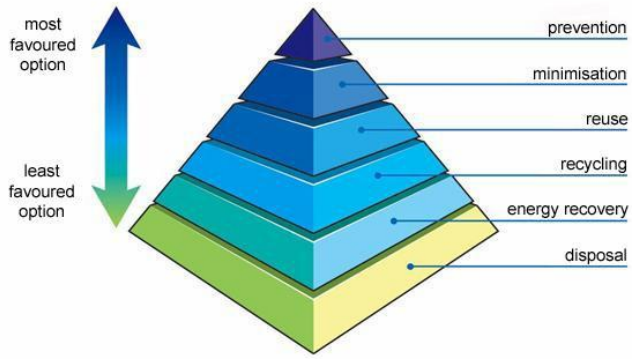
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 cutover 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

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

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER 2004).

Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, BnM 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 acrotelm – 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 BnM sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping is reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

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 IPC Licence Ref. P0503, Allen-Lullymore bog group.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.
- 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.

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- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.
- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

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APPENDIX IX. 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/resources/faqs/environment--you/faq-listing/ 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 X. ARCHAEOLOGY

Code of Practice

Role of the Archaeological Liaison Officer

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



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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.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:
- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:
- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:
- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index

Revision	Date	Description of change	Approved
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Blackriver Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet

Document Name:	Blackriver Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Draft v0.1**

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

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	CS	MMcC
Date:	06/08/2026	06/08/2026	06/08/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):		JB	CS
Date:		22/10/2026	23/10/2026

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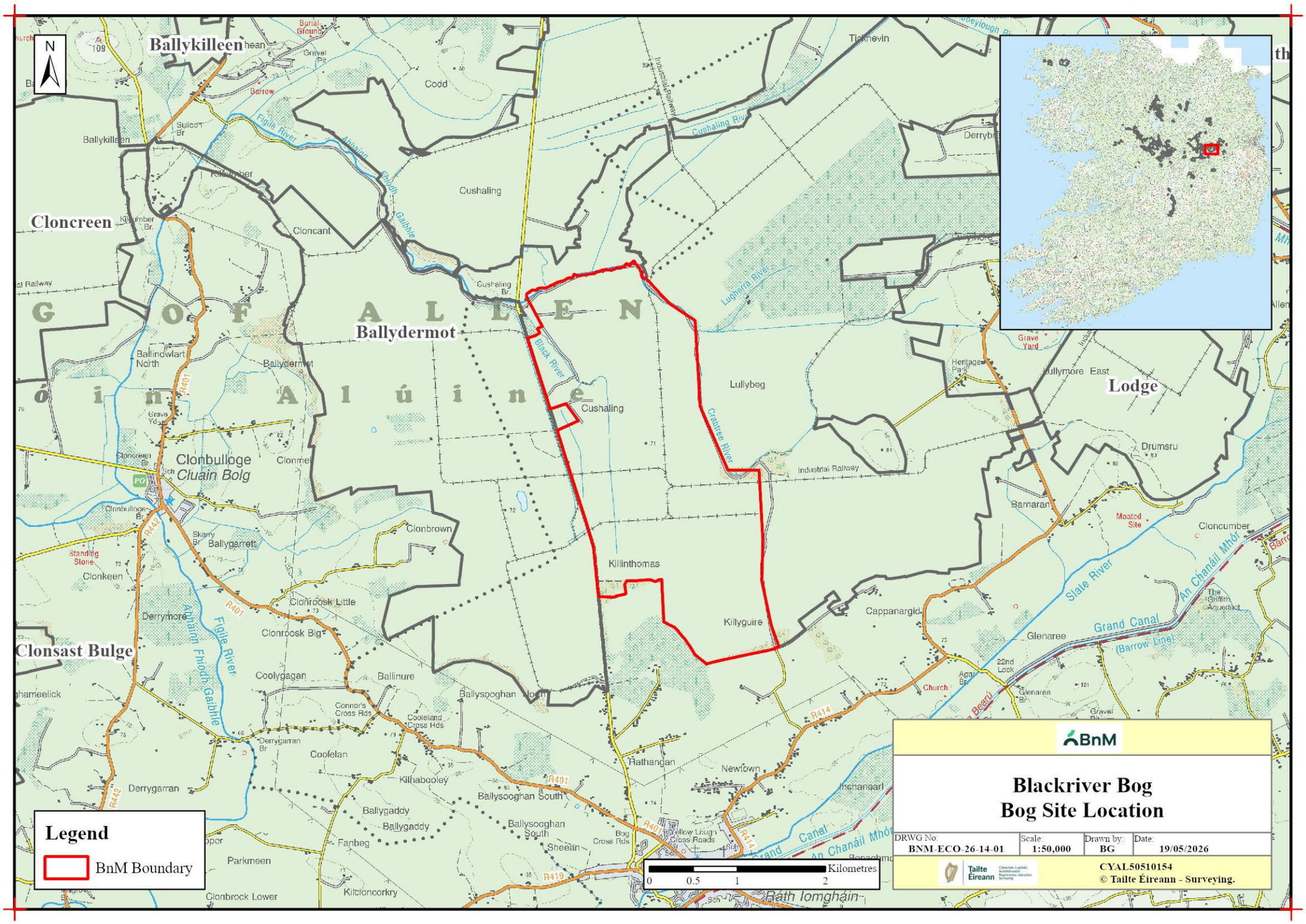
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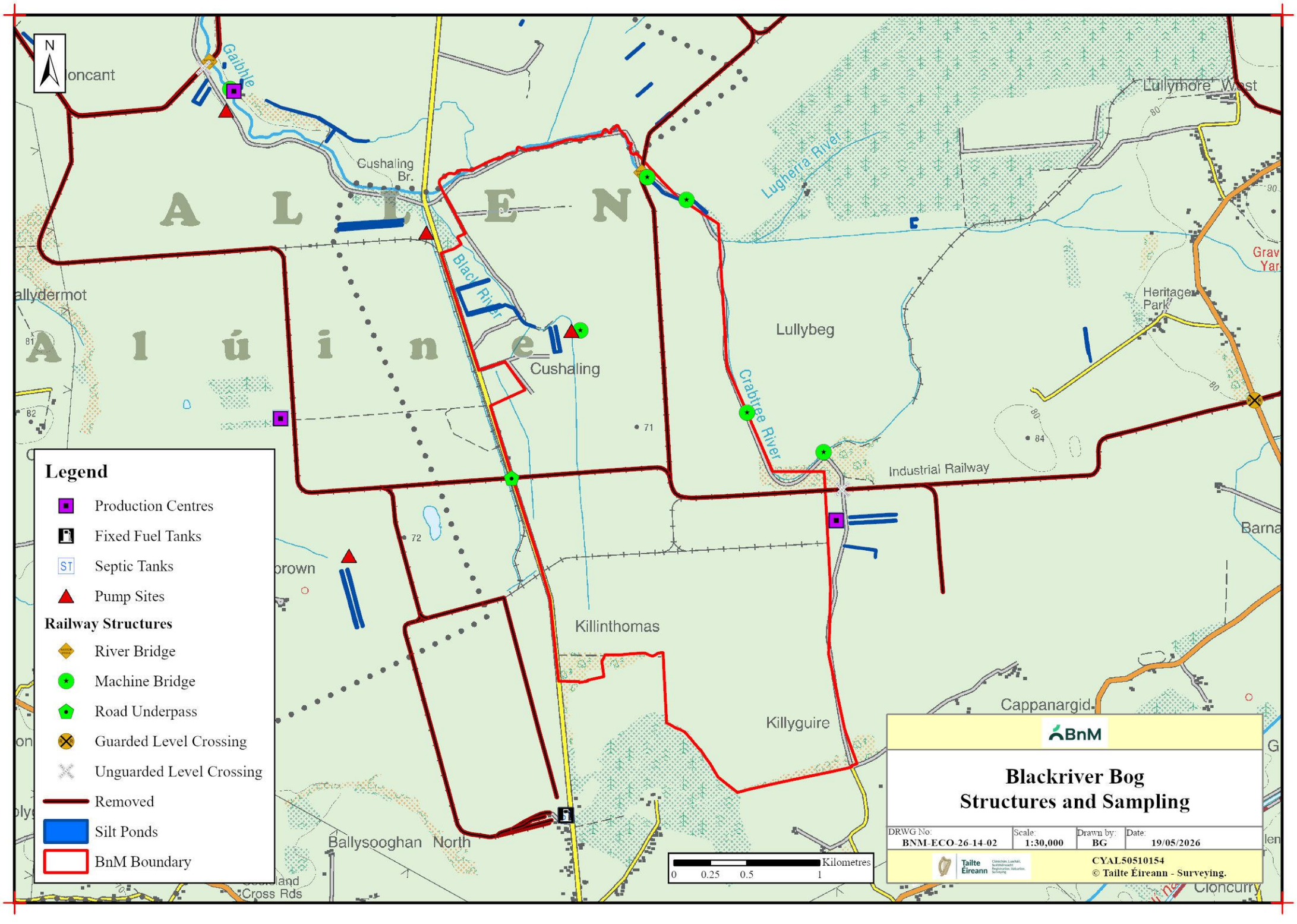
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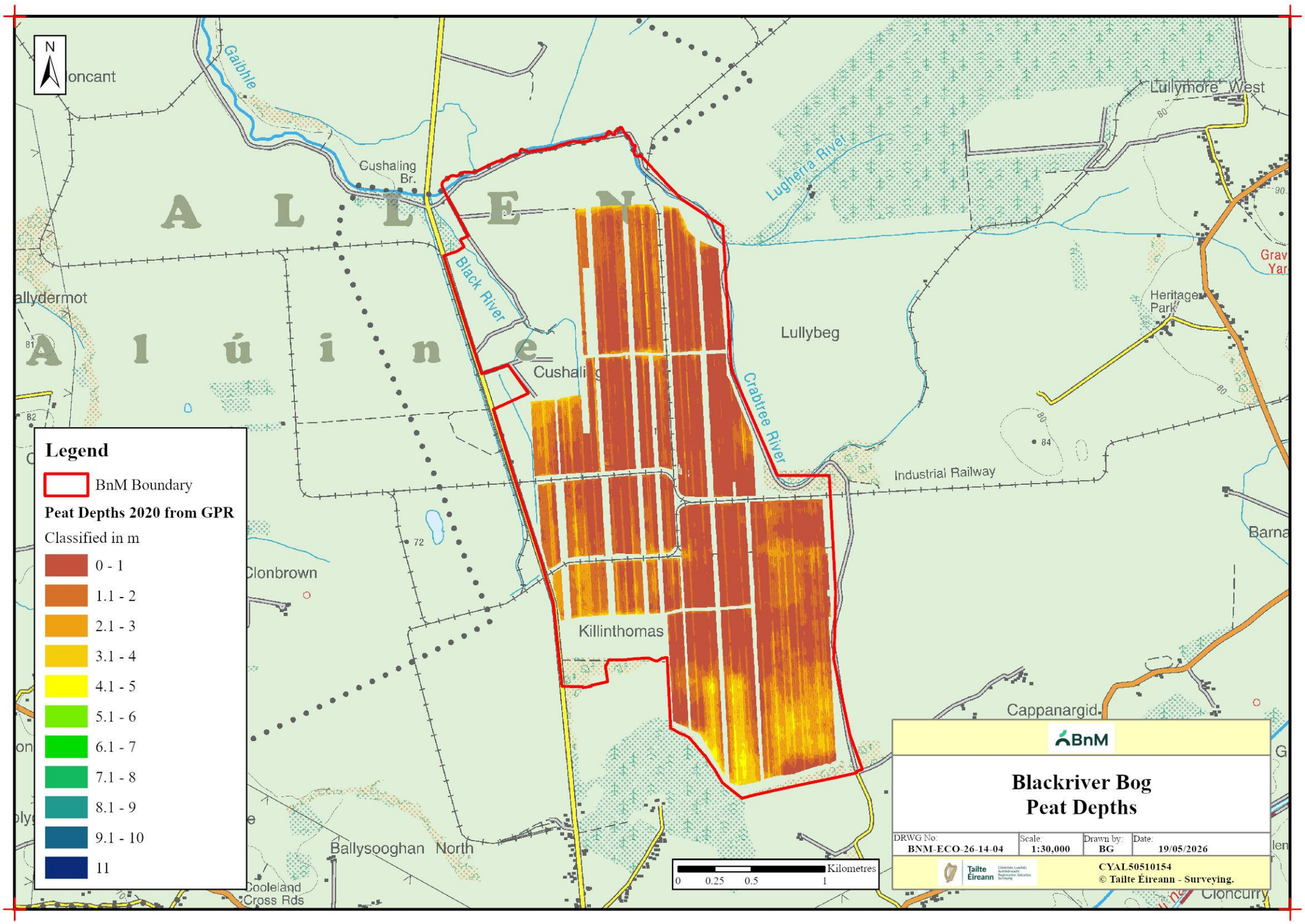
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Ballysooghan North
Cross Rds
Cloncurry
Barna
Legend
Production Centres
Fixed Fuel Tanks
Septic Tanks
Pump Sites
Railway Structures
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Machine Bridge
Road Underpass
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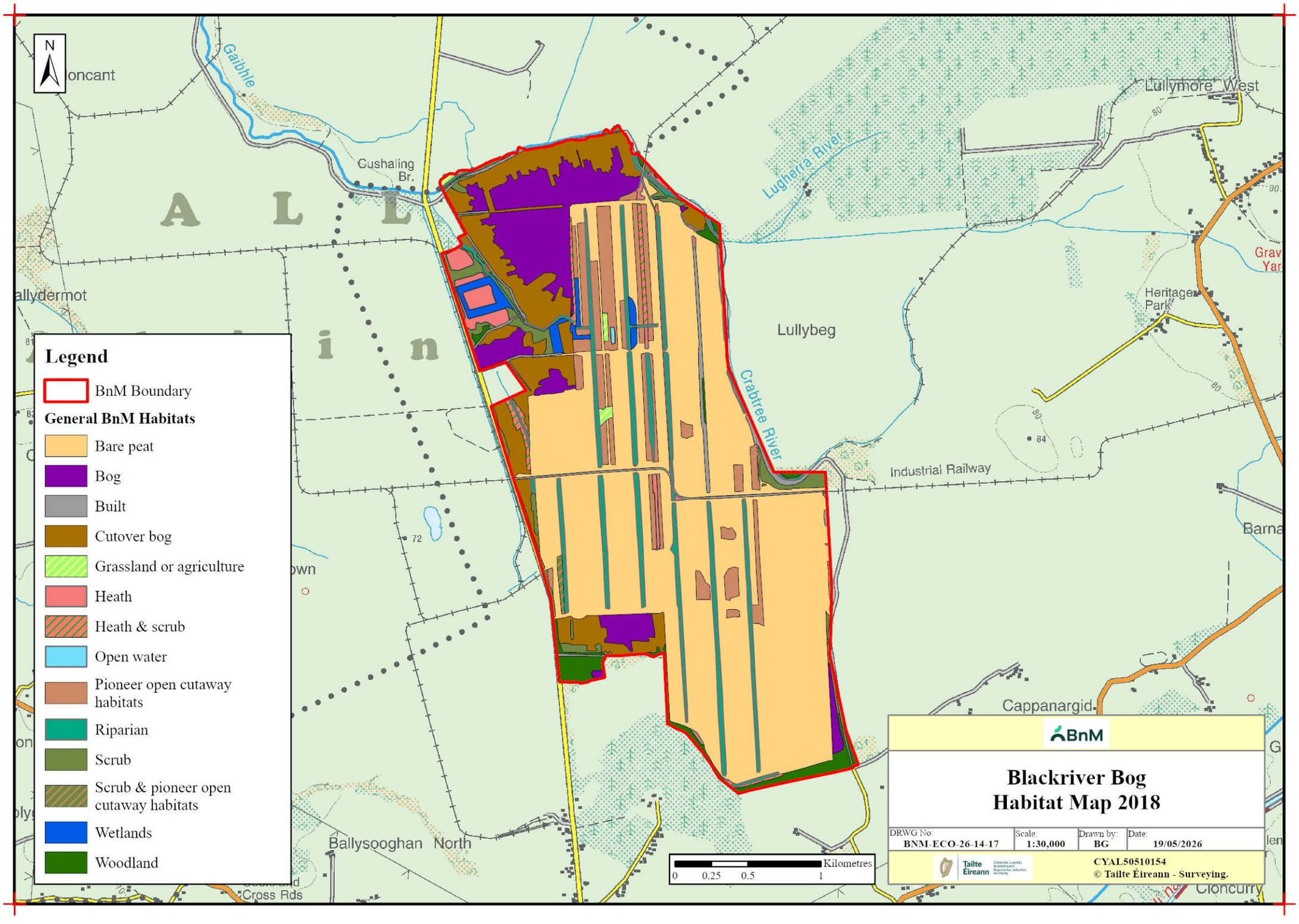
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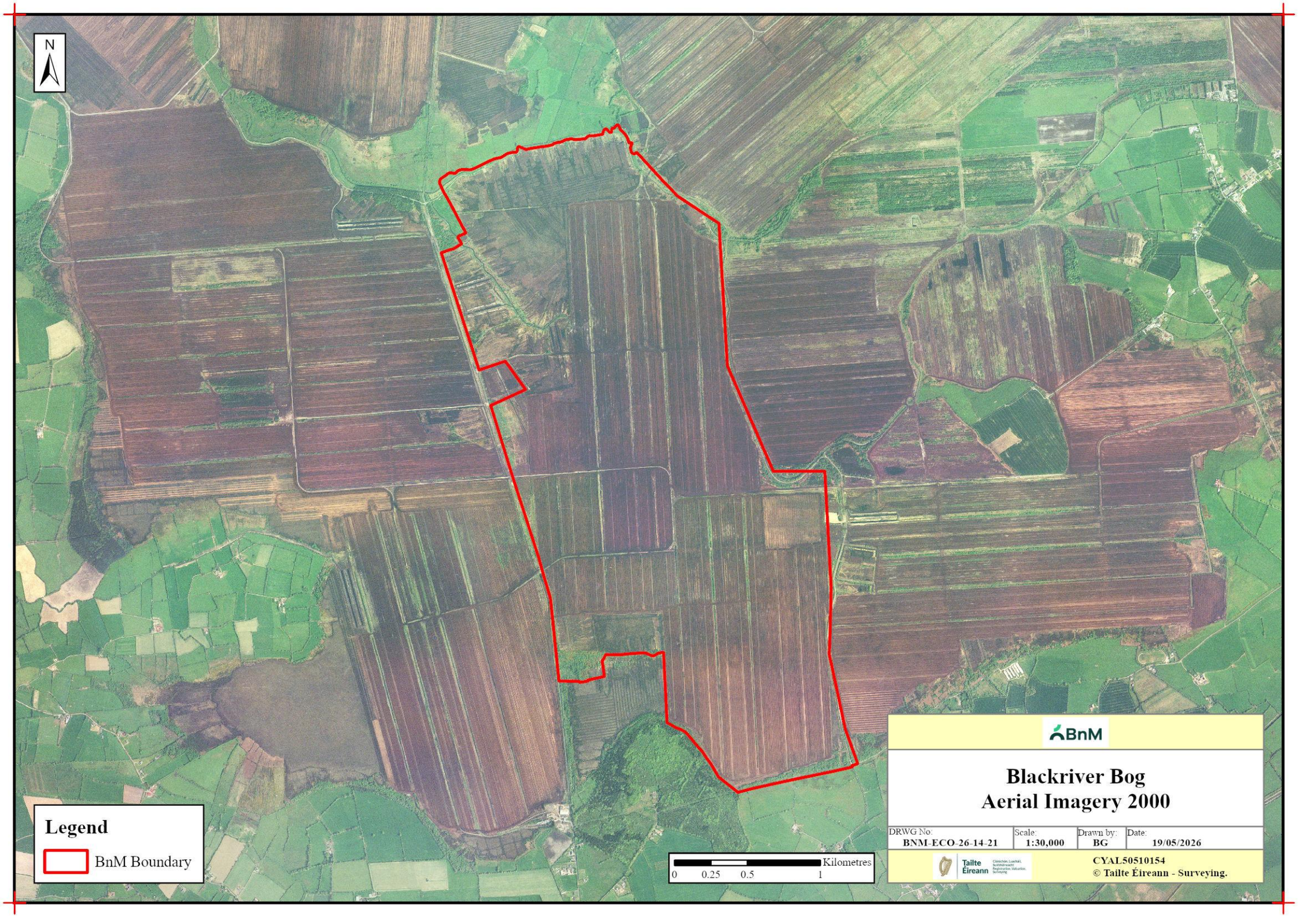
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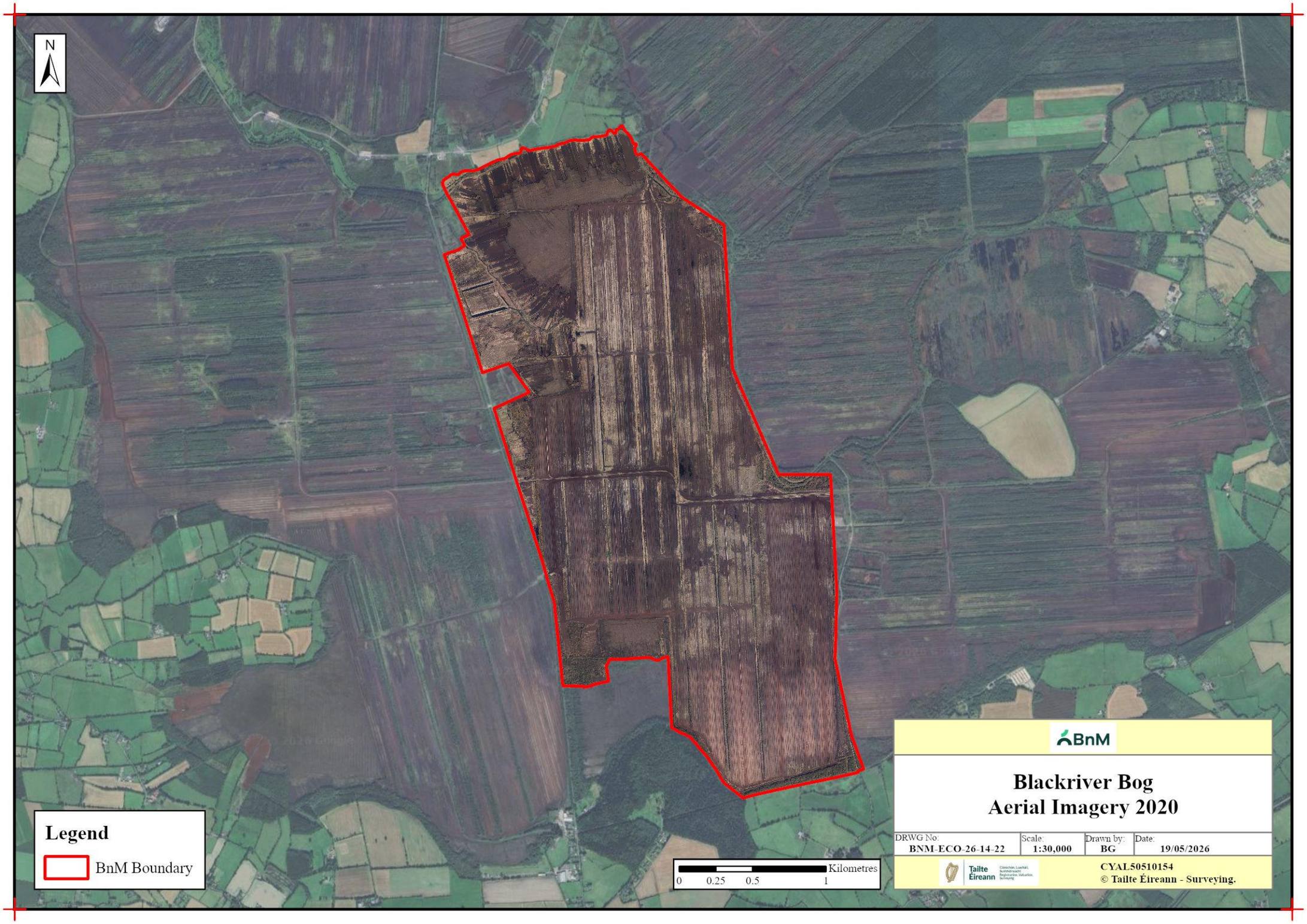
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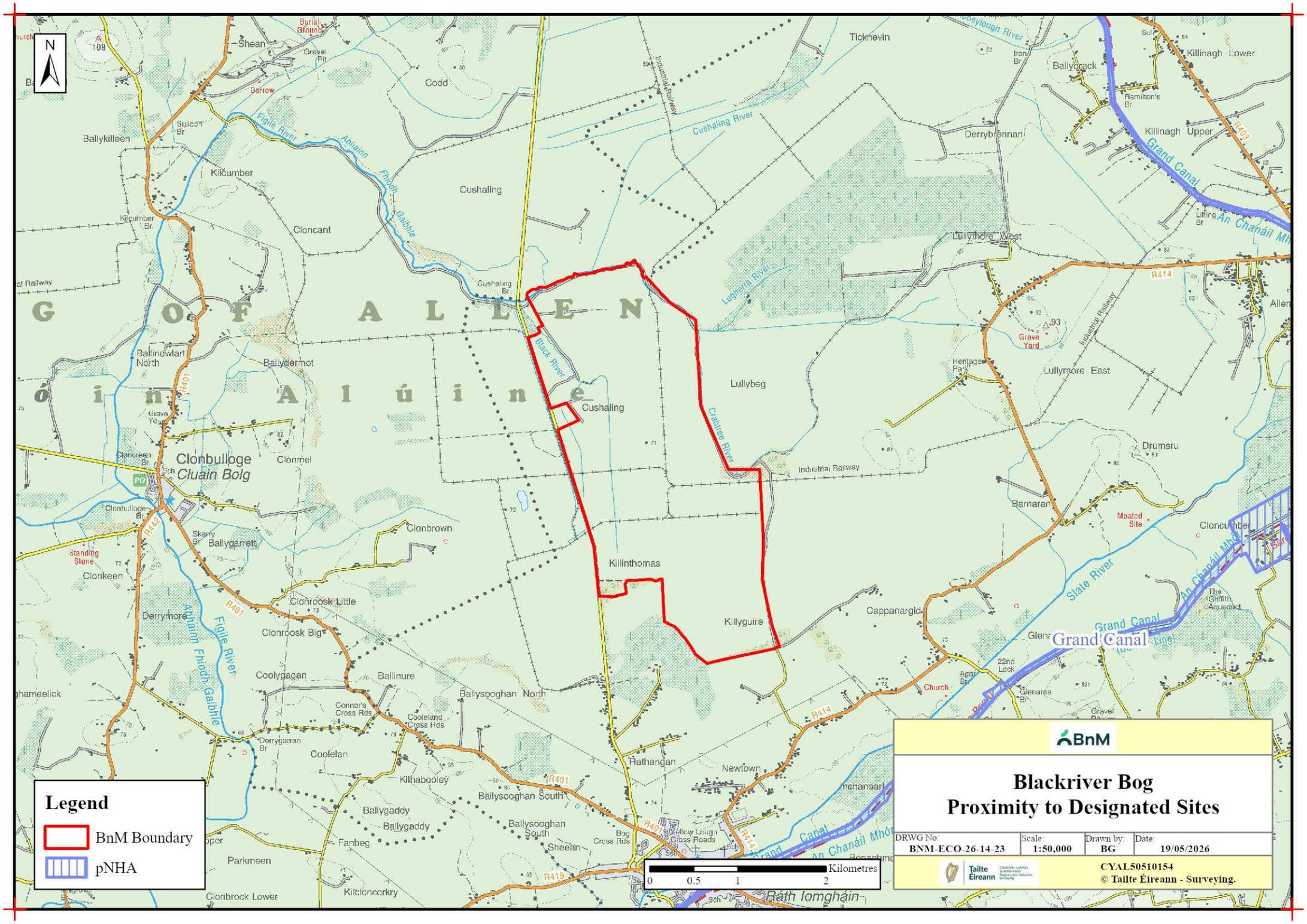
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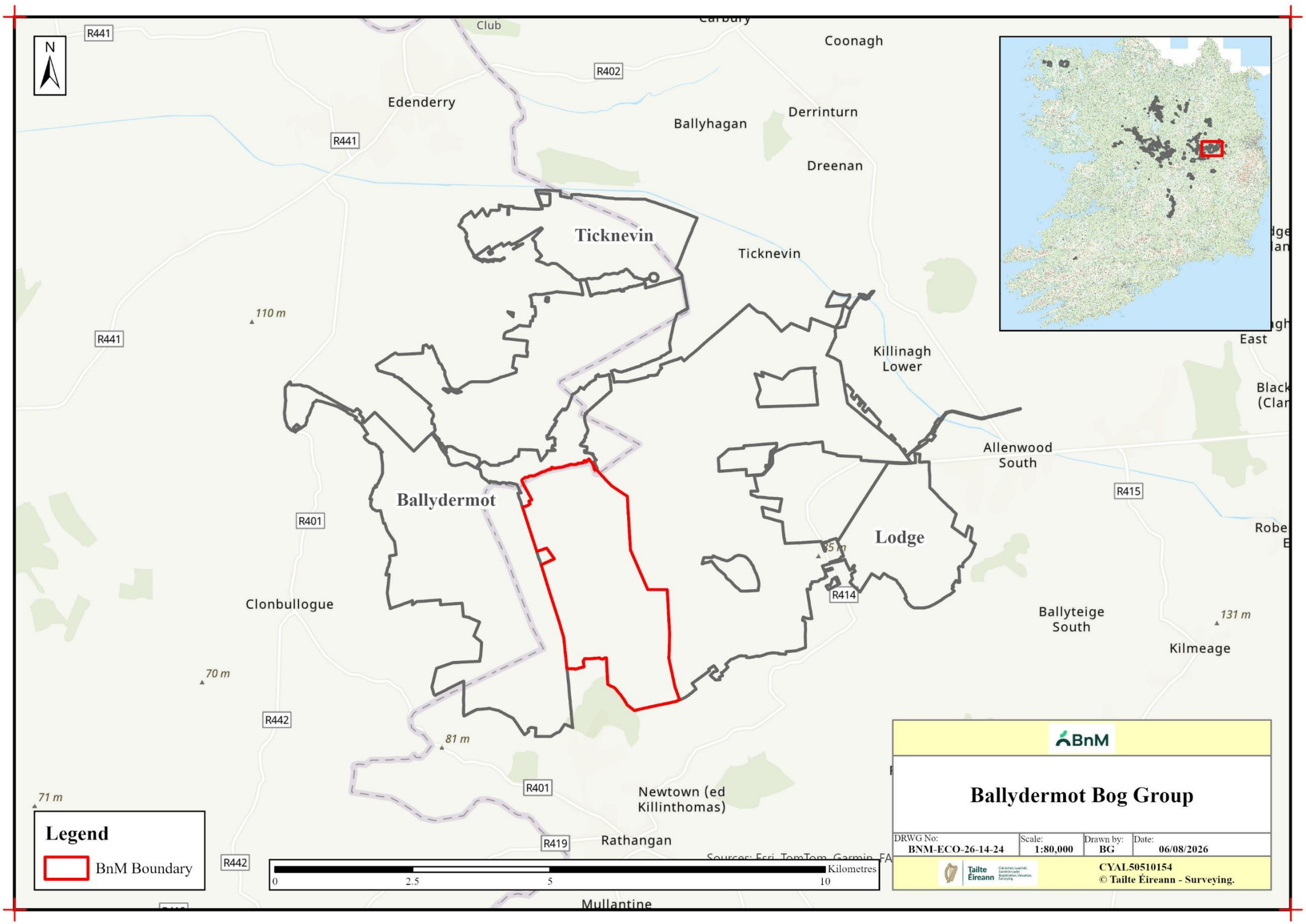
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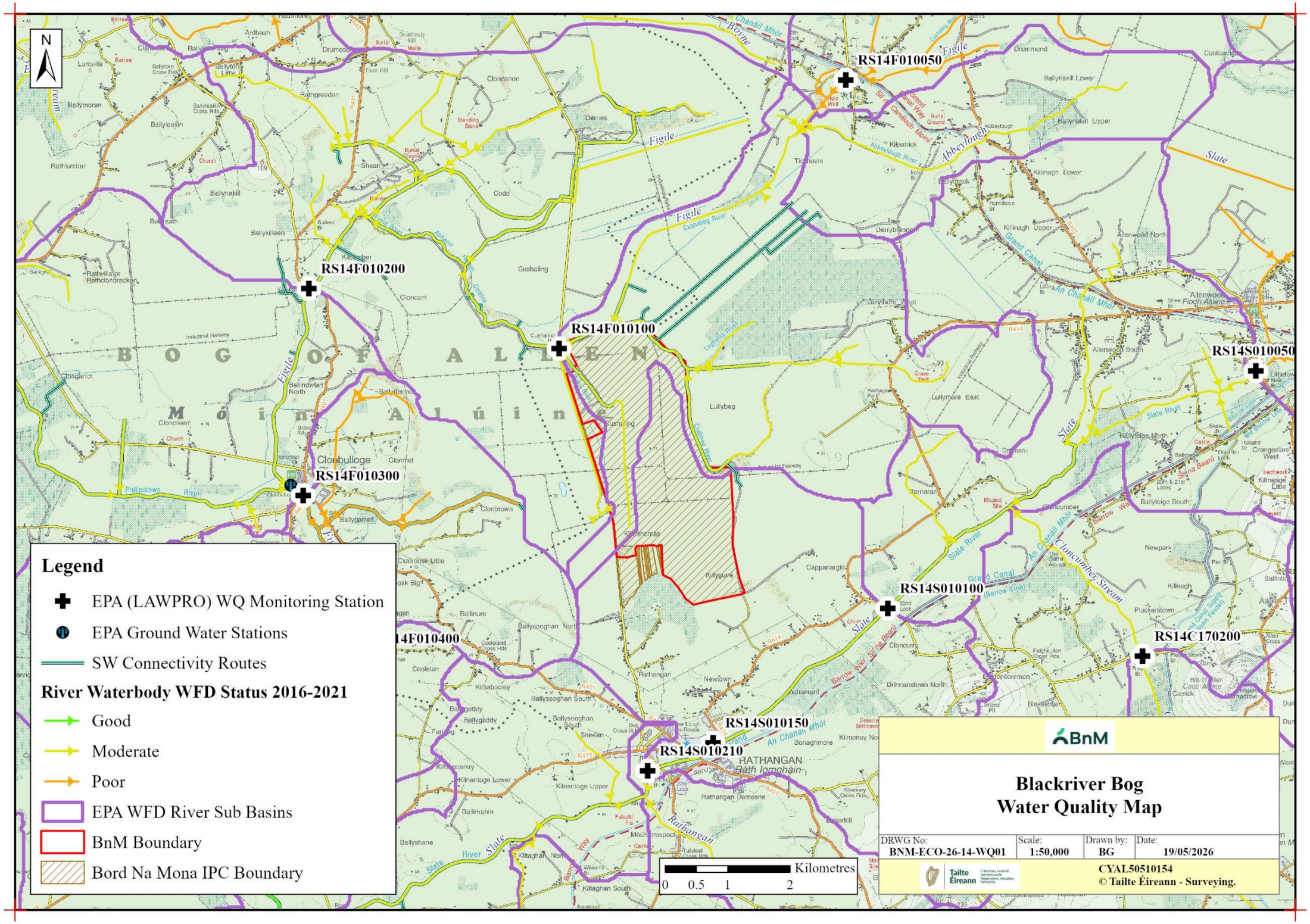
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Hydrology / Topography Maps

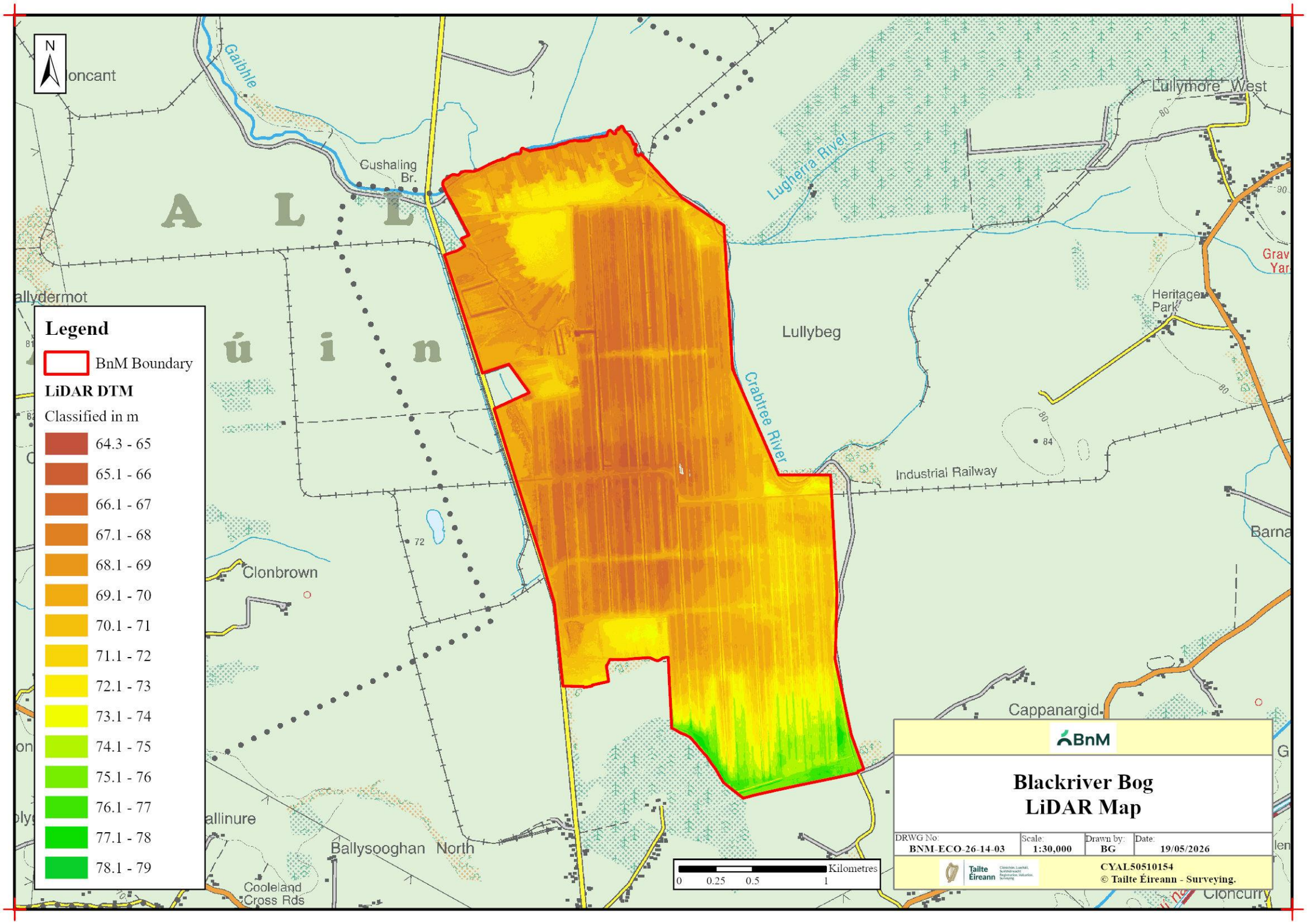
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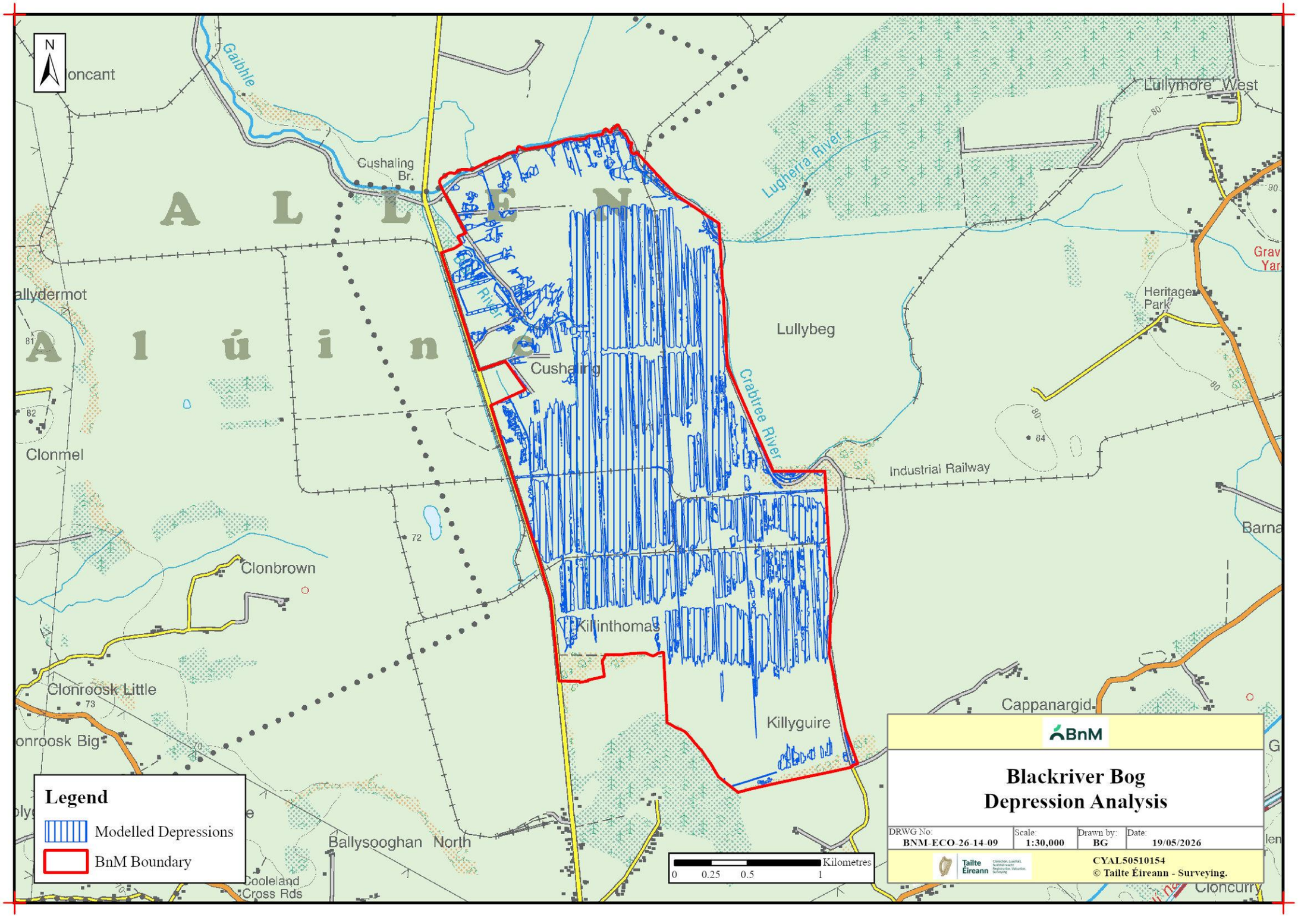
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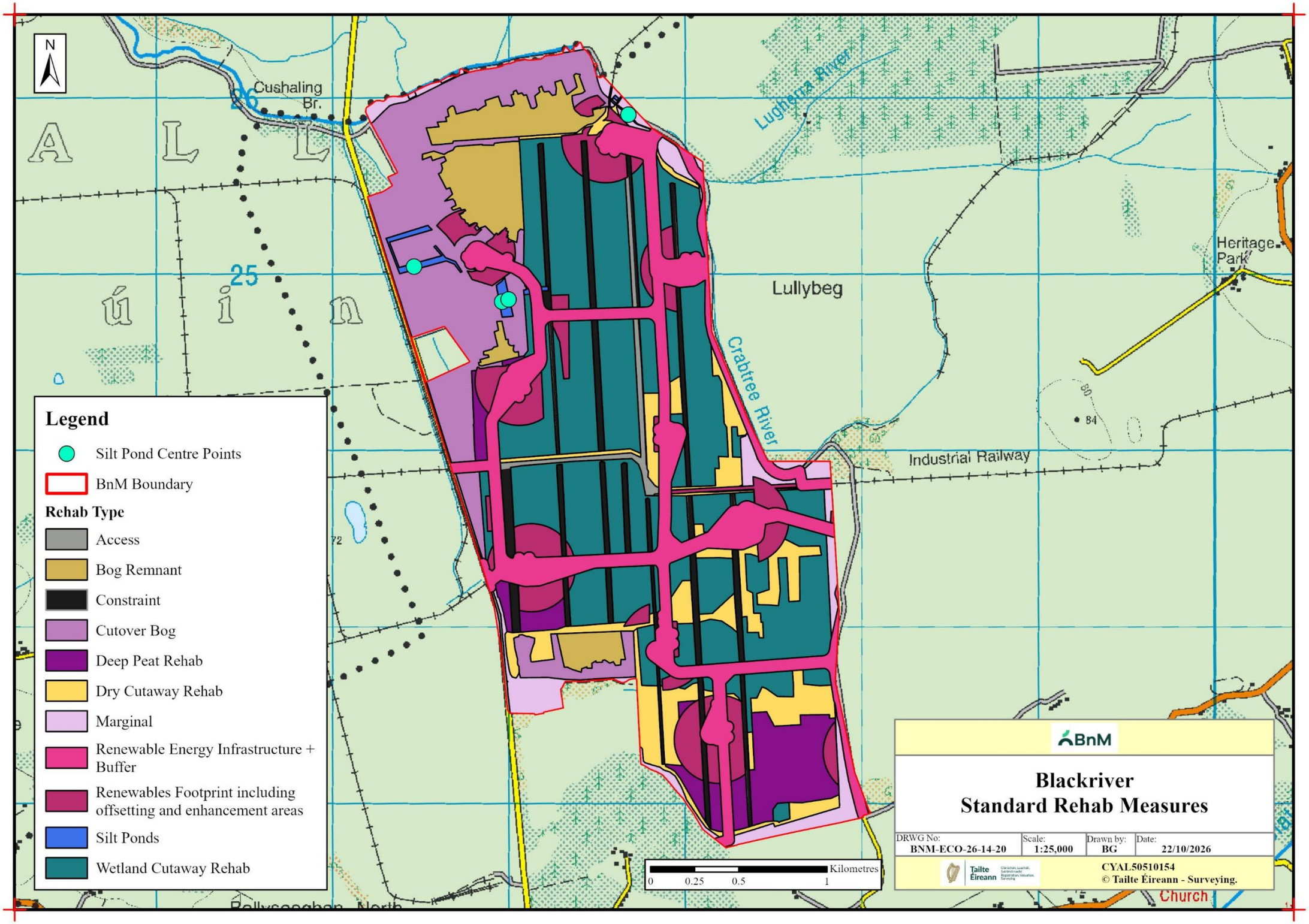



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Clonbrown
Killinthomas
Killyguire
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Clonroosk Big
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Rehabilitation Maps

BNM-ECO-26-14-20: Standard Rehab Measures

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Codd Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

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This document seeks to address the requirements of Condition 10.2 of Integrated Pollution Control (IPC) License Ref. P0503-01:

> "*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 BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Codd Bog upon cessation of peat production and complements 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 Codd Bog.

BnM have defined the key rehabilitation outcome at Codd Bog as environmental stabilisation.

Any consideration of any other future after-uses for Codd Bog, 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.

BnM are planning to develop a potential renewable energy project at Codd Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

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Non-technical summary

- BnM (formerly Bord na Móna) is planning to rehabilitate Codd Bog, a sub-section of a larger unit called Ballydermot Bog and is located approximately 4 km (kilometres) south of Edenderry in Co Offaly.
- Codd bog is further sub-divided into Codd 1 and Codd 2 by BnM.
- The Figile River flows through the site dividing Codd 1 and Codd 2 and there is some private land on both sides of the river within the floodplain.
- Codd Bog has been in full industrial peat production since pre 1975 and supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use.
- There was a small amount of *Sphagnum* sod moss production on a spur of high bog at the north-west corner of Codd 1 Bog.
- BnM Industrial peat extraction is now finished at Codd Bog.
- The majority of the site is dominated by bare peat.
- Codd Bog has a partially pumped bog drainage.
- A small conifer plantation is located to the east corner of Codd on old cutover bog, adjacent to Cushaling Bridge.
- BnM are planning to develop a potential renewable energy project at Codd Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The wind farm planning boundary overlaps Codd Bog and is considered as a constraint in the rehabilitation plan. Codd Bog will be rehabilitated as part of the Ballydermot Wind Farm development or at a later date. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a “skin” back onto the peat), and minimising effects to downstream waterbodies.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton will thrive.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures will be planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog 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.
- Rehabilitation at Codd Bog will result in improved water quality, climate benefits with the reduction of carbon emissions and enhanced biodiversity when the residual peat is re-wetted.

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- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and *Sphagnum* rich embryonic bog communities (on deeper peat); and wetlands with Reedbeds and Birch woodland on shallower peat. In time a naturalised peatland can be developed.
- It will take some time for vegetation and habitats to fully develop at Codd, and a peatland ecosystem to be restored. However, it is expected that most of the bare peat will be developing pioneer habitats after 5-10 years.
- The development of a range of habitats at Codd Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape
- This peatland rehabilitation plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen bog group (Ref. P0503-01). 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 Allen Bog Group comprises 2 main sub-groups: Allen-Clonsast and Allen-Lullymore. Codd Bog is part of the Allen-Lullymore bog group. Codd bog is further sub-divided into two sub-sections – Codd 1 and Codd 2. These sub-sections are the subject of this rehabilitation plan. Further details on the bogs within the Allen-Lullymore bog group are outlined in Appendix I.

The sub-sections Codd 1 and Codd 2 are located at the northwestern extent of the bogs within the wider footprint of Ballydermot Bog and are located in Co. Offaly, approximately 4km south of Edenderry.

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Codd Bog and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are **NOT** proposed as part of this draft Codd rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Codd will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future.

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1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

> "*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 document covers the area of **Codd Bog**. Parts of Codd Bog (around the perimeter of the site) are currently being used by domestic turf cutters who have turbary rights. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting and turbary issues on Codd Bog that are outside of the control of BnM. Nevertheless, BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

The proposed Water Supply Project – Eastern and Midlands Region (Irish Water) pipeline (taking water from Shannon to Dublin) crosses this bog (Codd 2 Section) close to the eastern margins and has been mapped as a constraint on the rehabilitation plan. It is expected that the footprint of the corridor will be rehabilitated post the construction of the proposed Water Supply Project – Eastern and Midlands Region.

BnM are planning to develop a potential renewable energy project at Codd Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). This proposed wind farm project is located within Codd Bog as well as the adjacent BnM bogs of Ballydermot, Barnaran, Blackriver, Derrybrennan, Glashabaun, Killinagh, Lodge, Lullybeg, Lullymore and Ticknevin. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm has been taken into account in the preparation of this Rehabilitation Plan. Where proposed wind farm infrastructure overlaps with areas identified for rehabilitation, the timing and sequencing of rehabilitation measures will be coordinated with the proposed development. Accordingly, these areas are treated as a temporal consideration in relation to the implementation of rehabilitation measures.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Codd Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Codd Bog 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 or issues such as rights of way/access, Edenderry power station and forestry.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan*' (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2011 to 2026 inclusive), monitoring and desktop analysis, forms the basis for the development of this 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022;
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

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.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.

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- 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, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027;
- BnM Annual Report 2025.
- 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 BnM's rehabilitation and Biodiversity Action Plan activities and will be contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Codd Bog was surveyed in September 2011. Additional ecological walk-over surveys and visits have taken place at Codd Bog between 2014-2026. 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 (2019), while mosses and liverworts nomenclature follows identification keys published by the Atherton *et al*. (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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3. SITE DESCRIPTION

Codd Bog is located approximately 4km to the south of Edenderry in Co. Offaly (Grid reference: ITM 263442; 226977). Codd Bog is a sub-section of a larger unit called Ballydermot Bog and is located in the northwest corner of the bog group. Codd Bog comprises two sub-sites Codd 1 to the south and Codd 2 to the northeast. The Figile River flows through the site dividing Codd 1 and Codd 2 and there is some private land on both sides of the river within the floodplain. The majority of Codd bog comprises bare peat with pioneer vegetation maturing and developing a mosaic of typical cutaway peatland habitats and it is surrounded by marginal habitats.

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland and other bogs in the wider Ballydermot Bog which are owned and managed by BnM.

See Drawing number *BNM-ECO-26-14-01: Site Location Map,* included in the accompanying Mapbook[1] , which illustrates the location of Codd Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Codd Bog was in full industrial peat production since before 1975 until 2020 and supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Much of Codd Bog is now cutaway and the majority of the original raised bog has now been removed.

A BnM industrial railway network occurred within the bog providing a link to Edenderry Power Station (now ceased). This railway has been decommissioned.

3.1.2 Current land-use

Codd Bog has a partially pumped drainage regime, with two pumps in the southern part of the bog (Codd 1). This hydrological management via pumping supported former industrial peat production and its infrastructure. Pumping is ongoing during the decommissioning phase.

A small area of conifer plantation has been planted at the north-east corner of the site at Codd 1 on old cutover bog. This is a private plantation (not developed by Coillte). South of the plantation there is some active cutover bog where there is private sod-turf cutting. There are some areas of active turbary outside the margins of the site.

Edenderry power station occurs on the western side of Codd and has been mapped as a constraint in the rehabilitation plan.

BnM are planning to develop a potential renewable energy project at Codd Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project is located within Codd Bog as well as the adjacent BnM bogs. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Codd Bog Map Book

infrastructure **partially** overlaps with the Codd Bog (see drawing number *BNM-ECO-26-14-20: Standard Rehab Measures*); these (infrastructure) areas have been treated as a constraint in the rehabilitation plan.

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

  a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

  b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

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xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

xxv. All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3 Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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.

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 Codd Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPL).

As the primary employer in many Midland counties, BnM 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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology[2] of Codd Bog is predominantly dark limestone (Lucan Formation) with Crinoidal wackestone/packstone limestone (Ballydams formation) towards the eastern boundary. The bedrock geology is therefore predominately alkaline (less acidic).

The sub-soils are classed as cutover peat. This is underlain by lacustrine marl, which is exposed in places.

3.2.2 *Peat type and depths*

Much of Codd Bog is now cutaway and the majority of the original raised bog has now been removed. In general, between 0.5-1.5 of residual peat remains. Remnants of deeper peat remain in the north-west spur and eastern section of Codd 2 with peat over 5m in depth in some places. This may have the potential to develop embryonic *Sphagnum*-rich peat-forming communities if optimum hydrological conditions can be developed.

3.3 Key Biodiversity Features of Interest

The different cutaway habitats developing across the site reflects the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All sites have hydrological gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and groundwater has a stronger influence.

The majority of Codd Bog comprises bare peat and pioneer vegetation mosaics as peat extraction only ceased recently (2020). The margins of the bog support habitats such as scrub, conifer plantation, Birch woodland and remnant bog. Codd 1 and Codd 2 are divided by the Figile River which supports adjacent fields of wet grassland within the river floodplain. These fields are privately owned but partially overlap the BnM boundary. Overall, habitats of biodiversity interest are largely confined to the marginal habitats fringing the former industrial production area.

The route of the former railway track gravel beds support populations of Blue Fleabane (*Erigeron acris*) and Basil Thyme (*Clinopodium acinos*). Both species are nationally rare, Red-listed species with Blue Fleabane listed as "Least Concern" and Basil Thyme listed as 'Near Threatened' on Irelands Red List (Wyse-Jackson *et al*., 2016). Several populations are present on former railway track routes throughout Codd or on areas of exposed gravel

[2] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0

that are associated with the railway tracks as part of the 'weed' or recolonising flora. These species are not typical bog species and are likely to have come on to the production bog from nearby eskers or gravel pits. The presence of these species enhances the rare flora resource of Co. Offaly.

Detailed ecological reports for Codd 1 and Codd 2 are provided in Appendix II.

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present include:

- Bare peat (community 'Bare peat (0-50% cover)'or BP) (PB4)
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff), Marsh Arrowgrass (pTrig), Bog cotton (pEang) and Reed-mace (pTyph).
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated)

The most common habitats found around the margins of the site include:

- Birch woodland (WN7)
- Scrub (WS1) (found on the undeveloped margins of site)
- Raised bog (PB1)
- Cutover bog (PB4) (several small fragments)
- Wet grassland (GS4)
- Silt Ponds (Silt) with associated habitats such as scrub

The majority of the site has been subject to industrial peat extraction and predominantly comprises bare peat. These areas have begun to be colonised with pioneer poor fen communities mostly dominated by Soft Rush (Juncus effusus) (pJeff), Marsh Arrowgrass (*Triglochin palustris*) (pTrig), Common Bog Cotton (*Eriophorum angustifolium*) (pEang) and Reedmace (*Typha latifolia*) (pTyph). The scrub is well developed along the margins of the site and dominated by Gorse (*Ulex europaeus*) and Downy Birch (*Betula pubescens*). There is a small area of remnant high bog located along the west side of Codd 1. It has been drained and is quite degraded. Part of this high bog contains some mature Birch woodland with Downy Birch and tall Scot's Pine (*Pinus sylvestris*), which is spreading. Within the woodland, the ground cover is dominated by Brambles (*Rubus fruticosus*) and Ivy (*Hedera helix*) with some Heather (*Calluna vulgaris*) and Bilberry (*Vaccinium myrtillus*). One feature of interest is that there is a block of tall (but relatively young) Oak (*Quercus petraea*) planted in this area. Oak is also self-seeding in the woodland and young saplings are present. It is unusual to see so many Oak saplings within Birch woodland. Other species such as Holly (*Ilex aquifolium*), Elder (*Sambucus nigra*), Hazel (*Corylus avellana*) and Alder (*Alnus*

[3] Categories in brackets refer to the current BnM classification system for vegetation communities, along with an equivalent Heritage Council habitat classification or Fossitt Code, where relevant.

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glutinosa) are present. This woodland was probably part of a much larger woodland that extends to the west (off the BnM property) but a small area was cut off by the construction of the BnM railway.

The Figile River divides Codd 1 and Codd 2 and supports fields of wet grassland within the river floodplain. White Clawed Crayfish (*Austropotamobius pallipes*) was recorded from the Figile River during drainage works in the 1990's.

Other habitats along the margins of the site include bog woodland (birch dominated) (WN7), scrub (WS1), raised bog (PB1), cutover bog (PB4) and wet grassland (GS4). A number of silt ponds are associated with the margins of the bog.

See Appendix II for more detail on site, habitats and local features.

See Drawing number *BNM-ECO-26-14-17: Habitat Map 2018*, included in the accompanying Mapbook, which illustrates the habitats at Codd Bog.

3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Codd Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC). Multiple mammal species have been recorded on or within 1 Km of the bog including Irish Hare (*Lepus timidus subsp. Hibernicus)*, Fox (*Vulpes vulpes*), Eurasian Badger (*Meles meles),* Pine Marten (*Martes martes*) and European Otter (*Lutra lutra*).

The butterfly species Peacock (*Aglais io*), Common Blue (*Polyommatus icarus*), Large White (*Pieris brassicae*) and Small Tortoiseshell (*Aglais urticae*), Meadow Brown (*Maniola jurtina*), Ringlet (*Aphantopus hyperantus*), Small White (*Pieris rapae*), Speckled Wood (*Pararge aegeria*) have been recorded at the bog.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Heron (*Ardea cinerea*), Mallard (*Anas plathrhynchos*), Kestrel (*Falco tinnunculus*), Skylark (*Alauda arvensis*), Wood Pigeon (*Columba palumbus*), Meadow Pipit (*Anthus pratensis*), Pheasant (*Phasianus colchicus*), Hooded Crow (*Corvus cornix*), Blue Tit (*Cyanistes caeruleus*), Wren (*Troglodytes troglodytes*), Pied Wagtail (*Motacilla alba yarrellii*) and Swallow (*Hirundo rustica*) have all been recorded during BnM ecology surveys.

NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km hectad (N62) within which Codd Bog is located include; Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Partridge (*Perdix perdix*). Grey Wagtail (*Motacilla cinerea),* Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola)* and Yellowhammer (*Emberiza citrinella*).

Red-listed[5] listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Red Kite (*Milvus milvus*) and White-tailed Eagle (*Haliaeetus albicilla*). Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

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

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

3.3.3 Invasive species

High risk invasive species American Mink (*Neovison vison*) has been recorded at the bog. No other invasive species has been recorded at the bog.

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Codd Bog. No SPAs occur within 27km of the site. The nearest EU Designated sites to Codd Bog are as follows:

- The Long Derries, Edenderry SAC (Site Code: 000925) – 413m northeast of Codd.
- River Barrow and River Nore SAC (site code: 002162) – 13km south of Codd
- Mouds Bog SAC (site code: 002331) – 13.5km southeast of Codd.
- Pollardstown Fen SAC (site code: 000396) – 14.1km southeast of Codd.
- Ballynafagh Lake SAC (site code: 001387) – 14.2km east of Codd

A number of non-statutory designated sites also occur in the wider area around Codd Bog. The Long Derries, Edenderry pNHA, also designated under The Long Derries, Edenderry SAC, is located 413m northeast of Codd.

- The Grand Canal pNHA (NPWS Site Code: 002104), occurs approximately 2.3km north of Codd.
- Carbury Bog NHA (Site Code: 001388) occurs approximately 7.2km northeast of Codd.
- Black Castle Bog NHA (NPWS Site Code: 000570) occurs approximately 7.2km northwest of Codd.
- Ballina Bog pNHA (NPWS Site Code: 000390), occurs approximately 12.8km north of Codd.
- Hodgestown Bog NHA (NPWS Site Code: 001393), occurs approximately 13.8km east of Codd,
- Mouds Bog pNHA (Site code: 002331) occurs approximately 13.5km southeast of Codd,
- Curragh (Kildare) pNHA (Site code: 000392) occurs approximately 13.6km southeast of Codd,
- Pollardstown Fen pNHA (Site code: 000396) occurs approximately 14.1km southeast of Codd,
- Ballynafagh Lake SAC (site code: 001387), occurs approximately 14.2km east of Codd
- Royal Canal pNHA (Site code: 002103) occurs approximately 14.9km north of Codd.

See drawing *BNM-ECO-26-14-23: Proximity to Designated Sites* in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar sites located in proximity to Codd Bog. The nearest Ramsar sites are Pollardstown Fen located approximately 14.1km southeast and Raheenmore Bog located approximately 16.9km west of Codd Bog.

3.5 Hydrology and Hydrogeology

Codd bog forms part of the Barrow Catchment (Catchment ID: 14) as defined by the EPA under the Water Framework Directive (WFD). The bog lies completely within the Figile_SC_010 sub-catchment.

The Figile River (EPA code:14F01) flows along the northern boundary of Codd 1 and the southern boundary of Codd 2 separating these sub-sites. The Figile River then continues to flow south along the western boundary of Codd 2. Cloncant River (EPA code: 14C41) flows through the centre of Codd 2 and into Figile River ((EPA code:14F01). Codd River (EPA code:14C44) flows in close proximity to the northern boundary of Codd 2 and then southwest where it joins the Figile River (EPA code:14F01).

Codd Bog has a partially pumped bog drainage (two pumps, with the main pump along the River Figile) whose water table will be below the surrounding water table for part of the site.

GSI data indicates that Codd Bog lies entirely within a locally important aquifer – bedrock which is Moderately Productive only in Local Zones. An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m^3/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.

Locally Important Aquifers, moderately productive in local zones, are aquifers with a limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water. In general, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres. Due to the low permeability and poor storage capacity, the aquifer has a low 'recharge acceptance'. Some recharge in the upper, more fractured/weathered zone is likely to flow along the relatively short flow paths and rapidly discharge to streams, small springs and seeps. Groundwater discharge to streams ('baseflow') can significantly decrease in the drier summer months.

Codd Bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Map viewer). Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site.

Quaternary sediment maps show that Codd Bog is generally underlain by cutover raised peat. This combination of sediment is common in the wider context surrounding the site.

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 Codd 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 bi-annual basis by BnM 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.

Codd Bog has 8 surface water outlets to the Barrow (14) catchment. All eight outlets are directed to the Figile River (14F01). This river is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds, associated surface water emission points and monitoring and sampling locations are detailed in drawing *BNM-ECO-26-14-02: Structures and Sampling*, along with *BNM-ECO-26-14-WQ01: Water Quality Map* included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Codd 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme Water Quality Monitoring

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also 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*., 2017). Bog rehabilitation is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) 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 BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Codd has been completed. This discharge will have improved 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 watercourse receptors and the Figile_SC_010 sub-catchment and will support the future status of the watercourses achieving Good Status.

While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

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

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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Codd 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. The majority of the bog will develop as birch woodland on drier areas and peripheral headlands. Wetlands are expected to develop on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors. Part of this bog is expected to develop

regenerating wet *Sphagnum*-rich vegetation on deep peat areas. These areas have the potential to develop as a carbon sink in the future.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Codd Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare peat and pioneer habitats in the former production area of Codd Bog are assessed as **local importance (lower value)**.

Habitats including woodland, scrub, fen, calcareous grassland, remnant raised bog, and wetlands may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Codd Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity, and other general topics over the years about Codd Bog within Allen bog group, including Codd 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.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Proposed Water Supply Project – Eastern and Midlands Region pipeline (Irish Water).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Codd Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Codd Bog.

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

4.2 Topics raised by Consultees

N/A Yet as consultation has not commenced.

4.3 BnM response to topics raised during consultation

N/A Yet as consultation has not commenced.

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5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect planned renewable energy infrastructure or areas required for this proposed project.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of a peatland used for industrial peat production in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies, where possible. However, this is dependent on the topography of the cutaway bog and the final drainage regime. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is already significant potential for the creation of wet cutaway habitats at this cutaway bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Codd Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source.
- 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, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

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- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and BnM). Reducing pressures due to former peat extraction activities at Codd 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 BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g. Timahoe South and Lodge Bog) in 2022-2023 and have previously carried out re-wetting and rehabilitation at Lullymore bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Codd Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Codd bog is part of the Allen-Lullymore bog group.
- The local environmental conditions of Codd Bog mean that drain blocking and hydrological management to re-wet peat where possible is the most suitable rehabilitation approach for this site. Codd Bog while largely comprising shallower peat does retain pockets of residual deep peat in places.
- The key goals and outcomes of rehabilitation set by BnM. BnM have defined the key goal and outcome of rehabilitation at Codd Bog as **environmental stabilisation** and **optimising residual peat re-wetting,** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Wind Farm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Codd Bog. In areas associated with proposed wind farm infrastructure, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- Rehabilitation of Codd Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.
- The cutaway at Codd Bog is mostly bare peat as it was recently in industrial peat extraction. Rehabilitation is proposed to enhance residual peat re-wetting across the site to accelerate natural colonisation with more intensive drain-blocking in the deeper peat areas. Codd Bog has a partially pumped bog drainage (with the main pump along the river in Codd South) whose water table will be below the surrounding water table for part of the site. It can be expected that if pumps are turned off or pumping is reduced that water tables will rise internally and part of the site will develop as wetlands, depending on the local topography and water courses.
- **Potential land-use.** It is expected that BnM will update and finalise the draft rehabilitation plan for Codd when a decision is made in relation to the wind farm planning application. BnM remain fully committed

to rehabilitating the whole bog and meeting the conditions of the IPC license. The targeted rehabilitation measures set out in this Rehabilitation Plan will be implemented following completion of the construction phase of the proposed Ballydermot Wind Farm in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.

- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM 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.
- **Land-use**. A small conifer plantation is located to the east corner of Codd 1 on old cutover bog, adjacent to Cushaling Bridge.
- **Turbary.** South of the conifer plantation there is some cutover bog where there is active private sod-turf cutting.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to BnM Archaeological Liaison Officer and the National Museum of Ireland (Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM 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.
- **Proposed Water Supply Project – Eastern and Midlands Region (Irish Water).** This proposed Irish Water Project traverses Codd 2 Bog in the eastern section. It is expected that the enhanced rehabilitation measures planned for this bog will be carried out in advance of the construction of the pipeline, which is still subject to planning consent. BnM do not propose to carry out any rehabilitation works within the footprint of the proposed Water Supply Project – Eastern and Midlands Region until a decision has been made by the relevant authorities in relation to the statutory consent applications for the project. It is expected that the footprint of the corridor will be rehabilitated post the construction of the proposed project.

6.2 Key Assumptions

- It is assumed that BnM 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.

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6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Codd 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.
- The footprint of Edenderry Power Station and surrounding lands.
- This plan is not intended to be an after-use or future land-use plan for Codd Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial drainage activities.

Rehabilitation is generally defined by BnM 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 a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g. potential suspended solids run-off).

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

- Rewetting of residual peat in the area originally drained for industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat forming habitats. 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 BnM 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 Longford Pass 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 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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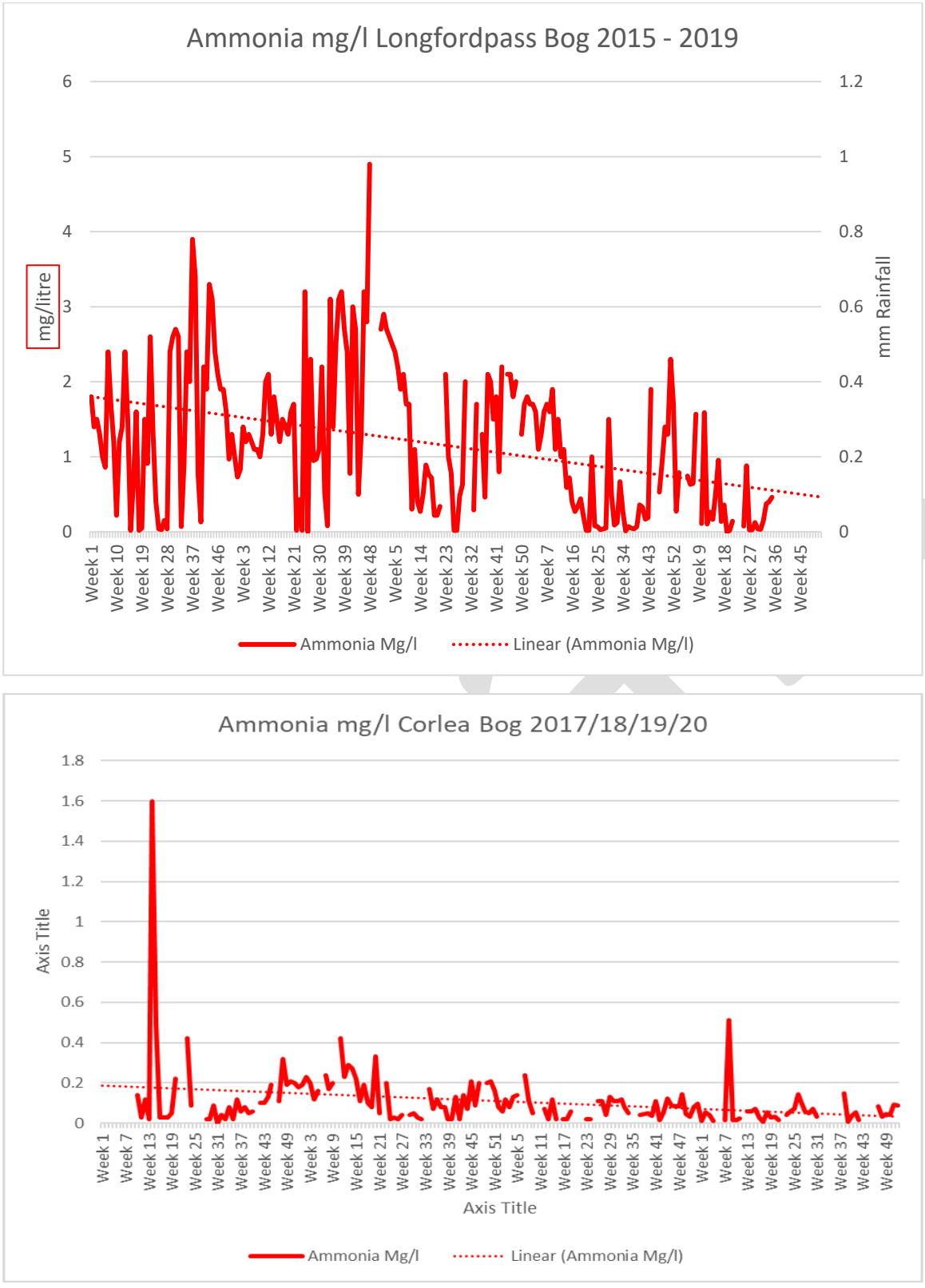


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

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

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and 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 based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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 and LiDAR Surface Maps, these are included in the accompanying mapbook as the drawings referenced below:

BNM-ECO-26-14-21: Aerial Imagery 2000

BNM-ECO-26-14-22: Aerial Imagery 2020

BNM-ECO-26-14-04: Peat Depths

BNM-ECO-26-14-03: LiDAR Map

BNM-ECO-26-14-09: Depression Analysis Map

The restoration and rehabilitation measures are provisionally outlined in drawing titled *BNM-ECO-26-14-20: Standard Rehabilitation Measures* in the accompanying Mapbook.

These rehabilitation measures for Codd Bog will include (see Table 8.1):

- Re-assessment of the pumping regime and removing pumps if this is desired and has no significant external impact or impacts on proposed future land-uses. Initial hydrological modelling indicates that a part of the site will develop a mosaic of wetland habitats with some permanent deeper water if pumps are decommissioned. 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 at outfalls and by adjusting piped drainage, where possible. 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 of surrounding rivers.
- A widespread drain-blocking programme and hydrological management will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat and residual deeper peat.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking, modifying outfalls and managing water levels with overflows;
- Wetland measures including blocking outfalls and managing water levels with overflows.
- 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 rehabilitation measures at Codd Bog.

Type	Code	Description	Area (Ha)*
Deep peat cutover bog	DPT1	Regular drain blocking, modifying outfalls and managing water levels with overflows	74.1
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	83.2
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway, targeted drain-blocking, modifying outfalls and managing water levels with overflows	86.8
Marginal land	MLT1	No work required	46.1
Silt Pond	Silt Pond	Silt Pond	6.3
Ballydermot Wind Farm	Wind Farm Infrastructure + Buffer	Wind Farm infrastructure areas including turbine bases, internal access roads and turning points, crane hard stand and peat and spoil areas.	63.9
	Renewables Footprint	Areas associated with the proposed Ballydermot Wind Farm where rehabilitation measures will be appropriately sequenced including a temporary construction compound, enhancement areas; peatland restoration, scrub planting	119.5
Constraint	Constraint	Access tracks, Edenderry power station, turf cutting, bog remnant and forestry, retained drainage infrastructure.	57.0
Total Area			**536.8**

** Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.*

8.1 Completed and Ongoing

- The site is predominantly comprised of bare peat with colonisation of some pioneer vegetation. Several sections have already developed vegetation cover and are developing a mosaic of typical cutaway peatland habitats.

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

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Codd Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out

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- 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) is to be 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.
- Carry out Appropriate Assessment (AA) of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA (where needed) in the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- 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.

8.4 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 9 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.

8.5 Timeframe (when finalised)

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions.
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation**: Decommission silt-ponds, if necessary

8.6 Budget and costing

BnM 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 BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

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At this time, a ‘standard’ rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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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.
- 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.
- Monitoring results will be maintained, trended 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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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 BnM 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.

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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

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APPENDIX I. BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow catchment, and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and Timahoe South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied an old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly, via the BnM industrial railway. Many bogs were in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long-term peat extraction activity reduced the peat depth on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen-Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Lullymore in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Lullybeg by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 and 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow piped outfall. Some cutaway bog at Lullymore, used as spread grounds for sod peat, was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly Conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries, Edenderry SAC (site code: 000925) is located in the Lullymore Bog sub-group. Glashabaun Bog (northern sub section) overlaps the SAC and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is an esker and BnM used the site in the past to extract gravel for the construction of railway embankments across BnM bogs. Rare plants including Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations.

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation is ongoing.

A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC Licence Ref. P0503-01, and current, indicative peat production status, is outlined in Table Ap-1.

Table Ap-1 Allen-Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	**Area (ha)**	**Stage of development**	**Land-Use and History**	**Peat Production Cessation**	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.		
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since 1950s Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Glashabaun South	569	Peat extraction since 1950s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s Peat extraction completely ceased in 2020 Majority completely cutaway	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial.	2020	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Parts still have deep peat	Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.		
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss Sphagnum inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023
Lullybeg	271	Peat extraction since before 1975 Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2004	Draft 2026
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group – amenity.	1992	Draft 2026
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019 Majority of bog still has relatively deep peat	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production. Cloncannon bog remnant – zoned for biodiversity Mostly bare peat. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2019	Draft 2026
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection	N/A	N/A

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab complete

See Drawing number *BNM-ECO-26-14-24: Bog Group Map*, included in the accompanying Mapbook which illustrates the location of Codd Bog and the Allen-Lullymore Bog Group in context to the surrounding area.

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Codd 1**	**Area (ha):**	1136 ha (2807 acres)
Works Name:	Ballydermot	**County:**	Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	8/09/2011

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (BP)
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II) also Marsh Arrow Grass (pTrig), Bog cotton (pEang) and Reed-mace (pTyph).
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway.)
- Pioneer calcareous grassland (gCal) (developing on old track)
- Purple Moorgrass-dominated grassland (gMol) (developing on margins of site).
- Gorse scrub (eGor) (developing on margins of site).
- Access routes (railways and paved tracks and associated verges)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated.) (Codes refer to Heritage Council habitat classification, Fossitt 2000, See Appendix II.)
- Rank dry meadow-type grassland (GS2) (found at southern margin).
- Raised bog (PB1) (dried remnant being invaded by scrub)

Description of site

This sub-section is part of Ballydermot Bog and is located in east Offaly with the southeast boundary of Codd 1 along the Offaly/west Kildare county boundary, 4 km north of Rathangan. A minor public road (Edenderry to Rathangan bog road) forms the eastern boundary and this report covers the BnM property south of the Figile River. The BnM railway system is extensive throughout this area and railway lines running in east to west orientation further divide the site.

Codd 1

The majority of this bog was used for milled peat-production. The southern boundary is marked by the railway while the Figile River flows along the northern side of the site. There is a spur of high bog at the northern end (which is adjacent to some private milled-peat production bog). This spur was used to produce *Sphagnum* sod moss). Access is via a track along the bog from the Cushaling Bridge. A small area of conifer plantation has been planted at the north-east corner of the site on old cutover bog. This is a private plantation (not developed by Coillte). South of the plantation there is some active cutover bog where there is private sod-peat cutting. There is a narrow ribbon of land between the track and the river that partially overlaps with the BnM GIS boundary. This land in the Figile River floodplain has been reclaimed and is grazed by horses.

There are no significant areas of cutaway vegetation present on the production bog and only a few fields have some development of pioneer communities such as Soft Rush-dominated vegetation. Several portions of fields were not available for production and these tend to only have thin peat remaining. Some typical pioneer cutaway habitats are found around the silt pond complexes where there is some dry heather communities, Birch scrub (oBir) and Purple Moorgrass-dominated grassland (gMol).

There is a small area of remnant high bog located along the west side of Codd 1. It has been drained and is quite degraded. Part of this high bog contains some mature Birch woodland with Birch and tall Scot's Pine, which is spreading. Within the woodland, the ground cover is dominated by Brambles and Ivy with some Heather and Bilberry. One feature of interest is that there is a block of tall (but relatively young) Oak planted in this area. Oak is also self-seeding in the woodland and young saplings are present. It is unusual to see so many Oak saplings within Birch woodland. Other species such as Holly, Elder, Hazel and Alder are present. This woodland was probably part of a much larger woodland that extends to the west (off the BnM property) but a small area was cut off by the construction of the BnM railway.

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Basil Thyme and Blue Fleabane

Basil Thyme and Blue Fleabane were noted at several locations along the northern railway. Basil Thyme has not been recorded at this site before and would not be a typical species of cutaway bog. This species was probably unlikely to have been present on the site prior to the development of the cutaway. The exposed gravel along the railway embankments is a perfect habitat for this species. One of its main known populations in Co. Offaly is located close by at the Long Derries SAC, Edenderry. This site was a BnM gravel pit and material from this site was used to make railway embankments. The spread of Basil Thyme from the Long Derries along the BnM railway network has been recorded in the past (Feehan pers. comm. 2011).

In the long-term, it could be expected that these railway embankments will re-vegetate with grassland and scrub as they go out of use, which will not favour this species. Occasional track maintenance is likely to be beneficial for this species as it will keep the gravel embankments exposed and prevent development of dense vegetation, which would be unsuitable for this species. Other BnM operations are not likely to have a significant impact on the status of this species. One possible solution is to develop some of the main railway line as an amenity walkway when production ceases. A suitable management regime to maintain the habitat of these rare plant species could easily be developed in association with the development and maintenance of these walkways. This will be considered within the wider context of the Derrygreenagh and Ballydermot Bogs, which are viewed as strongholds for the species in east Offaly. Consultation and licensing will be required with NPWS.

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

The nearest designated site to this sub-section of Ballydermot is 2.5 km SE to the Grand Canal pNHA (NPWS site code: 002104)

The Long Derries SAC (site code 000925) is located 3km to the northeast.

Adjacent habitats and land-use

Wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), scrub (WS1), Birch woodland (WN7), cutaway bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

There is a significant area of private production bog attached to Codd 1.

Watercourses (major water features on/off site)

- This section of Codd drains towards the Figile River and is located in the South-Eastern Barrow catchment. The Figile River flows along the northern boundary of Codd 1. White Clawed Crayfish was recorded from the Figile River during drainage works in the 1990's.
- There were no significant natural watercourses on site. Old drains pre-dating the development of BnM drained the bog. Large deep drainage channels were dug (east-west orientation) when the site was developed for sod-peat and mostly drain the site towards the east (roadside), where a large drain directs water north towards the Figile River.

Peat type and sub-soils

The majority of the peat exposed at this site is fen peat. There was some *Sphagnum*-moss peat production (for Environmental section) on dried out remnant high bog in Codd 1. Some former sod-peat cutaway has been recently developed and is going back into milled peat production. The largest area of remaining sod-peat cutaway has somewhat more acidic peat as the regeneration is dominated by Heather (although the layer of peat is quite thin in places).

A substantial portion of the eastern side of the site is underlain with a thick layer of shell marl.

Fauna biodiversity

Birds

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

- Kestrel (Codd 1, along Figile River)
- Other more common birds noted included Meadow Pipit, Pheasant, Wood Pigeon, Skylark, Hooded Crow, Blue Tit (in conifer woodland), Wren, (in conifer woodland) and a flock of 10 Pied Wagtail (cutaway).
- Local staff reported that Mallard and Heron are frequently observed on the bog.

Mammals

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

- Hare
- Fox
- Badger

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- Local staff note that Hare and Fox are the most common animals seen, but that deer have never been observed on the bog.

Other species

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

- Small Tortoiseshell
- Frog
- Meadow Brown

Fungal biodiversity

Brown Birch Bolete, Safron Milk Cap

Ecological Survey Report

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

Bog Name:	**Codd 2**	**Area (ha):**	780.28 Ha (area of production bogs)
Works Name:	Ballydermot	**County:**	Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	8th September 2011

Key biodiversity features of interest

- The railway tracks are supporting populations of Blue Fleabane and Basil Thyme. Both species are nationally rare plant species listed on Irelands Red List (Red List (Wyse Jackson et al., 2016). Several populations are present on railway tracks throughout the site or on areas of exposed gravel that are associated with the railway tracks as part of the 'weed' or recolonising flora. These species are not typical bog species and are likely to have come on to the production bog from nearby eskers or gravel pits. Continued disturbance along the railway tracks is likely to be beneficial for these species and they are not likely to be threatened by BnM operations. The presence of Basil Thyme is very significant and enhances the rare flora resource of Co. Offaly and Co. Kildare.

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway.)
- Pioneer calcareous grassland (gCal) (developing on old track)
- Purple Moorgrass-dominated grassland (gMol) (developing on margins of site).
- Gorse scrub (eGor) (developing on margins of site).
- Access routes (railways and paved tracks and associated verges)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated.) (Codes refer to Heritage Council habitat classification, Fossitt 2000, See Appendix II.)
- Rank dry meadow-type grassland (GS2) (found at southern margin).
- Raised bog (PB1) (dried remnant being invaded by scrub)
- Cutover bog (PB4) (small area formerly used to harvest peat).

Description of site

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This sub-site is part of Ballydermot Bog and is located approximately 4km south of Edenderry in Co Offaly. A secondary public road (Edenderry to Rathangan bog road) occurs along the eastern margin of Codd 2. A BnM railway crosses through Codd 2. The majority of the site was in active peat production until recently.

Codd 2

This bog is a relatively new production bog and was fully in production until recently with bare peat being exposed. It can be divided into two main sections by the BnM railway with a large spur located at the north-west part of the site.

The northern boundary of the main section takes in some marginal habitats including scrub (WS1) that has developed around some silt ponds on the margins of the bog. Basil Thyme and Blue Fleabane were recorded at several locations along the railway. There are no significant marginal habitats along the southern boundary as the boundary follows the edge of the production bog. The west side does have some wet grassland (GS4) that has developed along the floodplain of the Figile River. This area is grazed by Horses. Towards the bog there is some development of Birch woodland (WN7) and other marginal habitats such as scrub and Purple Moorgrass-dominated grassland.

The north-west section is similarly developed. The southern boundary takes in a small amount of remnant high bog (PB1) while there is significant area of active cutover bog (PB4) along the northern side.

Adjacent habitats and land-use

Wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), scrub (WS1), Birch woodland (WN7), cutaway bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

Watercourses (major water features on/off site)

- This section of Ballydermot drains towards the Figile River and is located in the South-Eastern Barrow catchment. White Clawed Crayfish was recorded from the Figile River during drainage works in the 1990's. The Figile River flows along the south side of Codd 2.

Peat type and sub-soils

Codd 2 has relatively deep peat still present. No sub-soil was exposed in the production bog. Gravelly sub-soil was exposed in some of the silt ponds to the north of the site.

Fauna biodiversity

Birds

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

- Other more common birds noted on the site included Meadow Pipit, Pheasant and Swallow.

Mammals

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

- Hare
- Fox
- Badger (Long Derries)
- Pine Marten (Long Derries)
- Otter (Cushaling River)

Other species

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

- Frog

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- Peacock, Common Blue and Large White noted along the northern side of Codd 2.

Fungal biodiversity

N/A

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

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

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

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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 Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2026-2030

The All-Ireland Pollinator Plan 2026-2030 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2020, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM 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 BnM'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.

14 BnM commitments

BnM 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.

In line with BnM'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. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. 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.

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APPENDIX VI. 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 license under section 95 of the EPA Acts. This is achieved by BnM 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	Codd Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

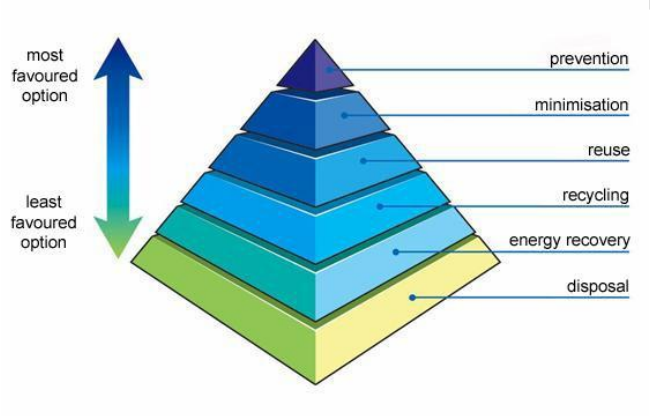
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 cutover 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

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

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement**

of ecological conditions in damaged wildlands through the **reinstatement of ecological processes**. In general, BnM 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 acrotelm – 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.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

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 IPC Licence's Ref. P0503-01 in the Allen-Lullymore Group of Bogs in Counties Offaly and Kildare.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.
- 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.

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- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.
- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

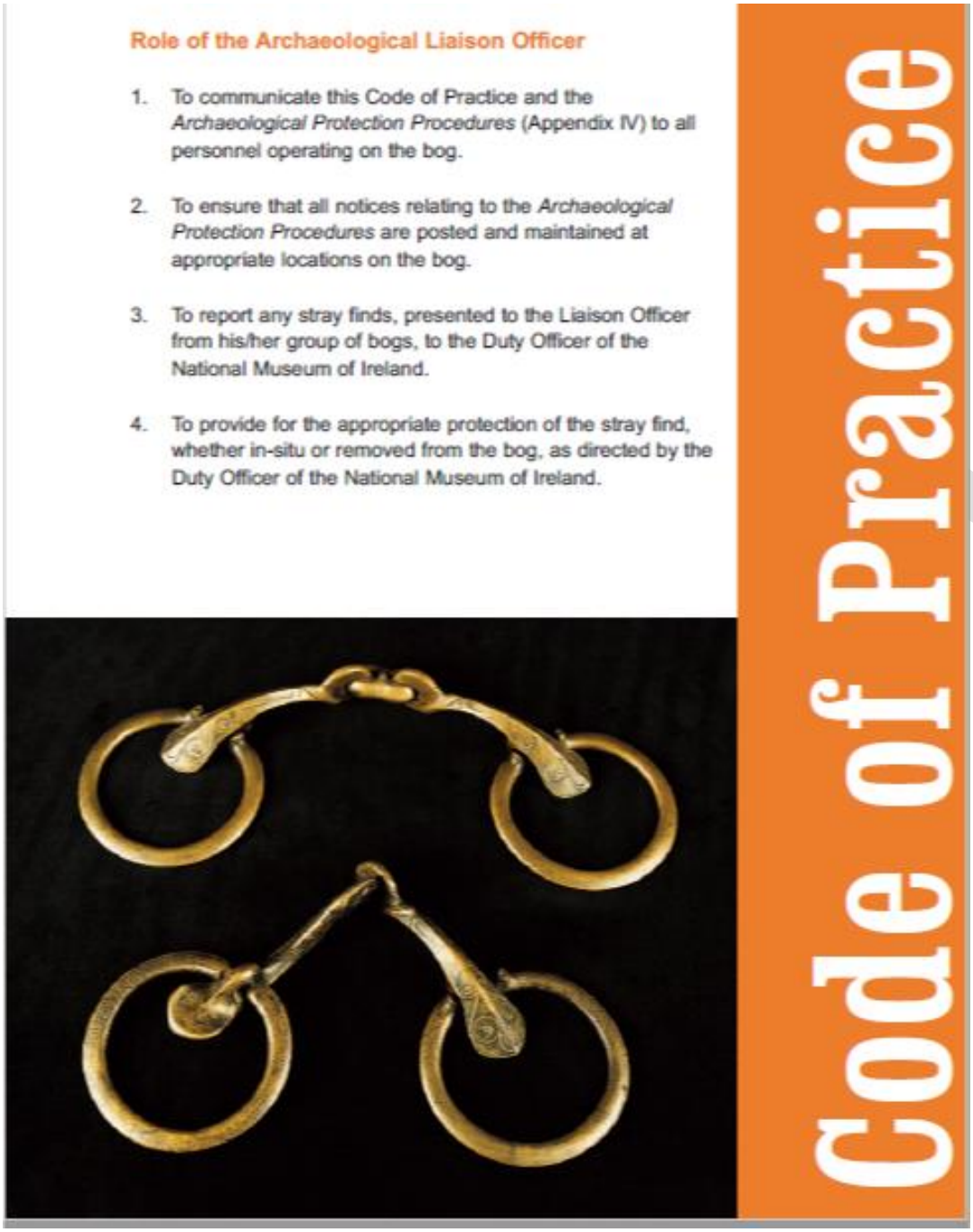
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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- 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/resources/faqs/environment--you/faq-listing/ 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 X. 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.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

---

2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:
- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:
- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:
- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

---

3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Codd Bog
Rehab Plan
GIS Map Book
2026

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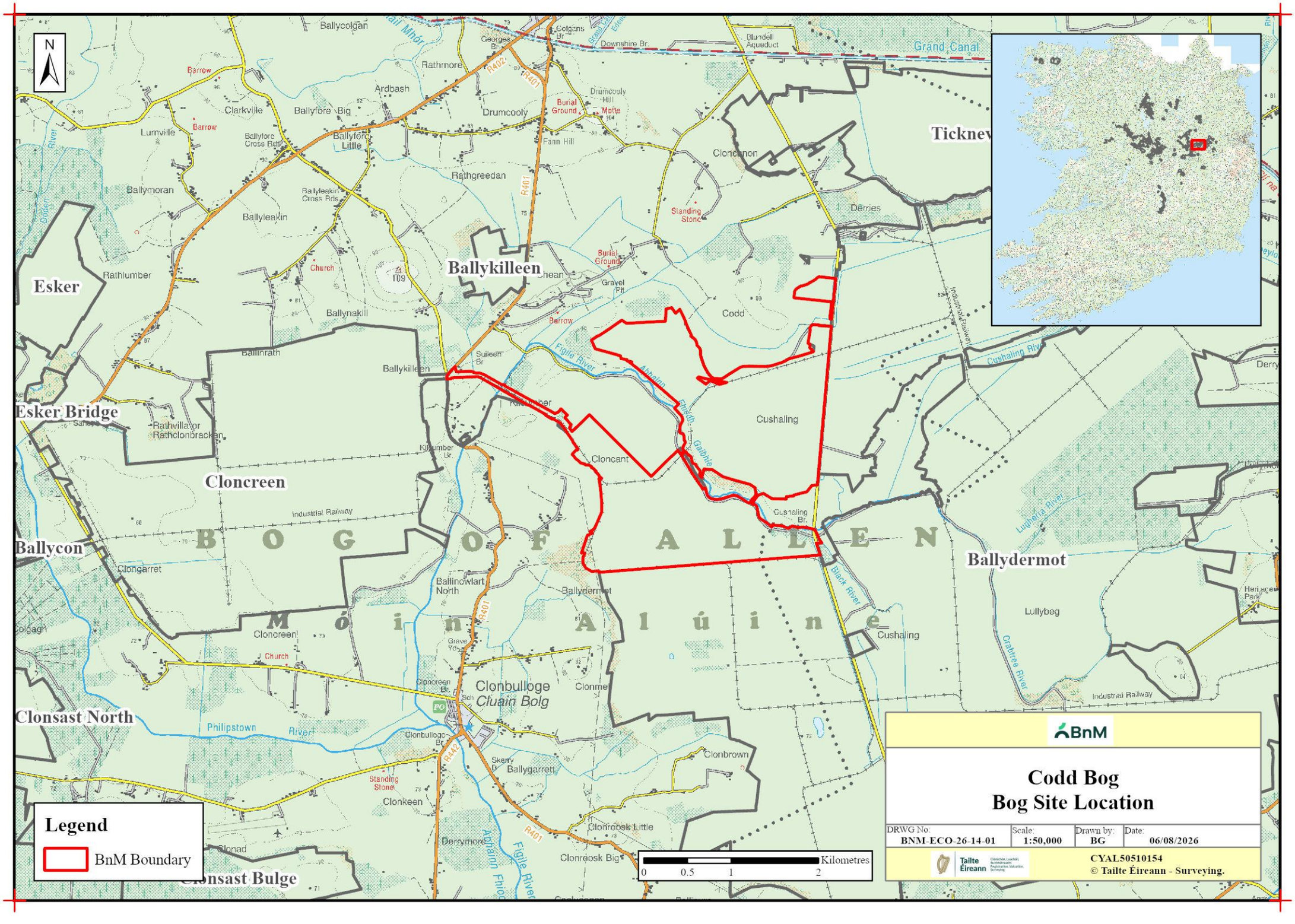
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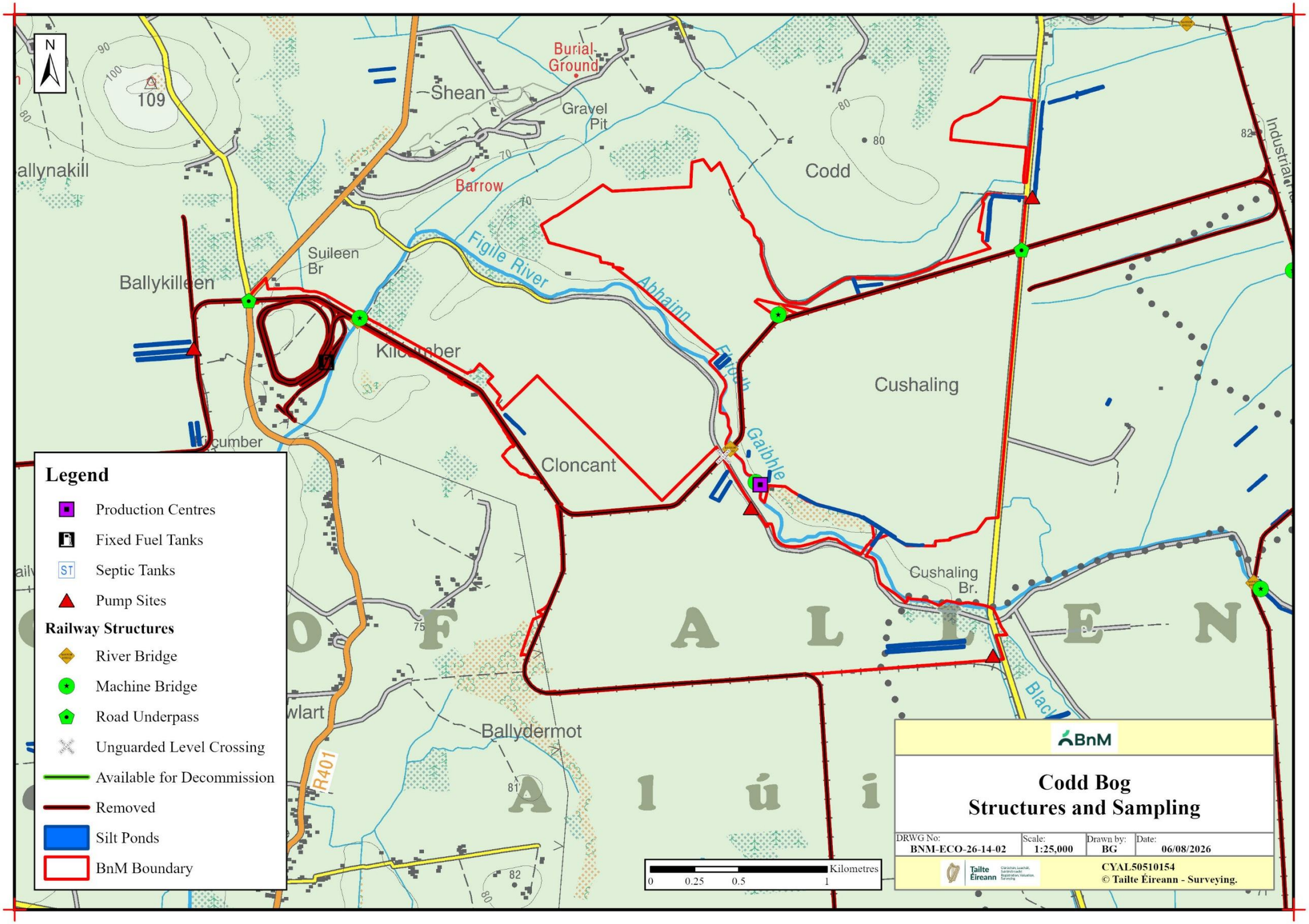
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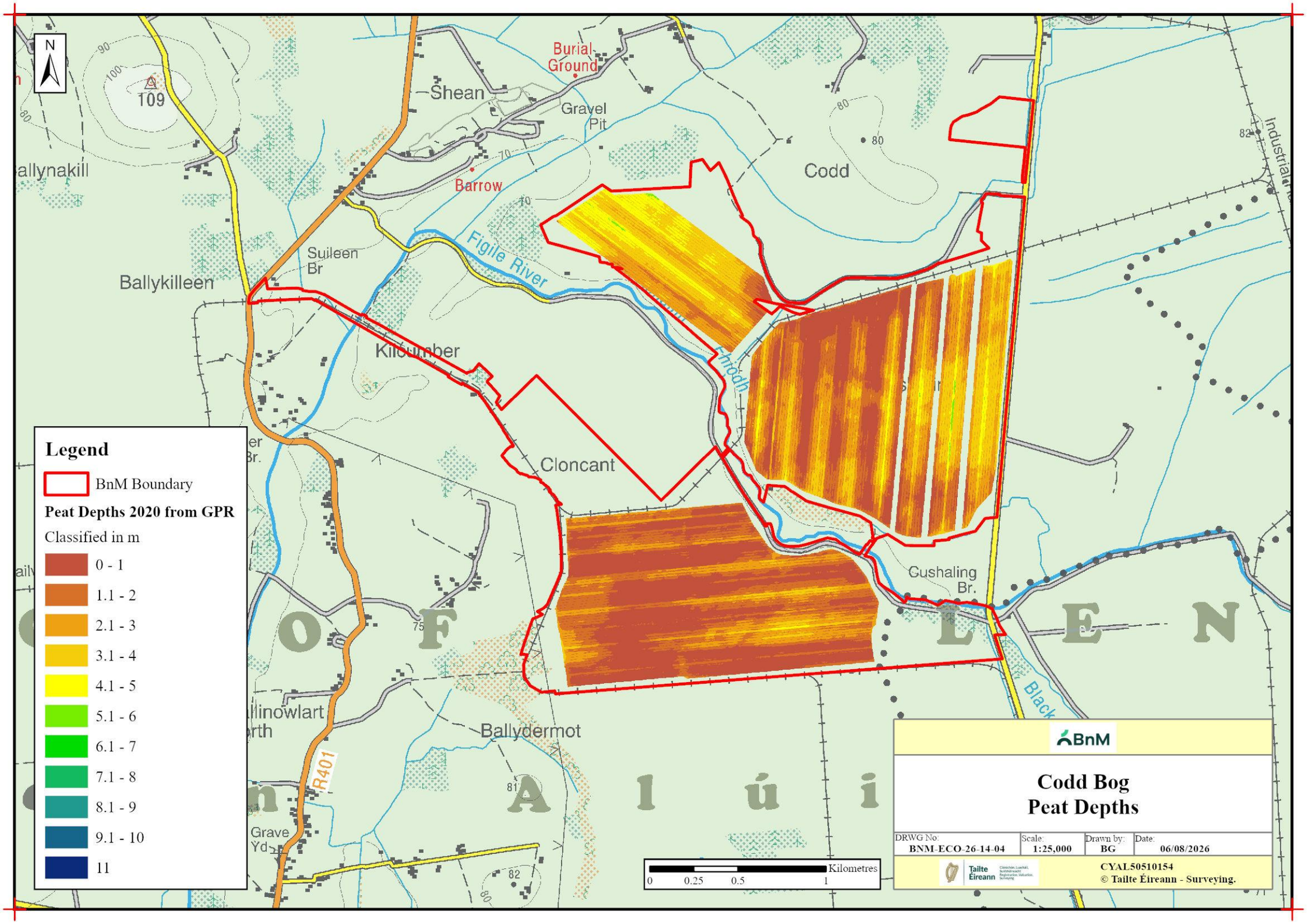
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Septic Tanks
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Railway Structures
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Machine Bridge
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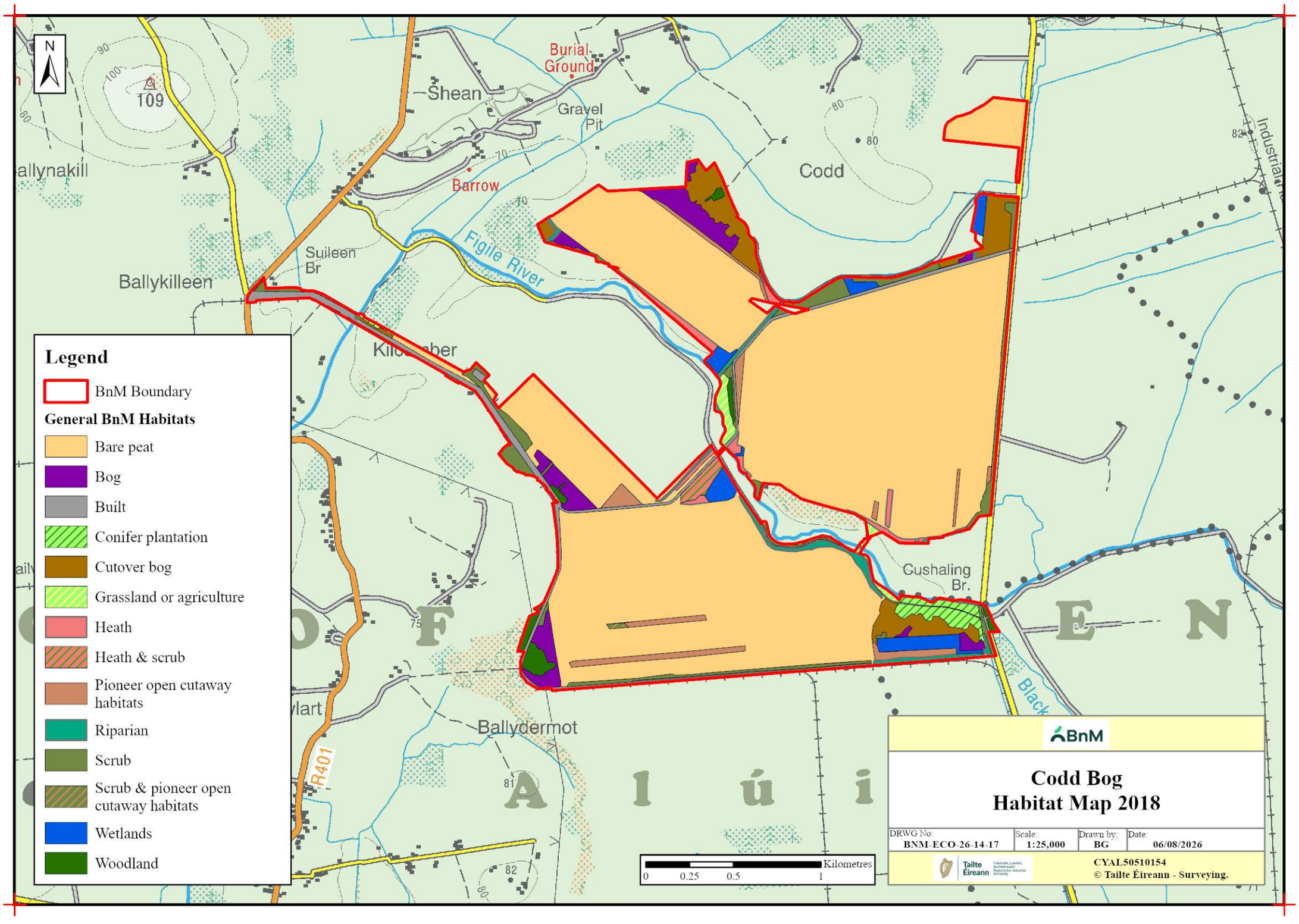
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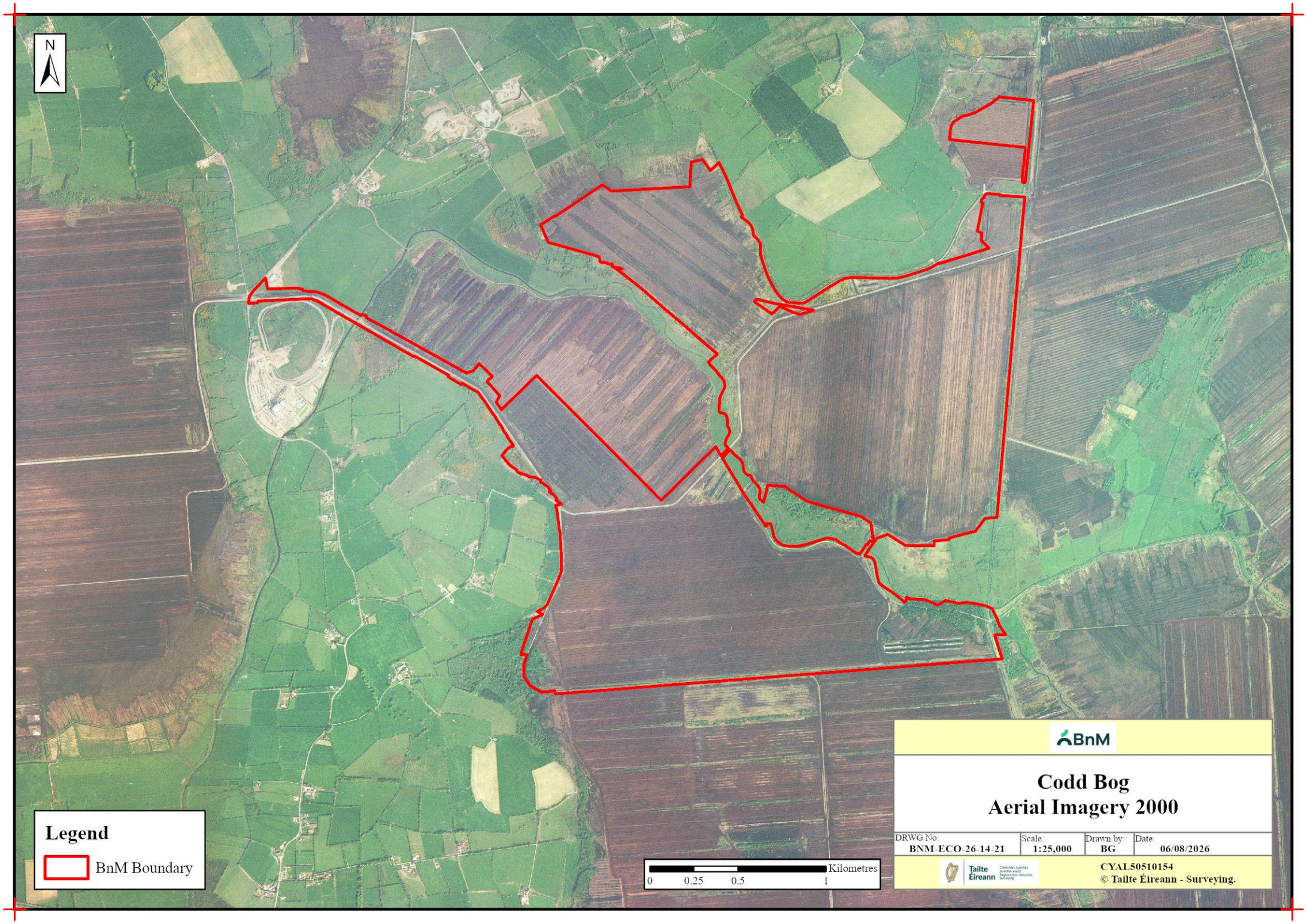
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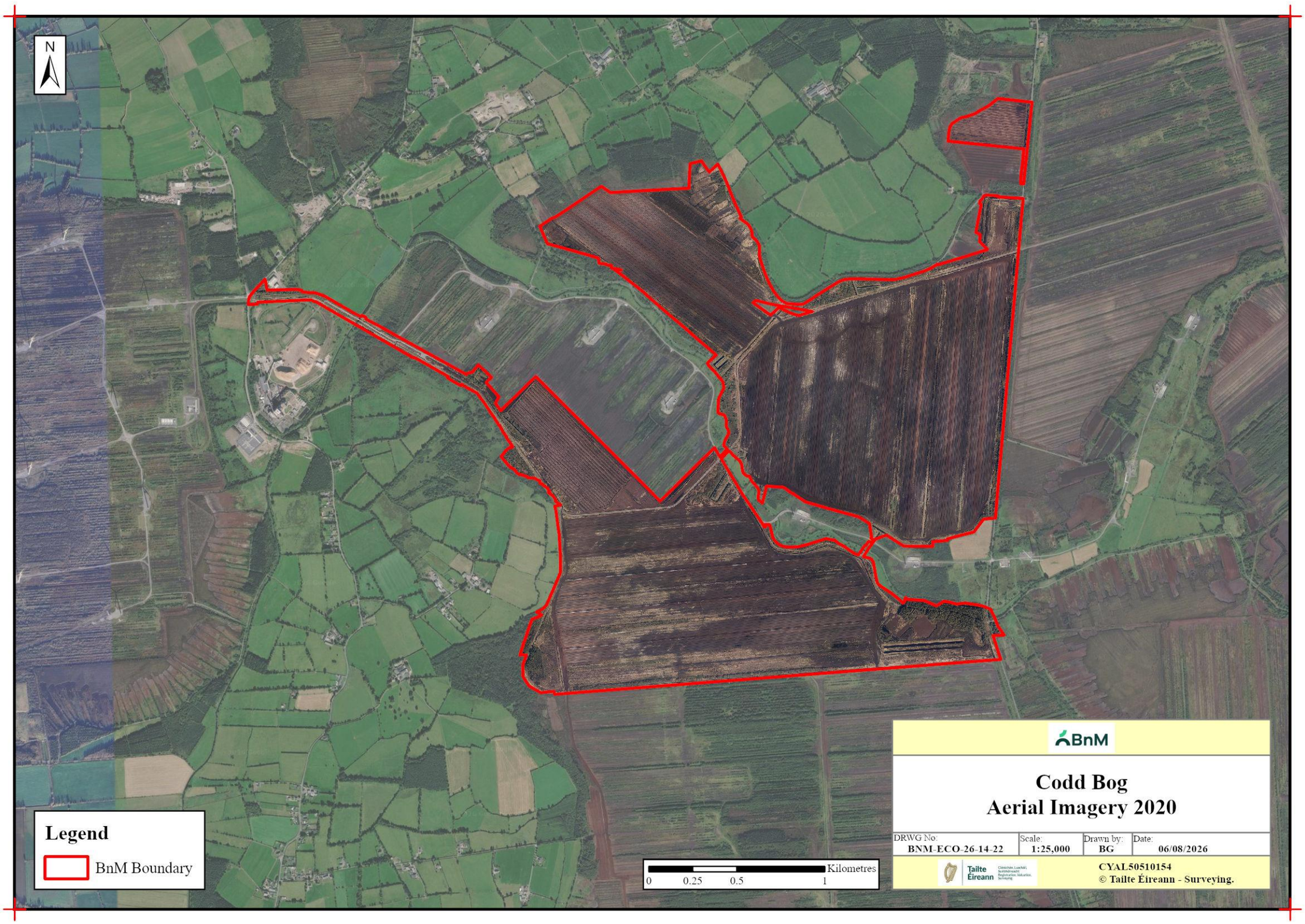
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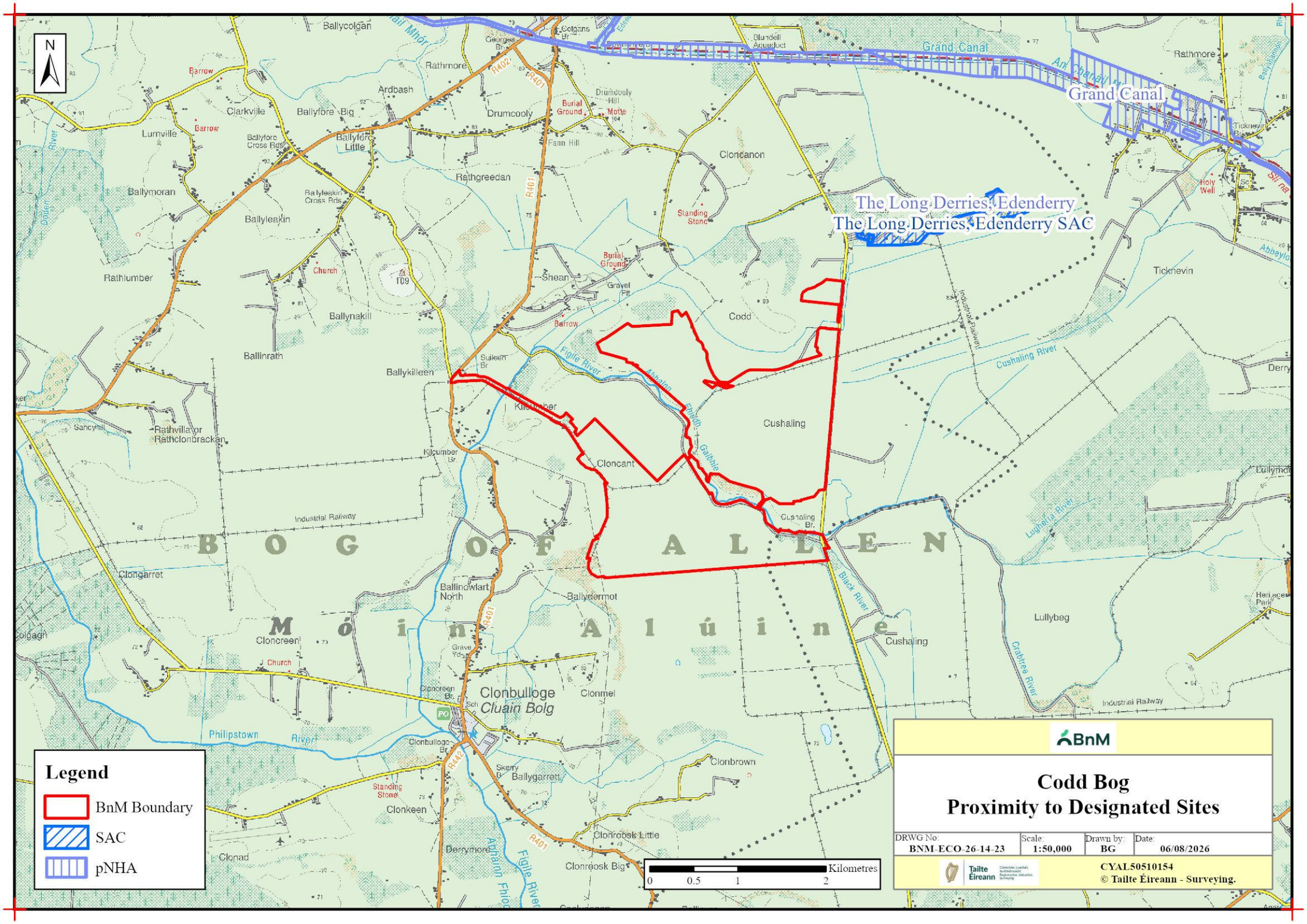
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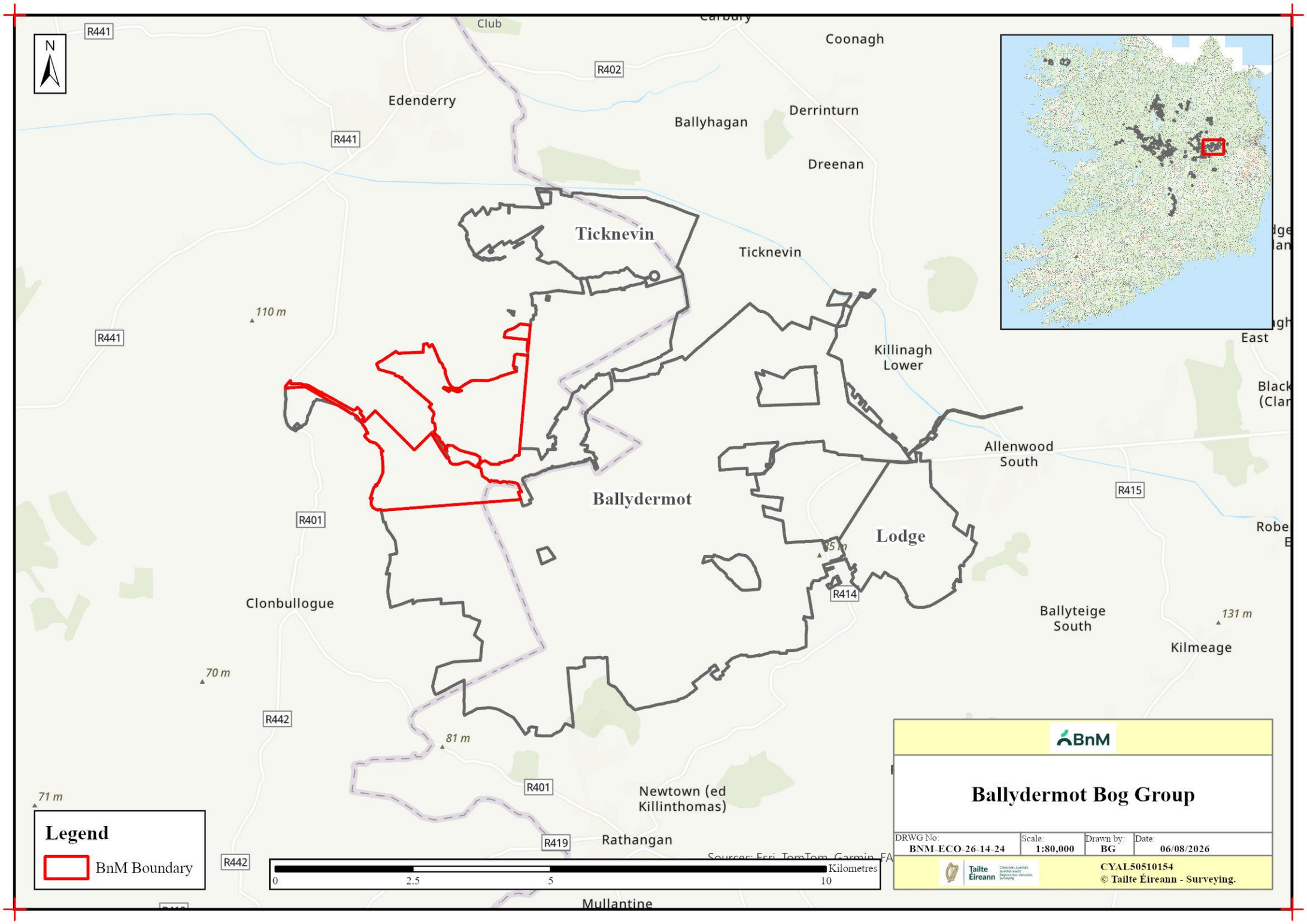
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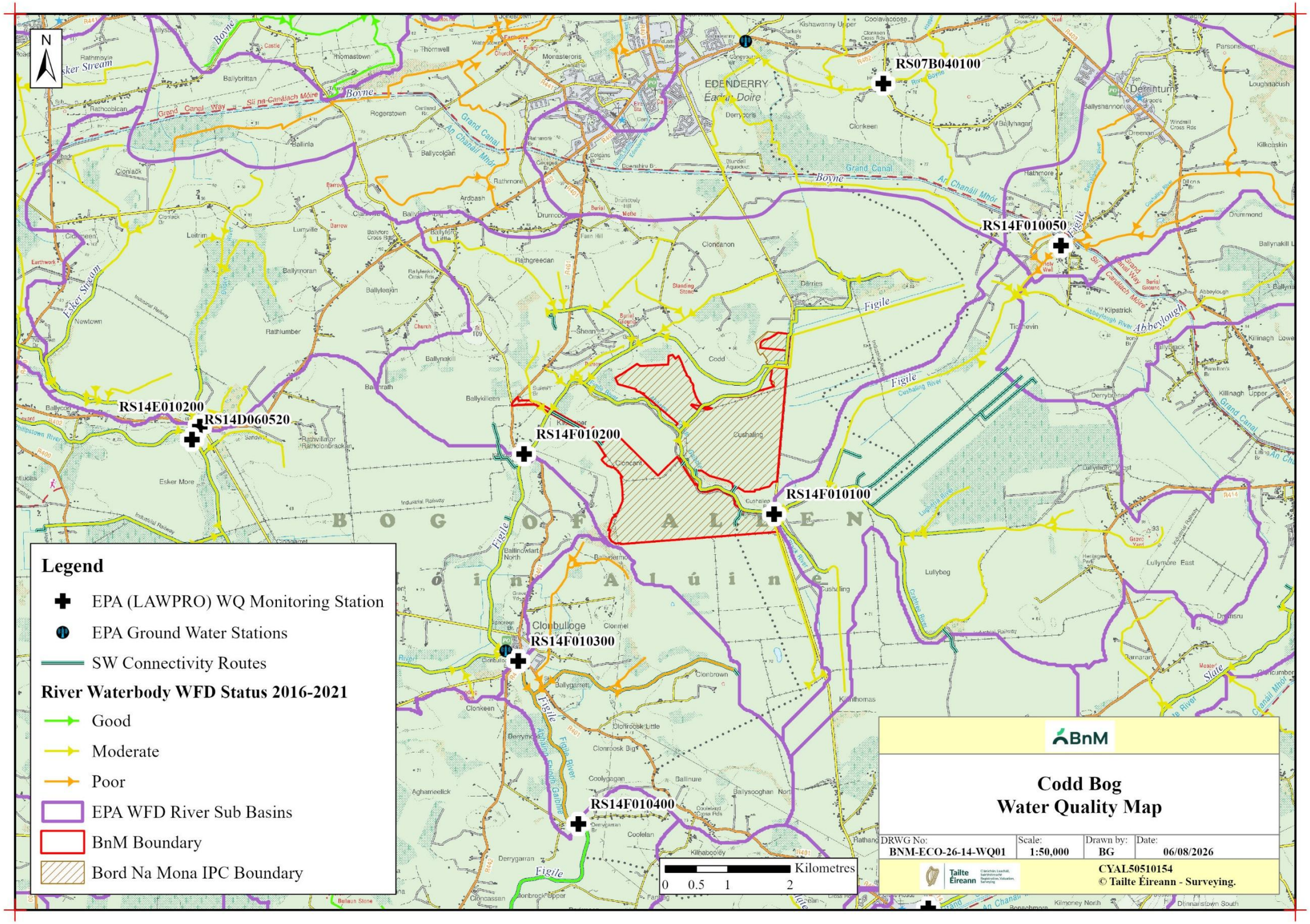
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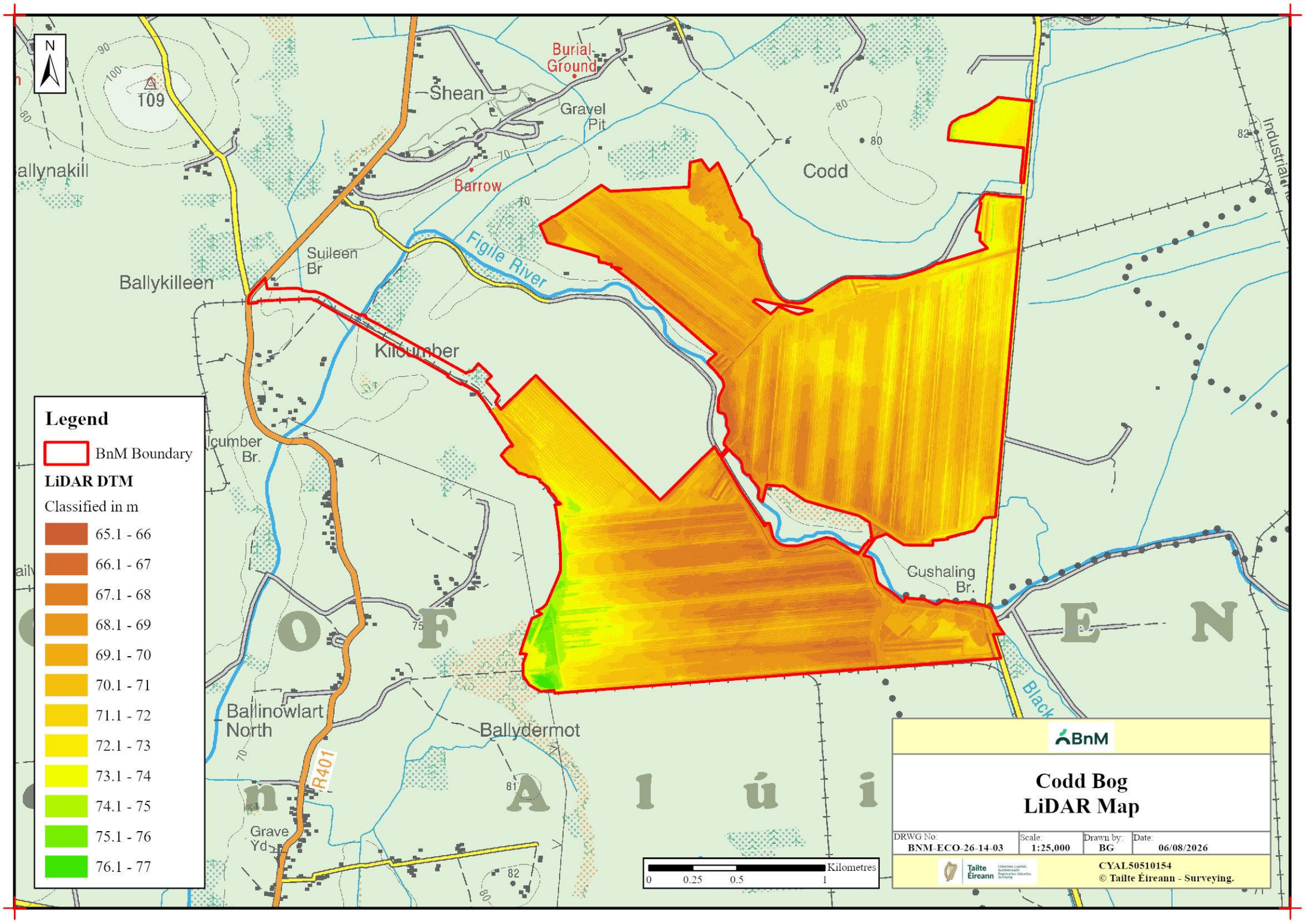
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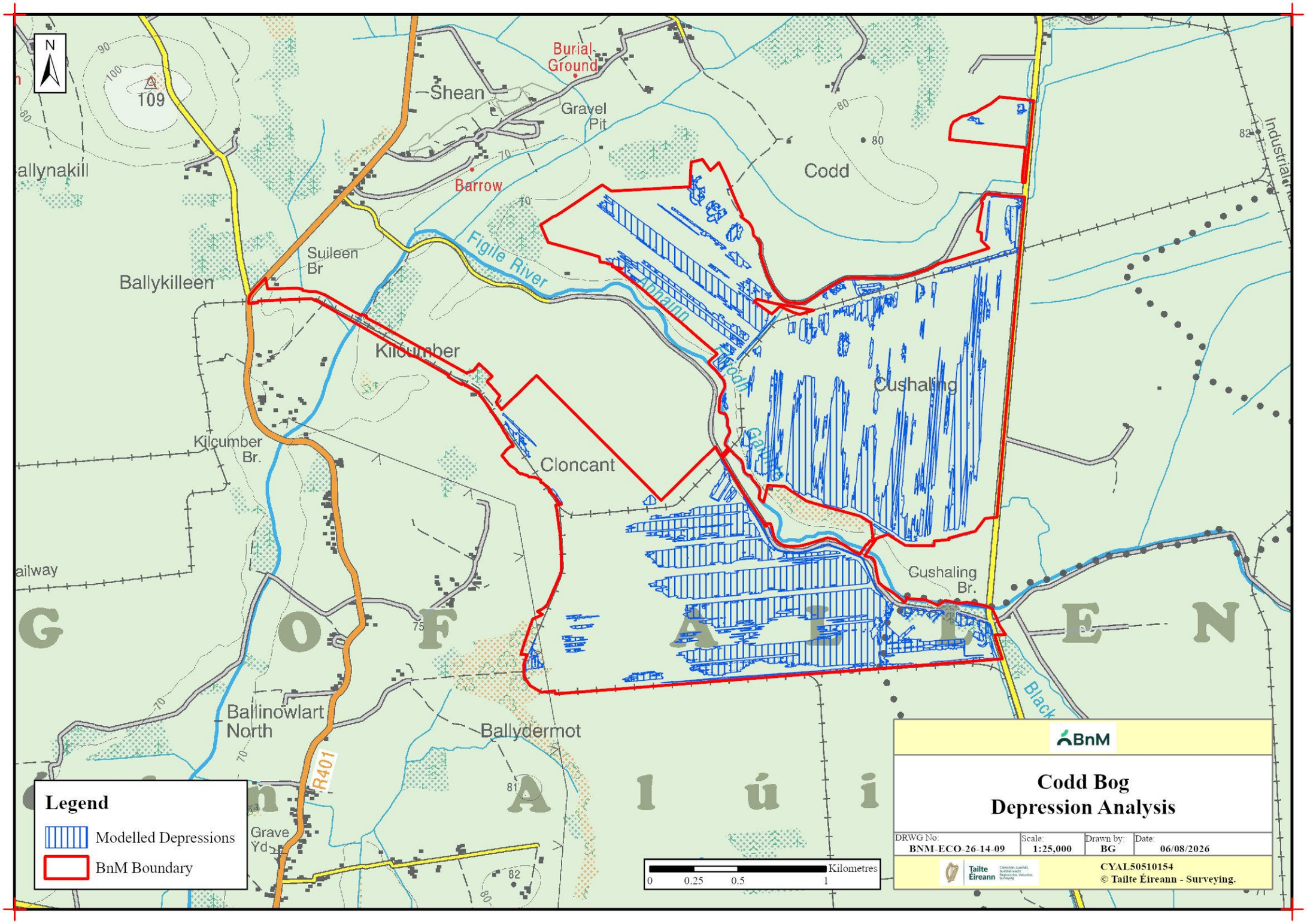
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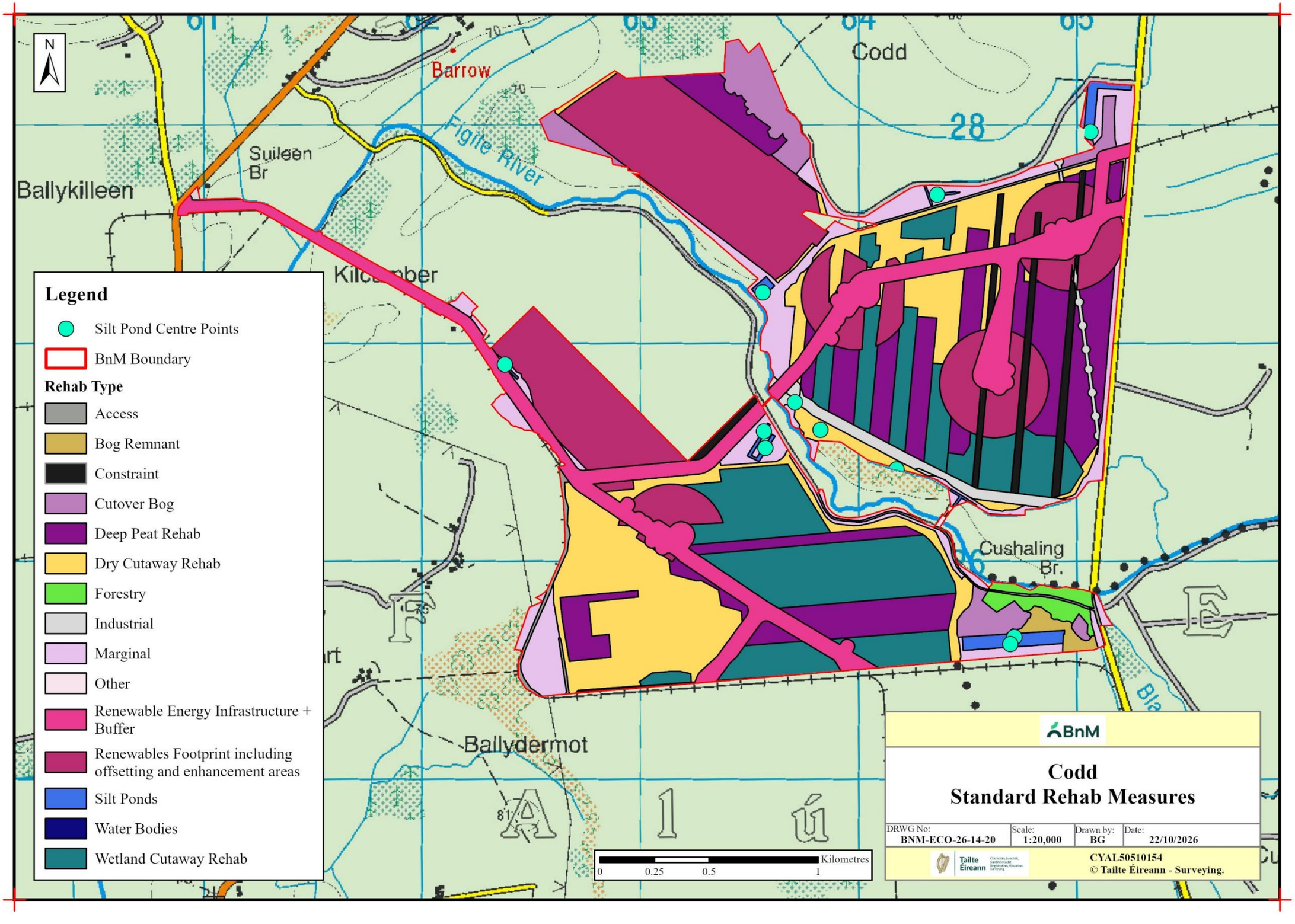
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Ballydermot
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Grave Yd
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BnM Boundary
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Codd Bog
Depression Analysis
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Rehabilitation Maps


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Ballykilleen
Codd
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Cushaling Br.
Ballydermot
Legend
Silt Pond Centre Points
BnM Boundary
Rehab Type
Access
Bog Remnant
Constraint
Cutover Bog
Deep Peat Rehab
Dry Cutaway Rehab
Forestry
Industrial
Marginal
Other
Renewable Energy Infrastructure + Buffer
Renewables Footprint including offsetting and enhancement areas
Silt Ponds
Water Bodies
Wetland Cutaway Rehab
Kilometres
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BnM
Codd
Standard Rehab Measures
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Derrybrennan Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

Draft

This document seeks to address the requirements of Condition 10.2 of Integrated Pollution Control (IPC) Licence Ref. P0503-01:

> "*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 BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Derrybrennan Bog upon cessation of peat production and complements 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 Derrybrennan Bog.

BnM have defined the key rehabilitation outcome at Derrybrennan Bog as environmental stabilisation.

Any consideration of any other future after-uses for Derrybrennan Bog, 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.

BnM are planning to develop a potential renewable energy project at Derrybrennan Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

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Non-technical summary

- BnM (formerly Bord na Móna) is planning to rehabilitate Derrybrennan Bog, co Kildare, 6km west of Allenwood.
- Derrybrennan is a sub-section of a larger unit called Ballydermot Bog.
- The site is located north of a farm developed on a mineral island at Derrybrennan townland and at the north-east corner of the overall Ballydermot Bog.
- Industrial peat production commenced at Derrybrennan in the 1960's. Derrybrennan formerly supplied turf for fuel and energy and latterly milled peat for electricity production.
- BnM Industrial peat harvesting completely finished at Derrybrennan Bog in 2015.
- Part of Derrybrennan Bog was used as a BnM commercial forestry trial and planted with conifer forestry in 2012.
- Derrybrennan is a gravity-drained bog.
- BnM are planning to develop a potential renewable energy project at Derrybrennan Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The wind farm planning boundary overlaps Derrybrennan Bog and is considered as a constraint in the rehabilitation plan.
- The site is a mosaic of bare peat or has only recently developed pioneer poor fen communities and some Birch scrub and woodland.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a "skin" back onto the peat), and minimising effects to downstream waterbodies.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures will be planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog 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
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and *Sphagnum* rich embryonic bog communities (on deeper peat); and wetlands with Reedbeds and Birch woodland on shallower peat. In time a naturalised peatland can be developed.
- It will take some time for vegetation and habitats to fully develop at Derrybrennan, and a peatland ecosystem to be restored. However, it is expected that most of the bog will be developing pioneer habitats after 5-10 years.
- The development of a range of habitats at Derrybrennan Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape.

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- This peatland rehabilitation plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM operates under an IPC Licence issued and administered by the EPA to extract peat within the Allen bog group (Ref. P0503-01). 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 Allen Bog Group comprises 2 main sub-groups: Allen - Clonsast and Allen - Lullymore. Derrybrennan Bog is part of the Allen-Lullymore bog group and is a sub-site of Ballydermot Bog (see Appendix I for details of the bog areas within the Allen-Lullymore bog group).

Derrybrennan Bog is located in Co. Kildare, approximately 6.5km southeast of Edenderry. Derrybrennan bog is located at the northeastern corner of the bogs within the wider footprint of Ballydermot Bog.

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Derrybrennan Bog and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are **NOT** proposed as part of this draft Derrybrennan rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Derrybrennan will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future.

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1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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 document covers the area of **Derrybrennan Bog**. Parts of Derrybrennan Bog (around the perimeter) are currently being used by domestic turf cutters who have turbary rights. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting and turbary issues on Derrybrennan Bog that are outside of the control of BnM. Nevertheless, BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

The proposed Water Supply Project – Eastern and Midlands Region (Irish Water) pipeline (taking water from Shannon to Dublin) crosses the bog has been mapped as a constraint on the rehabilitation plan. It is expected that the footprint of the corridor will be rehabilitated post the construction of the proposed Project.

BnM are planning to develop a potential renewable energy project at Derrybrennan Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). This proposed wind farm project is located within Derrybrennan Bog as well as the adjacent BnM bogs of Ballydermot, Barnaran, Blackriver, Codd, Glashabaun, Killinagh, Lodge, Lullybeg, Lullymore and Ticknevin. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. This infrastructure and areas are treated as a constraint in the rehabilitation plan.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Derrybrennan Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Derrybrennan Bog 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 be constrained due to other property issues or issues such as rights of way.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan'* (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2012 to 2026 inclusive), monitoring and desktop analysis, forms the basis for the development of this 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

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.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.

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- 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, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- 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;
- BnM Annual Report 2025;
- 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 BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Derrybrennan Bog was surveyed in August of 2010. Additional ecological walk-over surveys and visits have taken place at Derrybrennan Bog between 2014-2026. 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 (2019), while mosses and liverworts nomenclature follows identification keys published by the Atherton *et al*., (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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3. SITE DESCRIPTION

Derrybrennan Bog is located in County Kildare, approximately 6.5km southeast of Edenderry and 6km west of Allenwood (Grid reference: ITM 269689; 228453). The site is located north of a farm developed on a mineral island at Derrybrennan townland and at the north-east corner of the overall Ballydermot Bog. The Grand Canal Proposed Natural Heritage Area borders a small section of the northeast boundary of the bog.

The majority of the bog comprises cutaway which has emerging cutaway habitats. Part of Derrybrennan was used as a BnM commercial forestry trial. Derrybrennan is a gravity-drained bog.

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland and other bogs in the wider Ballydermot Bog which are owned and managed by BnM.

See Drawing number *BNM-ECO-26-14-01: Site Location Map,* included in the accompanying mapbook[1] , which illustrates the location of Derrybrennan Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Industrial peat production commenced at Derrybrennan in the 1960's and ceased in 2015. Derrybrennan Bog milled peat for electricity production.

3.1.2 Current land-use

Part of the site was planted with conifer forestry as a pilot in a partnership project with the Forest Service and Coillte (deep ploughing of cutaway, mixed planting of conifers and broad-leaves). A small proportion of the area comprises scrub and was included as a biodiversity feature (within the forestry development) that was allowed to develop naturally. Norway Spruce (*Picea abies*) was planted in open parts of the site that was developed with a deep ploughing treatment to aerate the peat and sub-soil. The remaining area is developing as cutaway bog with a mosaic of habitats and has now specific land-use.

A BnM industrial railway network occurred within the bog providing a link to Edenderry Power Station (now ceased). This railway has been decommissioned.

There are some areas of agricultural grassland within the bog boundary in the northeast of the site, and areas of active turbary outside the margins of the site.

BnM are planning to develop a potential renewable energy project at Derrybrennan Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project is located within Derrybrennan Bog as well as the adjacent BnM bogs. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm infrastructure **partially** overlaps with the Derrybrennan Bog (see drawing number BNM-ECO-26-14-20: Standard Rehab Measures); these (infrastructure) areas have been treated as a constraint in the rehabilitation plan.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Derrybrennan Bog Map Book

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

  a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

  b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

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xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

xxv. All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3 Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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.

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 Derrybrennan Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power.

As the primary employer in many Midland counties, BnM 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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology[2] of Derrybrennan Bog is comprised of with Ballyadams formation (crinoidal wackestone/packstone limestone) with Allenwood formation (thick-bedded limestone, locally peloidal) to the east and Waulsortian Limestones (massive unbedded lime-mudstone) to the northeast. This means that bedrock and sob-soils are predominately alkaline.

3.2.2 *Peat type and depths*

Derrybrennan Bog is now cutaway and the majority of the original raised bog has now been removed. Much of the bog comprises shallow residual pat of less than 1 m with some deeper pockets of peat interspersed. Peat is deeper to the northeast of the bog. Deep peat areas may have the potential to develop embryonic *Sphagnum*-rich peat-forming communities if optimum hydrological conditions can be developed.

3.3 Key Biodiversity Features of Interest

The different cutaway habitats developing across the site reflects the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All sites have hydrological gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and groundwater has a stronger influence.

The majority of Derrybrennan Bog has revegetated post industrial peat production and now comprises a mosaic pioneer poor fen vegetation and Birch scrub with some bare peat remaining.

Part of the site was planted with conifer forestry as a trial in a partnership project with the Forest Service and Coillte (deep ploughing of cutaway, mixed planting of conifers Norway Spruce (*Picea abies*), and broad-leaves). A small proportion of the area comprises scrub and was included as a biodiversity feature (within the forestry development) that was allowed to develop naturally.

The most developed habitats are found at the south-east corner of the sub-site and include a small patch of Birch woodland surrounded by developing Birch scrub. The poor fen and Birch scrub is also well developed at the southern side of the bog and vegetation cover decreases towards the north. The vegetation cover is related to the topography of the site and production status with the heaviest vegetation cover on the highest ground to the south of the site.

[2] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0

The topography of the site is related to the mineral island at Derrybrennan with the highest ground towards the southern and south-east sides of the sub-site. A shallow basin has developed between this mineral island and the high ground along the northern margin and deepens further west towards the greater Ballydermot Bog. Peat depths are greater in this sub-site basin.

The Grand Canal Proposed Natural Heritage Area borders the northeast boundary of the site.

Wild Mignonette (*Reseda lutea*) has been recorded on this site along the railway embankment. This is a notable species as it is quite scarce in Ireland. It is typically found on sandy and gravely ground in the eastern half of the country.

Basil Thyme (*Clinopodium acinos*) has previously been recorded along the former railway embankment at several locations. Basil Thyme is a nationally rare plant species listed on Irelands Red List (Wyse Jackson *et al*., 2016). Several populations are present on railway tracks throughout Derrybrennan or on areas of exposed gravel that are associated with the railway tracks as part of the 'weed' or recolonising flora. Basil thyme is not a typical bog species and are likely to have come on to the former production bog from nearby eskers or gravel pits. The presence of these species enhances the rare flora resource of Co. Kildare.

A detailed ecological report is provided in Appendix II.

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present include:

- Bare peat (PB4)
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff) (PF1)
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities) (WS1),
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway) (WN7)
- Pioneer calcareous grassland (gCal) (developing on old track) (GS1)
- Purple Moorgrass-dominated grassland (gMol) (developing on margins of site) (GS).
- Gorse scrub (eGor) (developing on margins of site) (WS1)
- Access routes (railways and paved tracks and associated verges)
- Scrub (WS1) (found on the undeveloped margins of site; Birch and Gorse-dominated.)
- Rank dry meadow-type grassland (GS2) (found at southern margin)
- Raised bog (PB1) (dried remnant being invaded by scrub)
- Cutover bog (PB4) (small area formerly used to harvest peat)

The most common habitats found around the margins of the site include:

- Improved grassland (GA1) used by grazing livestock (on mineral soil)
- Wet grassland (GS4) (on bog margin)

[3] Categories in brackets refer to the current BnM classification system for vegetation communities, along with an equivalent Heritage Council habitat classification or Fossitt Code, where relevant.

- Tillage (BC1) (on mineral soil)
- Cutover bog (PB4)

See Appendix II for more detail on the bog, habitats and local features.

See Drawing number *BNM-ECO-26-14-17: Habitat Map 2018,* included in the accompanying mapbook, which illustrates the habitats at Derrybrennan Bog.

3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Derrybrennan Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC). Multiple mammal species have been recorded on or within 1 Km of the bog including Irish Hare (*Lepus timidus subsp. Hibernicus)*, Eurasian Badger (*Meles meles),* Rabbit (*Oryctolagus cuniculus*), Red Fox (*Vulpes vulpes*), Otter (*Lutra lutra*) and Fallow Deer (*Dama dama*).

The butterfly species Peacock (*Aglais io*), Common Blue (*Polyommatus icarus*), Small Heath (*Coenonympha pamphilus*) and Large White (*Pieris brassicae*), Green-veined White (*Pieris napi*), Wood White (*Leptidea* sp.) and the red listed near threatened species Dingy Skipper (*Erynnis tages*) have all been recorded at the Derrybrennan Bog. Marsh Fritillary (*Euphydryas aurinia*) has been recorded just outside the bog boundary on adjacent bog Glashabaun Bog.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Buzzard (*Buteo buteo*), Linnet (*Carduelis cannabina*), Meadow Pipit (*Anthus pratensis*), Blackbird (*Turdus merula*), Hooded Crow (*Corvus cornix*), Swallow (*Hirundo rustica*), Pheasant (*Phasianus colchicus*), Wren (*Troglodytes troglodytes*), Blue Tit (*Cyanistes caeruleus*) have all been recorded during BnM ecology surveys.

NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km squares (N62, N72) which Derrybrennan intersects include; Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Partridge (*Perdix perdix*). Grey Wagtail (*Motacilla cinerea),* Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Red Grouse *(Lagopus lagopus)*, Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola)* and Yellowhammer (*Emberiza citrinella*). Red-listed listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Nightjar *(Caprimulgus europaeus)*, Red Kite (*Milvus milvus*) and White-tailed Eagle (*Haliaeetus albicilla*).

Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

NBDC holds records for the high risk invasive species Grey squirrel (*Sciurus carolinensis*). No other invasive species has been recorded at Derrybrennan Bog.

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

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Derrybrennan Bog. The nearest European Designated sites to Derrybrennan Bog are as follows:

- The Long Derries, Edenderry SAC (site Code: 000925) – 1.6km northwest of Derrybrennan
- River Barrow and River Nore SAC (site code: 002162) – 17.6km south of Derrybrennan
- Mouds Bog SAC (site code: 002331) – 10.7km southeast of Derrybrennan
- Pollardstown Fen SAC (site code: 000396) – 12.5km southeast of Derrybrennan
- Ballynafagh Lake SAC (site code: 001387) – 8.8km east of Derrybrennan
- Ballynafagh Bog SAC (site code: 000391) – 9.8km east of Derrybrennan

A number of non-statutory designated sites also occur in the wider area around Derrybrennan Bog. The Grand Canal pNHA (site code: 002104) borders the northeast boundary of the site. The Long Derries, Edenderry pNHA (site code: 000925), also designated under The Long Derries, Edenderry SAC, is located 1.6km northwest of Derrybrennan, Carbury Bog NHA (Site Code: 001388) occurs approximately 5.6km north, Hodgestown Bog NHA (NPWS Site Code: 001393), occurs approximately 7.9km east of Derrybrennan, Black Castle Bog NHA (NPWS Site Code: 000570) occurs approximately 11.2km northwest of Derrybrennan Bog and Ballina Bog pNHA (NPWS Site Code: 000390), occurs approximately 11.3km north of Derrybrennan.

See drawing *BNM-ECO-26-14-23: Proximity to Designated Sites* in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar sites located in proximity to Derrybrennan Bog. The nearest Ramsar sites are Pollardstown Fen located approximately 12.5km southeast and Raheenmore Bog located approximately 24.2km west of Derrybrennan Bog.

3.5 Hydrology and Hydrogeology

Derrybrennan Bog forms part of the Barrow Catchment (Catchment ID: 14) as defined by the EPA under the Water Framework Directive (WFD). The bog lies completely within the Figile_SC_010 sub-catchment.

Abbeylough River (EPA code (14A01) is located approximately 82m from the northern boundary of the site at its closest point. This river flows west and then south into the Figile River (EPA code 14F01) located within the Figile_SC_010 sub-catchment.

GSI data indicates that the majority of Derrybrennan Bog lies within a regionally important aquifer – Karstified (conduit). An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential and further subdivided based on the type of openings through which

groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m^3/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.

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters ('baseflow') and large (>2,000 m^3/d), dependable springs may be associated with these aquifers.

The majority of Derrybrennan Bog is located in an area mapped by GSI as of moderate groundwater vulnerability (GSI Map viewer). There is a small section to the northwest of the site which is mapped as high groundwater vulnerability. Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site.

Quaternary sediment maps show that Derrybrennan Bog is completely underlain by cut over raised peat. This sediment is common in the wider context to the west of the site. To the east of the site there is a large area of till derived from limestones.

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 Derrybrennan 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 bi-annual basis by BnM 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.

Derrybrennan Bog does not have any surface water outlets. Four surface water outlets are located in the adjacent Glashabaun South to which Derrybrennan Bog drains. These surface water outlets ultimately discharge to the Figile River (EPA code 14F01). This river is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds, associated surface water emission points and monitoring and sampling locations are detailed in Drawing numbers *BNM-ECO-26-14-02: Structures and Sampling,* along with *BNM-ECO-26-14-WQ01: Water*

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Quality Map included in the accompanying mapbook, which illustrate the various drainage and water quality infrastructure present at Derrybrennan 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme Water Quality Monitoring

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also 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*., 2017). Bog rehabilitation is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) 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 BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Derrybrennan has been completed. This discharge will have improved 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 watercourse receptors and the Barrow catchment and will support the future status of the watercourses achieving Good Status. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

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

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 monitoring for pH, suspended solids, total solids, total phosphorus, total ammonia, colour, and COD.

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3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al.* 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al.* 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the longterm warming effect of continued CO_2 emissions (Gunther *et al.* 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Derrybrennan 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. The majority of the bog will develop as Birch woodland on drier areas and peripheral headlands. Wetland mosaics are expected to develop on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors. A small part of this bog is expected to develop regenerating wet deep peat vegetation on deep peat areas.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Derrybrennan Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare peat and pioneer vegetation communities in the former production area of Derrybrennan Bog are assessed as **local importance (lower value)**.

Scrub, heath, woodland, and grassland may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Derrybrennan Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity, and other general topics over the years about Allen-Lullymore bog group, including Derrybrennan Bog, with various stakeholders in relation to:

- Forestry trial with the Forest Service (2009).
- IPCC Lodge Bog Nature Reserve and management plan (IPCC).
- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Proposed Water Supply Project – Eastern and Midlands Region pipeline (Irish Water).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Derrybrennan Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Derrybrennan Bog.

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

4.2 Topics raised by Consultees

N/A Yet as consultation has not commenced.

4.3 BnM response to topics raised during consultation

N/A Yet as consultation has not commenced.

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5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect planned renewable energy infrastructure or areas required for this proposed project.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Integrating rehabilitation measures with existing land-use (e.g. conifer forestry). It is not proposed to change or affect any conifer or commercial forestry via this scheme.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of a peatland used for industrial peat production, in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies, where possible. However, this is dependent on the topography of the cutaway bog and the final drainage regime. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is already significant potential for the creation of wet cutaway habitats at this cutaway bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Derrybrennan Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce Carbon emissions from the site from a larger Carbon source to a smaller Carbon source.
- 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.

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Nevertheless, re-wetting across the entire bog, 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 BnM). Reducing pressures due to former peat extraction activities at Derrybrennan 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 BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g. Timahoe South, and Lodge Bog in 2022-2023) and have previously carried out re-wetting and rehabilitation at nearby Lullymore bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Derrybrennan Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Derrybrennan bog is part of the Allen-Lullymore bog group.
- The local environmental conditions of Derrybrennan Bog mean that drain blocking and hydrological management to re-wet peat where possible is the most suitable rehabilitation approach for this site. Derrybrennan Bog while largely comprising shallower peat does retain pockets of residual deep peat in places.
- The key goals and outcomes of rehabilitation set by BnM. BnM have defined the key goal and outcome of rehabilitation at Derrybrennan Bog as **environmental stabilisation** and **optimising residual peat re-wetting, where possible,** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Wind Farm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Derrybrennan Bog. In areas associated with proposed wind farm infrastructure, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- The cutaway is already developing a mosaic of grassland, wetland and cutaway peatland habitats. Much of this cutaway has largely stabilised. Rehabilitation is proposed to enhance environmental stabilisation in the bare peat areas while taking account of existing habitats, future infrastructure and land-uses (e.g. forestry).
- Integrating rehabilitation measures with existing conifer forestry. It is not proposed to change or affect any conifer or commercial forestry via re-wetting.
- Rehabilitation of Derrybrennan Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.
- Derrybrennan has a gravity drainage regime and there are several local topographical basins that are expected to develop as wetlands when drains are blocked.

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- **Potential land-use.** It is expected that BnM will update and finalise the draft rehabilitation plan for Derrybrennan when a decision is made in relation to the wind farm planning application. BnM remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC license. The targeted rehabilitation measures set out in this Rehabilitation Plan will be implemented following completion of the construction phase of the proposed Ballydermot Wind Farm in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.
- **Land-use.** Part of the bog has been developed for forestry. The drainage of this area will have to be maintained.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM 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**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to BnM Archaeological Liaison Officer and the National Museum of Ireland (Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM 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. There is a right of way along the southern boundary of Derrybrennan.
- **Proposed Water Supply Project – Eastern and Midlands Region (Irish Water).** This proposed Irish Water Project that is currently in the pre-planning stage also traverses Derrybrennan Bog. It is expected that the enhanced rehabilitation measures planned for this bog will be carried out in advance of the construction of the pipeline, which is still subject to planning consent. BnM do not propose to carry out any rehabilitation works within the footprint of the proposed Water Supply Project – Eastern and Midlands Region until a decision has been made by the relevant authorities in relation to the statutory consent applications for the project. It is expected that the footprint of the corridor will be rehabilitated post the construction of the proposed Water Supply Project – Eastern and Midlands Region.

6.2 Key Assumptions

- It is assumed that BnM 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.

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6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Derrybrennan 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 Derrybrennan Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial drainage activities.

Rehabilitation is generally defined by BnM 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 a naturally functioning raised bog ecosystem
- mitigation of key emissions (e.g. potential suspended solids run-off).

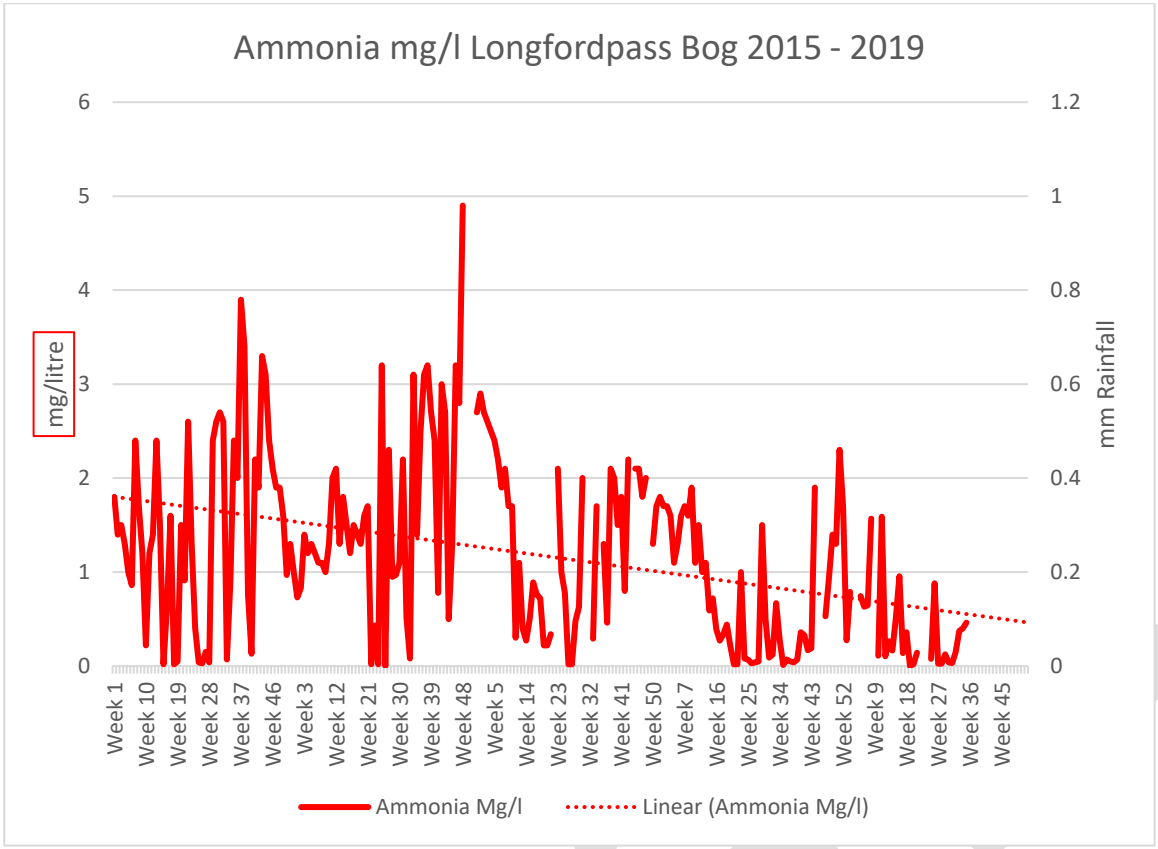
7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the area originally drained for industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat forming habitats. 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 BnM 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 Longford Pass 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 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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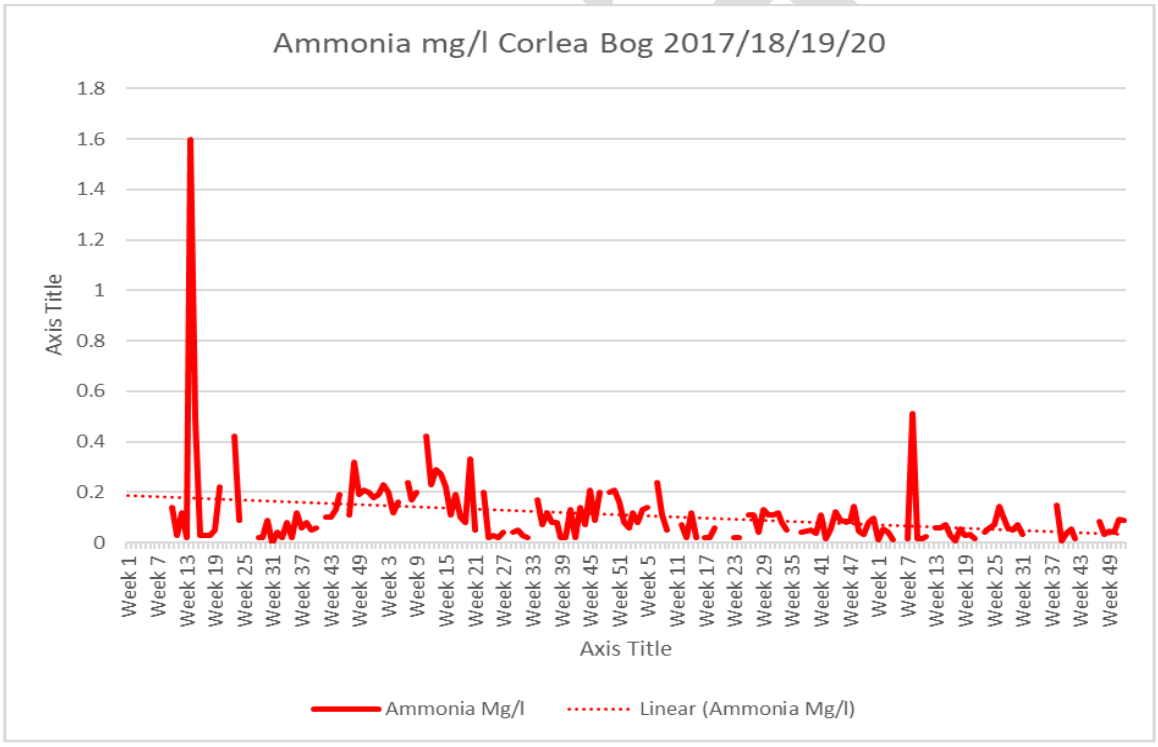


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

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

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and 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 based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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 and LiDAR surface maps, these are included in the accompanying mapbook as the drawings referenced below:

BNM-ECO-26-14-21: Aerial Imagery 2000

BNM-ECO-26-14-22: Aerial Imagery 2020

BNM-ECO-26-14-04: Peat Depths

BNM-ECO-26-14-03: LiDAR Map

BNM-ECO-26-14-09: Depression Analysis

The restoration and rehabilitation measures are provisionally outlined in drawing titled *BNM-ECO-26-14-20: Standard Rehabilitation Measures* in the accompanying Mapbook.

These rehabilitation measures for Derrybrennan Bog will include (see Table 8.1):

- A widespread drain-blocking and hydrological management programme will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat and deeper residual peat.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking, modifying outfalls and managing water levels with overflows.
- Wetland measures including blocking outfalls and managing water levels with overflows.
- 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 rehabilitation measures at Derrybrennan Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking, modifying outfalls and managing water levels with overflows	0.5
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	24.7

Type	Code	Description	Area (Ha)
Wetland cutaway	WLT1	Modifying outfalls, targeted drain-blocking and managing water levels with overflows	29.4
Marginal land	MLT1	No work required	17.2
Ballydermot Wind Farm	Wind Farm Infrastructure + Buffer	Wind Farm infrastructure areas including a turbine base, internal access roads and turning points and crane hard stand.	12.6
	Renewables Footprint	Peat and spoil areas.	0.5
Constraint	Constraint	Access tracks, proposed Uisce Éireann pipeline corridor, turf cutting, bog remnant, retained drainage infrastructure and forestry	46.8
Total Area			**131.8**

**Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.*

8.1 Completed and Ongoing

- A significant part of the site has already re-vegetated, with colonisation of pioneer vegetation with Birch woodland predominating. Bare peat areas within the older cutaway areas are reducing. Natural re-colonisation of the cutaway so far has been quite effective. Other parts of the site (younger cutaway) are naturally colonising for more than 10 years and are developing a mosaic of cutaway habitats. Natural re-colonisation of the cutaway so far has been quite effective.
- Part of Derrybrennan bog was developed by Coillte as a deep ploughing forestry trial in 2010. This forestry (mixed conifers and broad-leaves) has established as immature woodland and is considered to be rehabilitated.

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

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Derrybrennan Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.
- A hydrology and drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out
- 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) is to be 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.

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- Carry out Appropriate Assessment (AA) of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA (if needed), in the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- 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.

8.4 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 9 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.

8.5 Timeframe (when finalised)

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions.
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation**: Decommission silt-ponds, if necessary

8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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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.
- 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.
- Monitoring results will be maintained, trended 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 monitoring for pH, suspended solids, total solids, total phosphorus, total ammonia, colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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 BnM 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.

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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 have 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.

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APPENDIX I. BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow catchment, and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and Timahoe South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied an old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly, via the BnM industrial railway. Many bogs were in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long-term peat extraction activity reduced the peat depth on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen-Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Lullymore in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Lullybeg by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 and 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow piped outfall. Some cutaway bog at Lullymore, used as spread grounds for sod peat, was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly Conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries, Edenderry SAC (site code: 000925) is located in the Lullymore Bog sub-group, south of Ticknevin Bog and north of Glashabaun North. Glashabaun Bog (northern sub section) overlaps the SAC and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is an esker and BnM used the site in the past to extract gravel for the construction of railway embankments across BnM bogs. Rare plants including Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by BnM. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation Is ongoing.

A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC Licence Ref. P0503-01, and current, indicative peat production status, is outlined in Table Ap-1.

Table Ap-1 Allen-Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since before 1975. Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Glashabaun South	569	Peat extraction since 1950s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry.	2020	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.		
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss *Sphagnum* inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023
Lullybeg	271	Peat extraction since the 1930's. Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2004	Draft 2026
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group – amenity.	1992	Draft 2026
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019 Majority of bog still has relatively deep peat	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production. Cloncannon bog remnant – zoned for biodiversity Mostly bare peat. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2019	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection	N/A	N/A
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab ongoing

See Drawing number *BNM-ECO-26-14-24: Bog Group Map*, included in the accompanying mapbook which illustrates the location of Derrybrennan Bog and the Allen-Lullymore Bog Group in context to the surrounding area.

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Derrybrennan (sub-section of Ballydermot)**	**Area (ha):**	
Works Name:	Ballydermot	**County:**	Kildare
Recorder(s):	MMC & DF	**Survey Date(s):**	5/08/2010

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway.)
- Pioneer calcareous grassland (gCal) (developing on old track)
- Purple Moorgrass-dominated grassland (gMol) (developing on margins of site).
- Gorse scrub (eGor) (developing on margins of site).
- Access routes (railways and paved tracks and associated verges)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated.) (Codes refer to Heritage Council habitat classification, Fossitt 2000, See Appendix II.)
- Rank dry meadow-type grassland (GS2) (found at southern margin).
- Raised bog (PB1) (dried remnant being invaded by scrub)
- Cutover bog (PB4) (small area formerly used to harvest peat).

Description of site

This sub-site is part of Ballydermot Bog and is located in west Kildare 6 km west of Allenwood and south of the BnM Lullymore Briquette Factory. The site is located north of a farm developed on a mineral island at Derrybrennan Townland and at the north-east corner of the overall Ballydermot Bog. A BnM railway is located along the southern boundary of the sub-site.

The topography of the site is related to the mineral island at Derrybrennan with the highest ground towards the southern and south-east sides of the sub-site. A shallow basin has developed between this mineral island and the high ground along the northern margin, and deepens further west towards the greater Ballydermot Bog. Peat depths are greater in this sub-site basin. The mineral island that is part of Derrybrennan only affects a small part of the site near the southern margin where rare dry grassland has developed on mineral soil. The remainder of the site is on peat.

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The majority of the sub-site is only recently out of production so most of the site is still bare peat or has only recently developed pioneer poor fen communities and some Birch scrub. The most developed habitats are found at the south-east corner of the sub-site and include a small patch of Birch woodland surrounded by developing Birch scrub. The poor fen and Birch scrub is also best developed at the southern side of the site and vegetation cover decreases towards the north. The vegetation cover is related to the topography of the site and production status with the heaviest vegetation cover on the highest ground to the south of the site. Further west the vegetation cover is much lighter on fields that have only recently come out of production.

The Birch-dominated woodland and scrub is a typical example of this habitat. It is relatively species-poor. The small patch of woodland has a canopy about 14 m high and is quite open. The ground cover under the trees is dominated by typical mosses. There are also some patches of Brambles, Heather, Ivy, Purple Moorgrass and ferns such as Broad Buckler Fern. Other species present included Holly. The influence of the mineral sub-soil/shallow peat layer can be seen with the presence of Hawthorn and Elder. The small woodland is likely to have developed on cutover bog as old face-banks were still present within the woodland. The surrounding scrub is dominated by Birch with some Willow and occasionally dominant Gorse. This scrub is quite thick and dense. There are several other small patches of Birch-dominated scrub along the southern part of the site along with some areas where there is light cover of emerging Birch saplings within the Rush-dominated vegetation.

The Rush-dominated poor fen is quite well-developed along the southern side on the high ground. Some of this area is heavily infested with tall Soft Rush while there also patches of lighter cover and more frequent bare peat (Poor fen mosaic). This community also contains other typical species such as Bog Cotton, Birch saplings, Willow, Creeping Bent and Rosebay Willowherb. Soft Rush colonisation seems to have occurred relatively quickly over the past number of as much of this area was bare peat in the 2004 aerial photo series. The poor fen towards the northern side of the site has much lighter vegetation cover and the smaller Jointed Rush is more prevalent. Bulrush was scattered through the central part of the site with small patches of this plant being found in the drains. Flow of water in some drains was impeded in places, although water-logging of the peat was not significant and there was only one small area with surface water.

Other habitats on the site only cover a relatively minor area and hare generally quite typical examples of these habitats. Dry calcareous grassland has developed along an old track along the edge of the site and contains frequent cover of Glaucous Sedge, Knapweed, Ox-eye Daisy and Wild Carrot, along with Purple Moorgrass. This area was attracting some butterfly species such as Large White, Peacock and Large Heath. Grassland typical of dry peat and dominated by Purple Moorgrass has developed along the northern headland in places and along old travel paths. The southern margin has rank grassland more typical of mineral soil that is dominated by Cocksfoot and False Oatgrass. This area is being invaded by scrub and there are patches of Brambles along with Gorse, Hawthorn and Birch.

Wild Migonette (*Reseda lutea*) was recorded on this site along the railway embankment. This is a notable species as it is quite scarce in Ireland. It is typically found on sandy and gravely ground in the eastern half of the country.

Basil Thyme

Basil Thyme is a rare plant that is typically found on esker and arable habitats, on sandy and gravel soils. Its distribution is midlands-based. It has only been recorded in 18 10 km gird squares in Ireland in the past 20 years. It is only previously known from 3 sites in Offaly. It is listed as 'Near Threatened' on Irelands Red List (Wyse Jackson et al., 2016).

Basil Thyme was noted along the railway embankment at several locations and seemed to have a widespread distribution over 300 m of railway track, although there were large sections of the track where it was absent. The overall population was estimated at 150-200 plants.

Basil Thyme has not been recorded at this site before and would not be a typical species of cutaway bog. This species was probably unlikely to have been present on the site prior to the development of the cutaway. The exposed gravel along the railway embankments is a perfect habitat for this species. One of its main known populations in Co. Offaly is located close by at the Long Derries cSAC, Edenderry. This site was a BnM gravel pit and material from this site was used to make railway embankments. The spread of Basil Thyme from the Long Derries along the BnM railway network has been recorded in the past (Feehan pers. comm. 2011).

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

None

Adjacent habitats and land-use

Habitats and land-use around the site include

- Improved grassland (GA1) used by grazing livestock (on mineral soil);
- Wet grassland (GS4) (on bog margin)
- Tillage (BC1) (on mineral soil);
- Cutover bog (PB4)

Watercourses (major water features on/off site)

- There are no major water courses around the site apart from the Grand Canal that is located 1 km east of the site.
- The Abbeylough River (stream) flows along the northern boundary of the site and a canalised channel. This stream flows west towards the Figile River
- The site is within the River Barrow catchment.

Peat type and sub-soils

The whole of the site has been mapped as cutover bog (GSI soils and sub-soils map). The sub-soils and soils to the north of the site are mapped as being based on limestone till. The 'mineral island' of Derrybrennan is not mapped but this area and the area underlying the site is also likely to have limestone till sub-soil.

Fauna biodiversity

Birds

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

- Buzzard (single individual, potentially a young individual – not in breeding season)
- Linnet (small group)
- Other more common birds noted on the site included Grey Crow, Swallow, Pheasant, Meadow Pipit, Wren, Blue Tit and Blackbird.

Mammals

- Signs of Deer, Hare and Rabbit were noted on the site.
- There were some old signs of Badger within the small Birch woodland.

Other species

- Large White Butterfly
- Peacock
- Common Blue
- Small Heath

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References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

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

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[5] will be adhered with throughout all rehabilitation measures and activities.

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

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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 Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2026-2030

The All-Ireland Pollinator Plan 2026-2030 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2015, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM lands. The Bord na Móna Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This

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includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and BnM'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.

14 BnM commitments

BnM 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.

In line with BnM'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. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. 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.

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APPENDIX VI. 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 BnM 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, stockpile covering, pumps, septic tanks and fuel tanks.

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

Item	Description	Derrybrennan Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Not relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

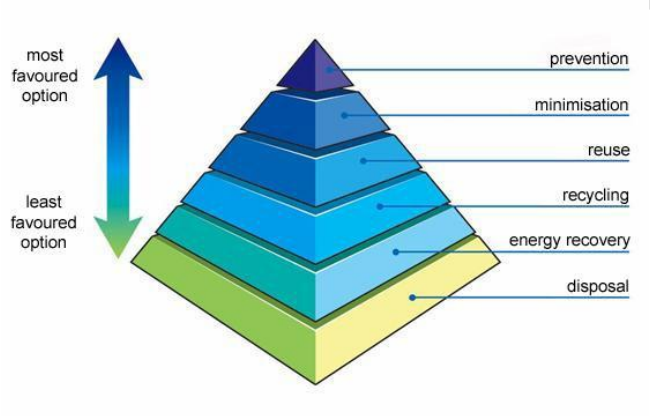
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 cutover 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

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

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER, 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant, 1999) and the **improvement**

of ecological conditions in damaged wildlands through the **reinstatement of ecological processes**. In general, BnM 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 acrotelm – 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.

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APPENDIX VIII. 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 IPC Licence's Ref. P0503-01 in the Allen-Lullymore Group of Bogs in Counties Offaly and Kildare.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.

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- 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.
- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.
- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

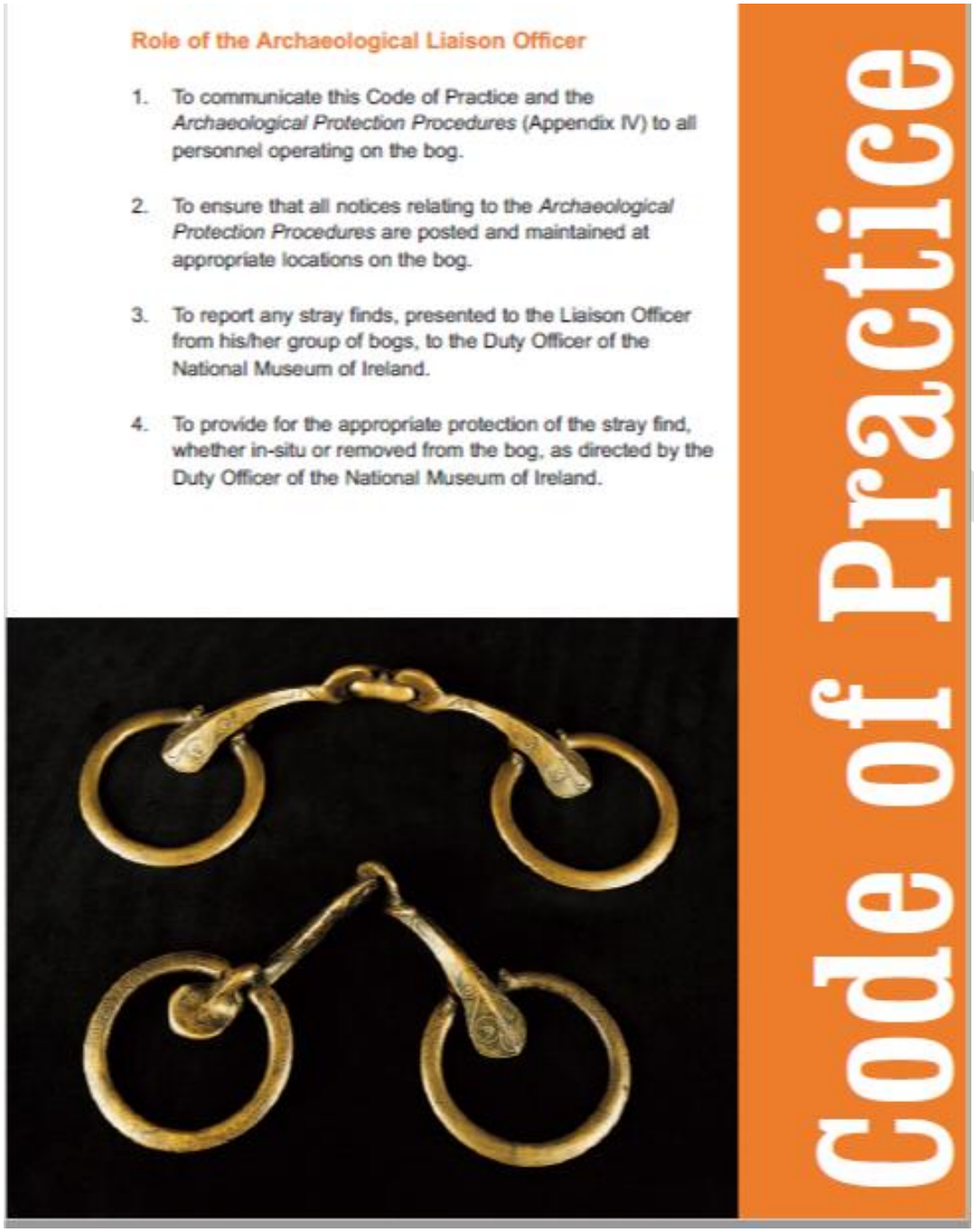
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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- 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/resources/faqs/environment--you/faq-listing/ 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 X. 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.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Derrybrennan Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet	
Document Name:	Derrybrennan Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Draft v0.1**

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

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Name(s):	BG	CS	MMcC
Date:	06/08/2026	06/08/2026	06/08/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):		JB	CS
Date:		22/10/2026	23/10/2026

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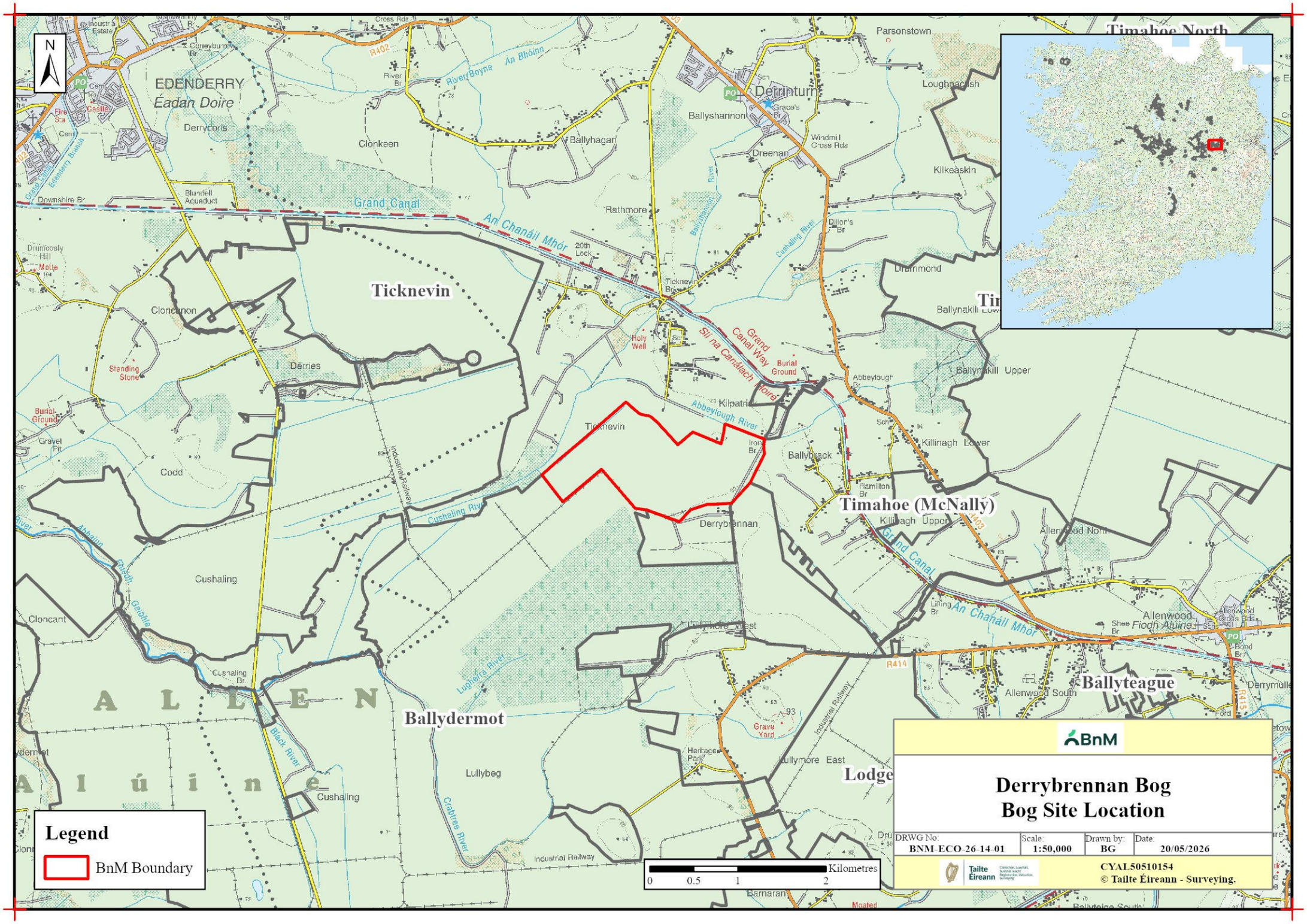
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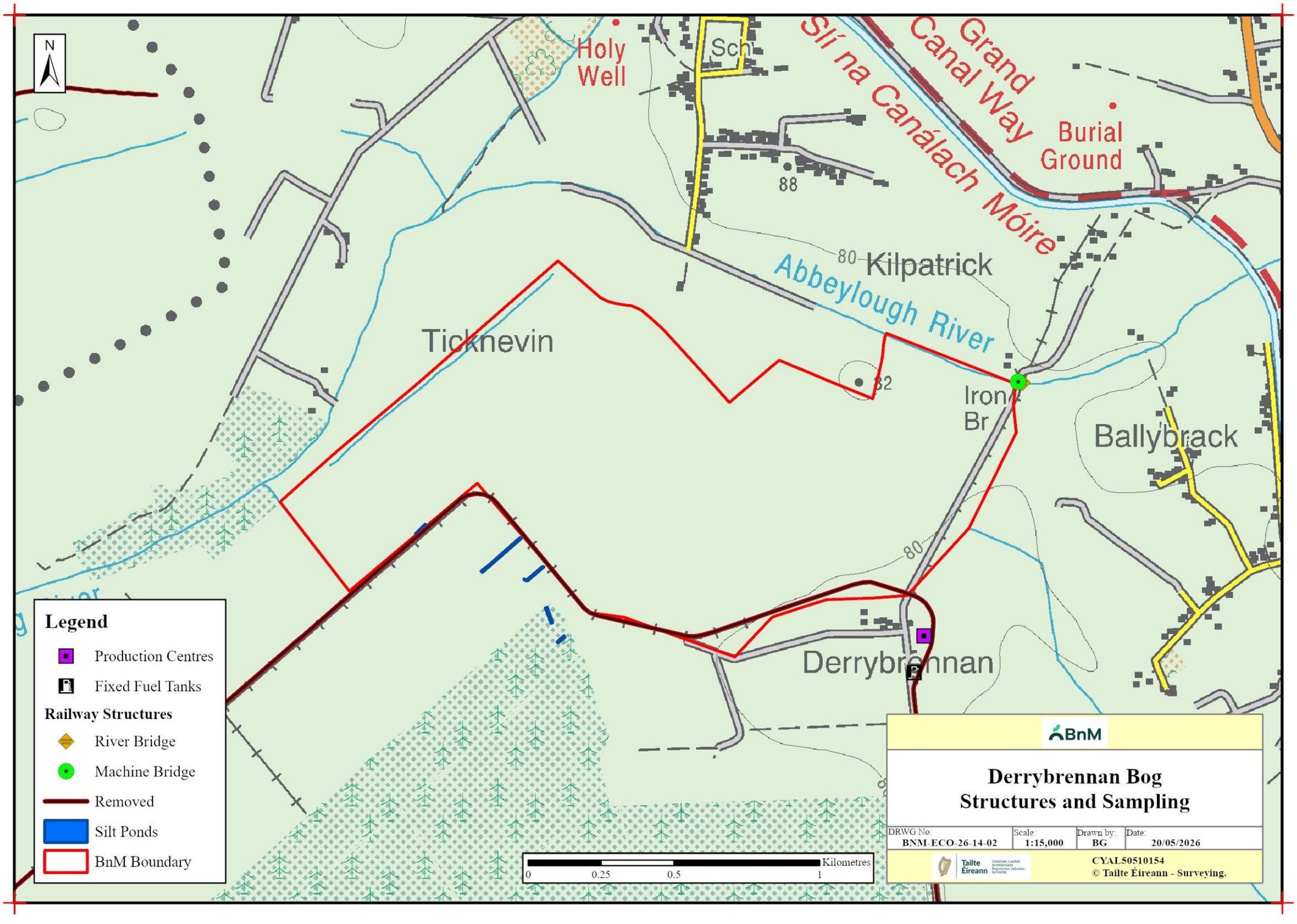
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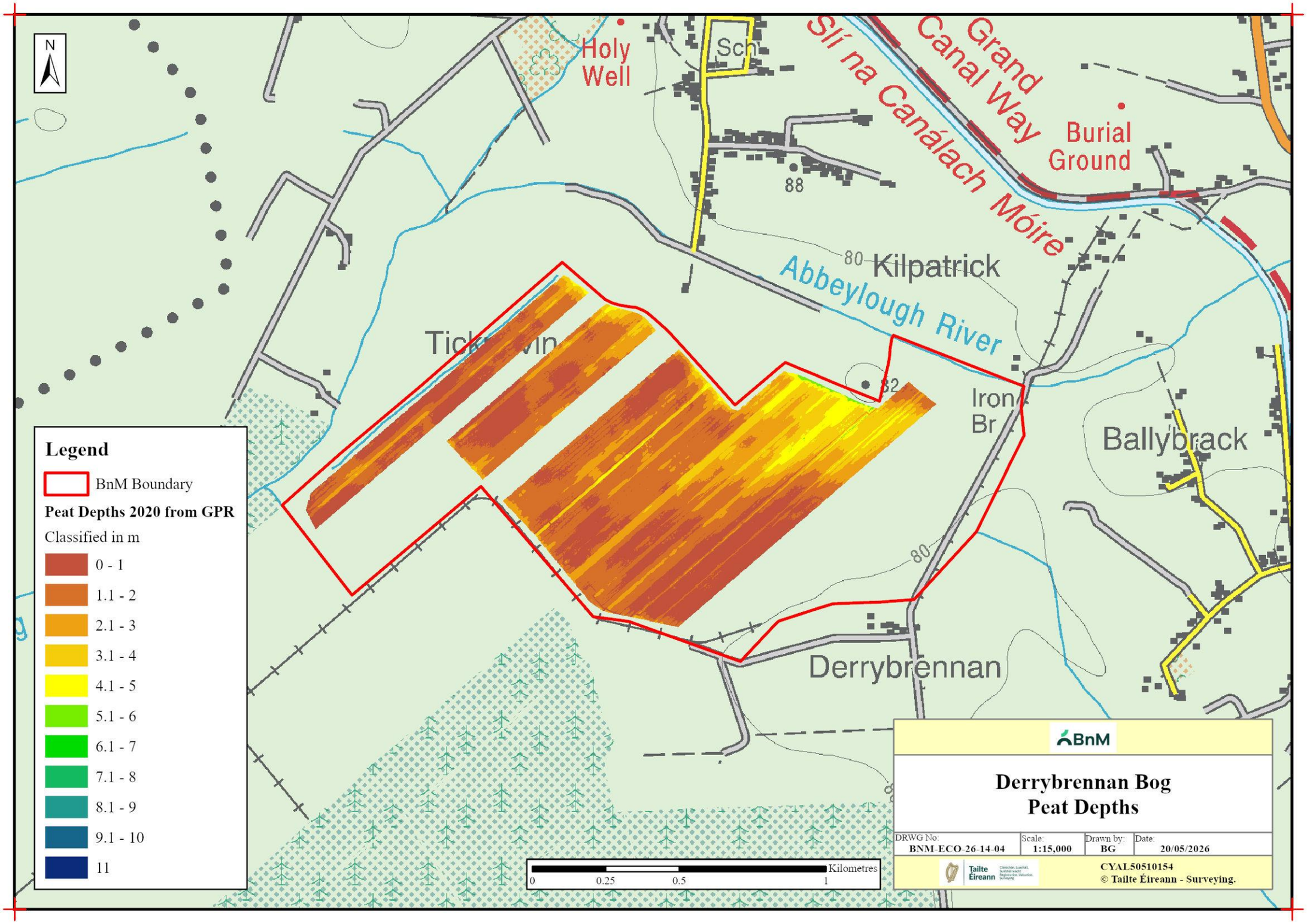
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Drawn by: BG
Date: 20/05/2026
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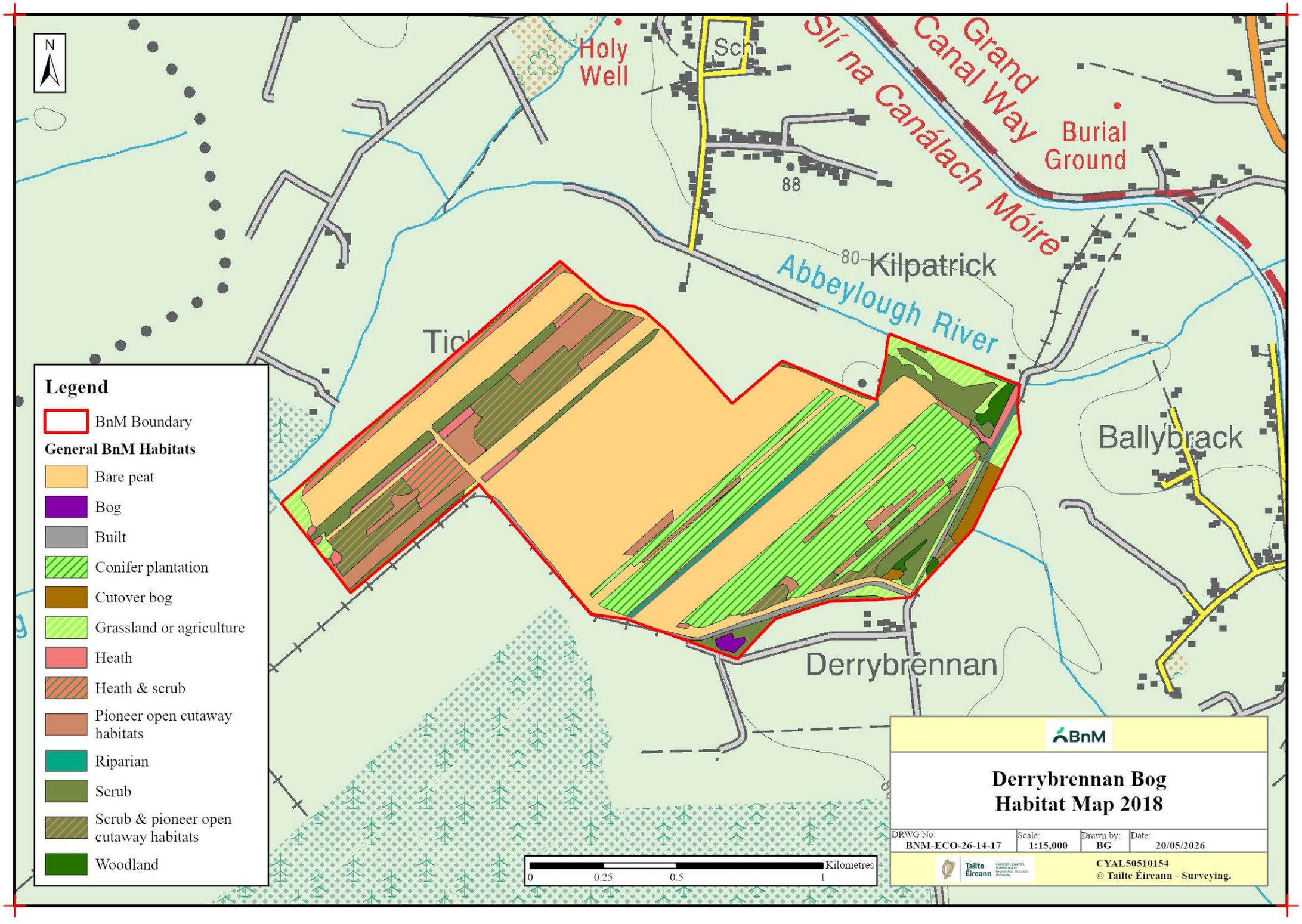
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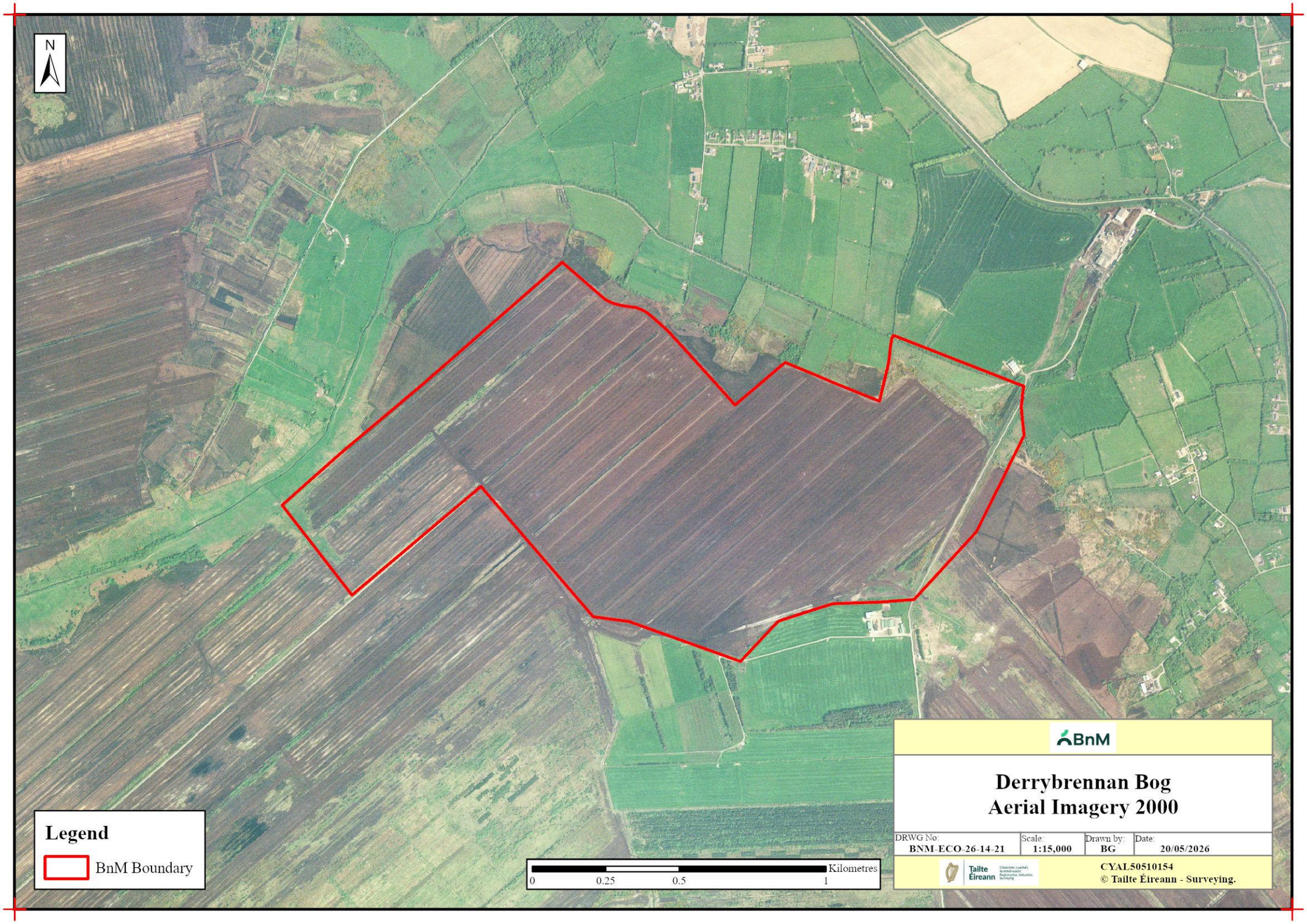
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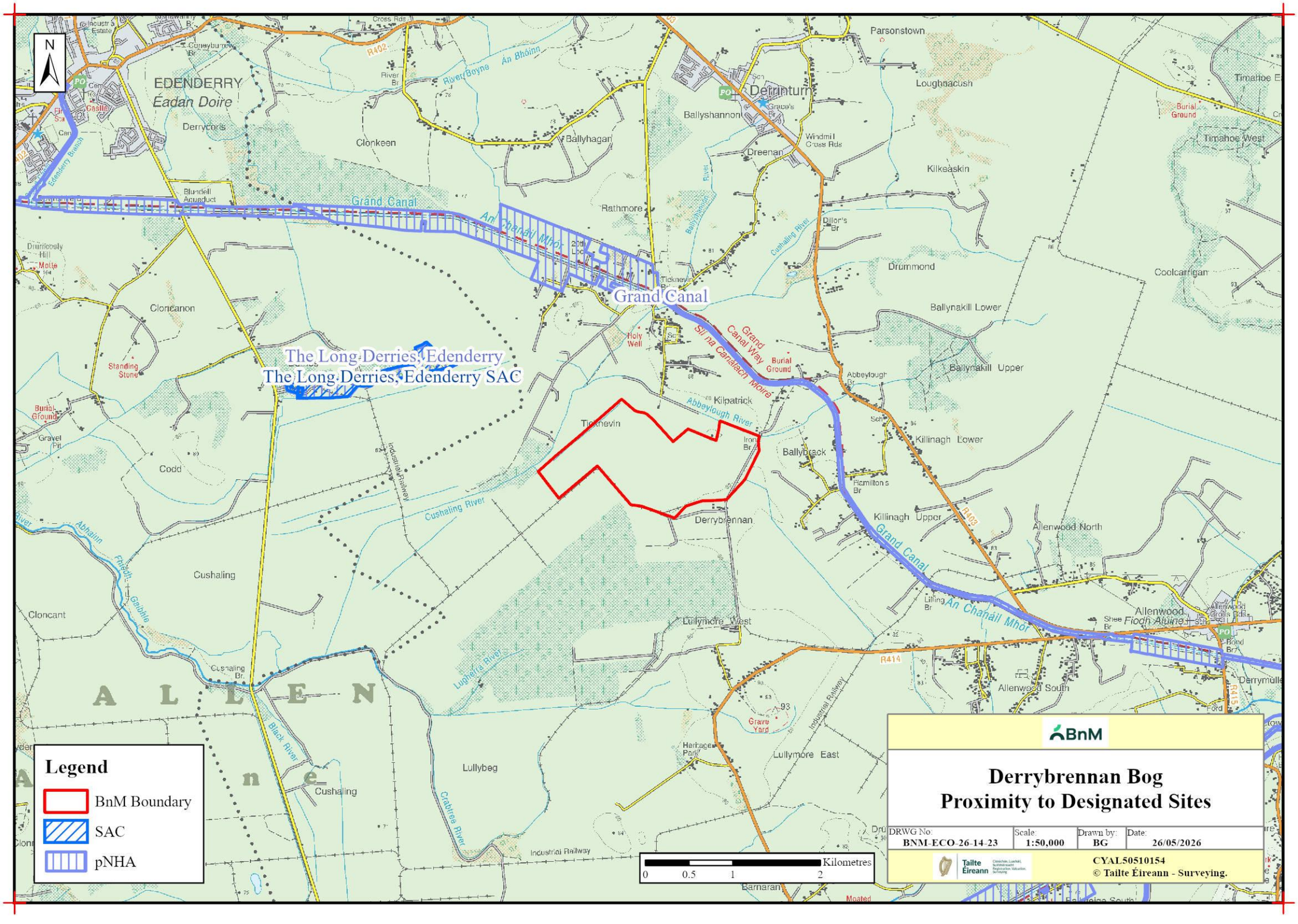
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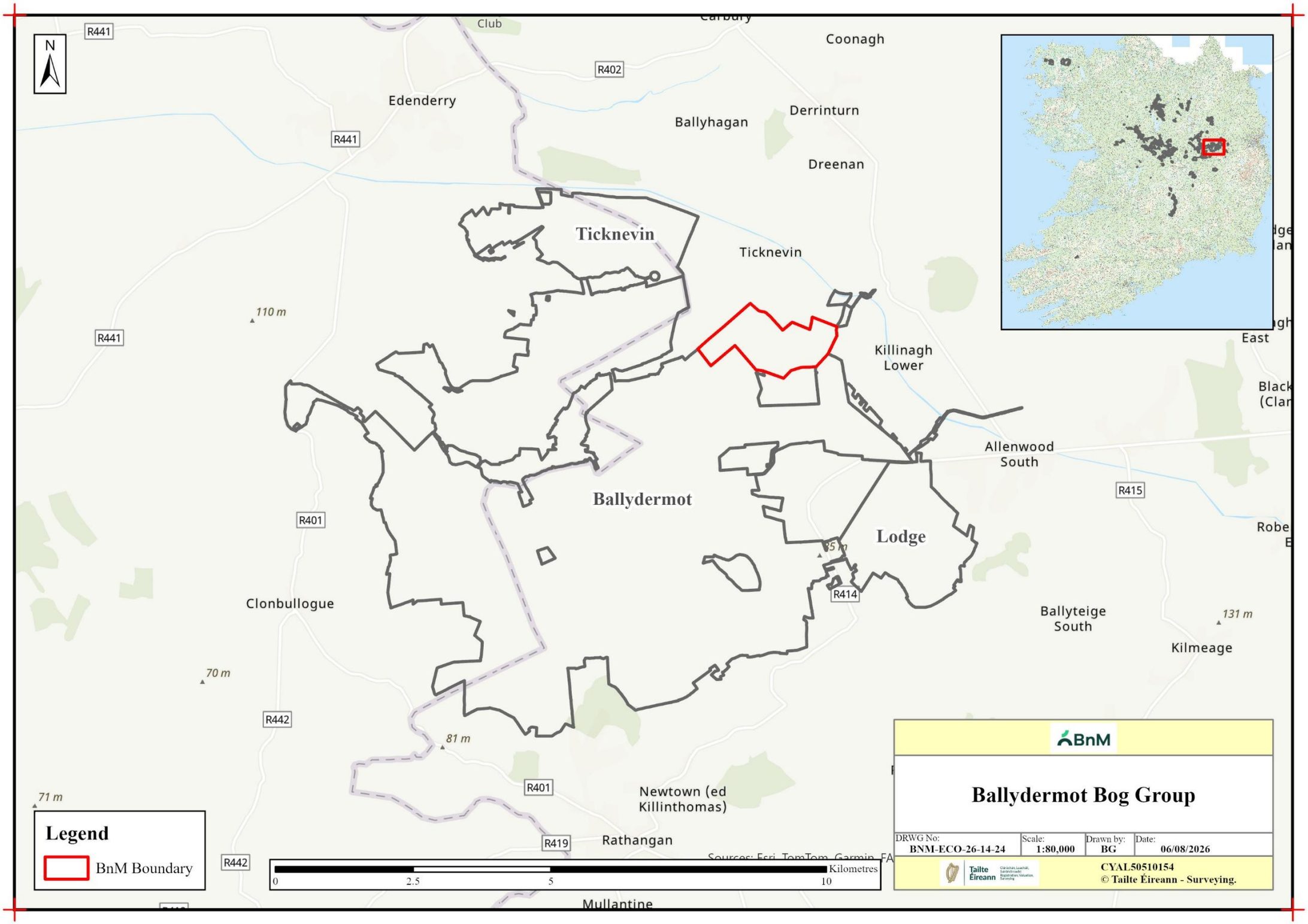
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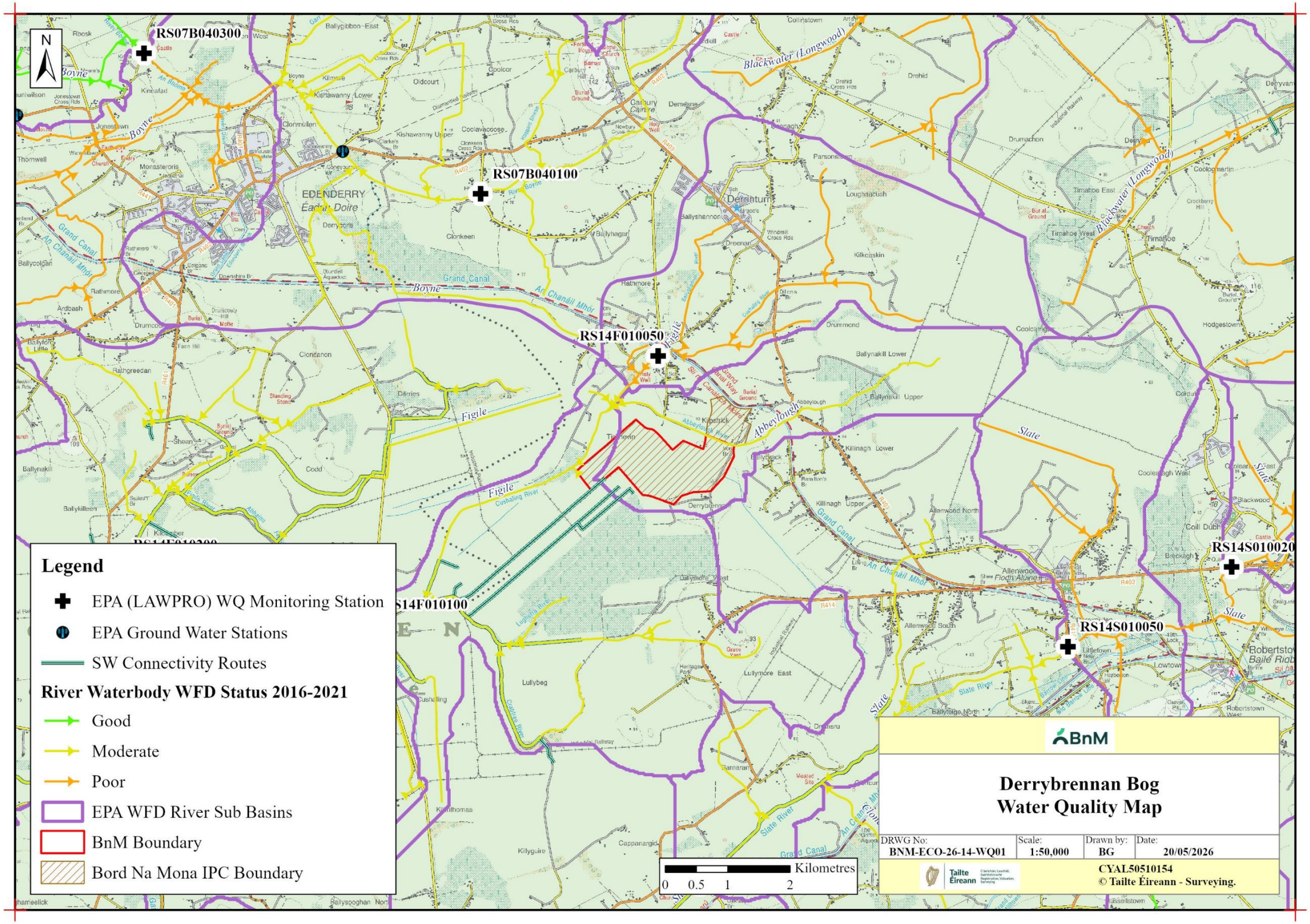
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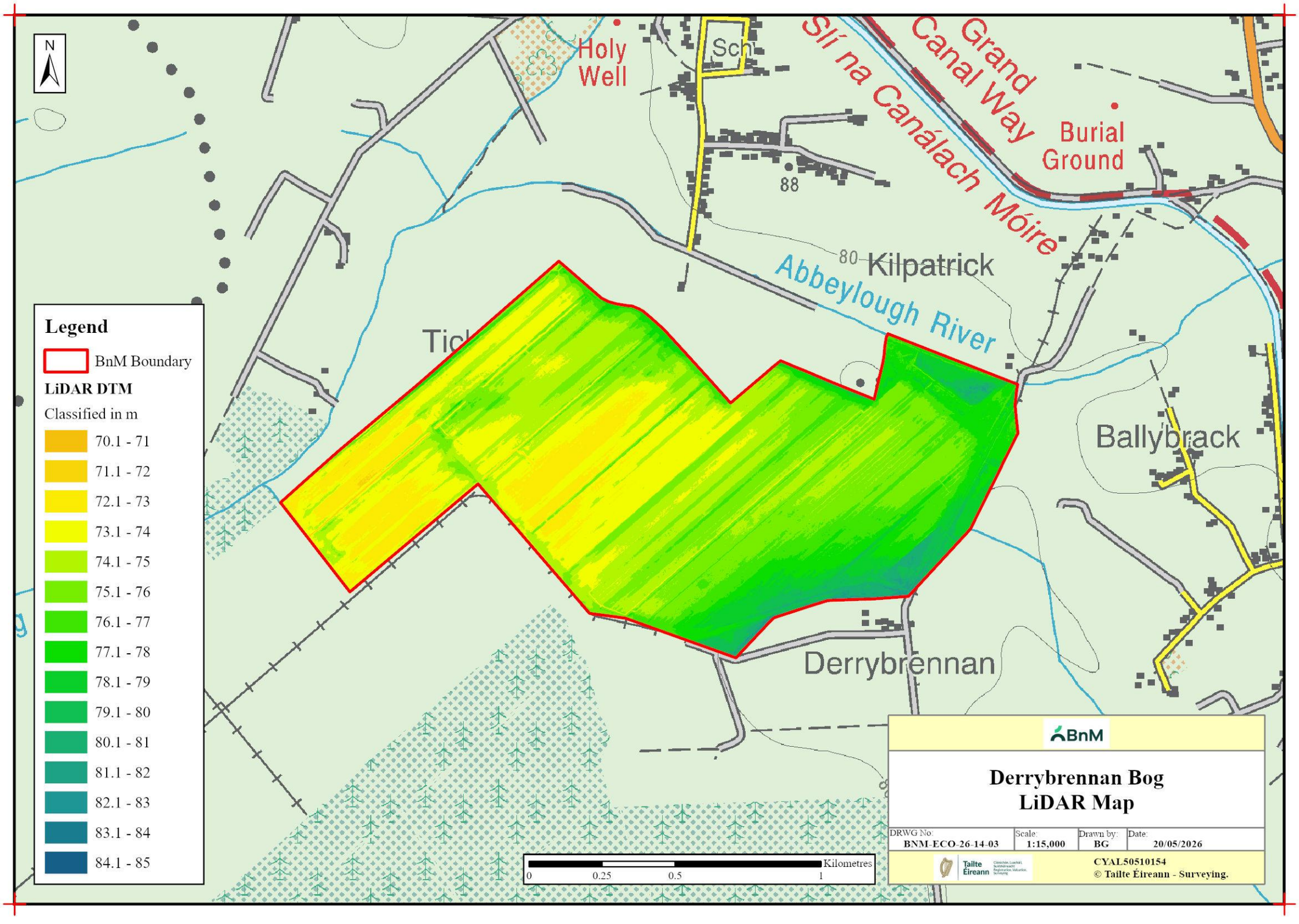
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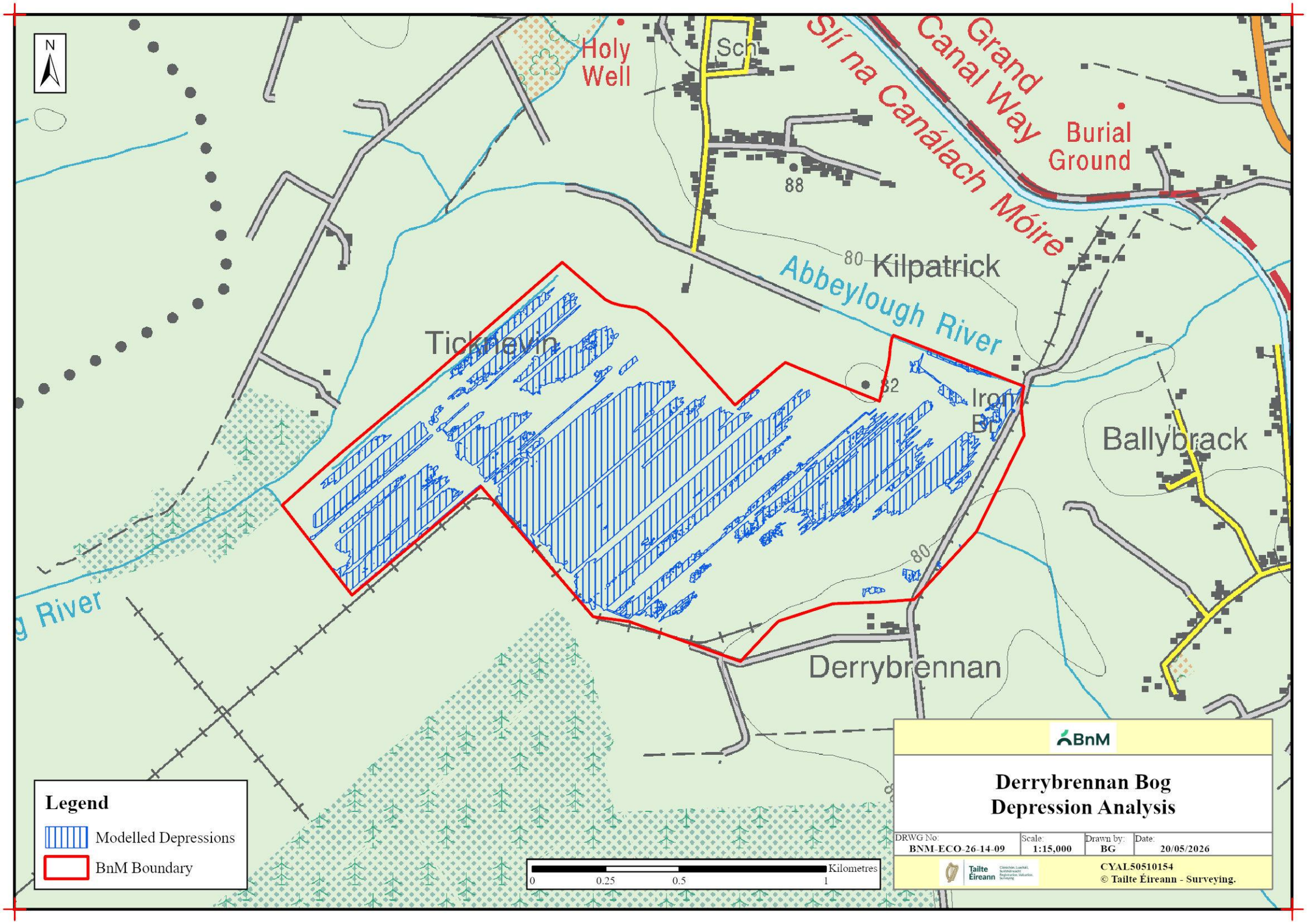
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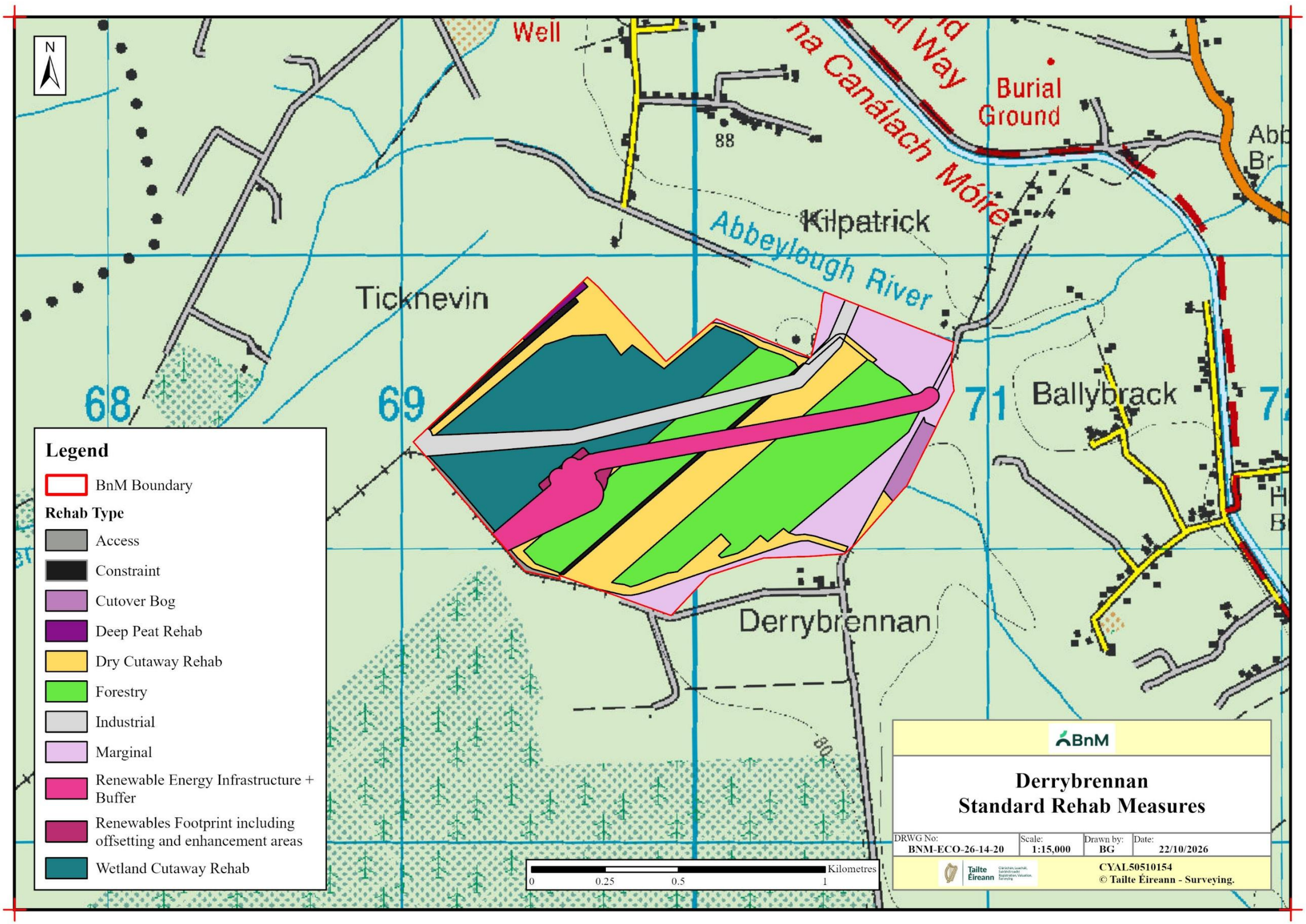
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Rehab Type
Access
Constraint
Cutover Bog
Deep Peat Rehab
Dry Cutaway Rehab
Forestry
Industrial
Marginal
Renewable Energy Infrastructure + Buffer
Renewables Footprint including offsetting and enhancement areas
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Glashabaun Bog
Rehab Plan
GIS Map Book
2026

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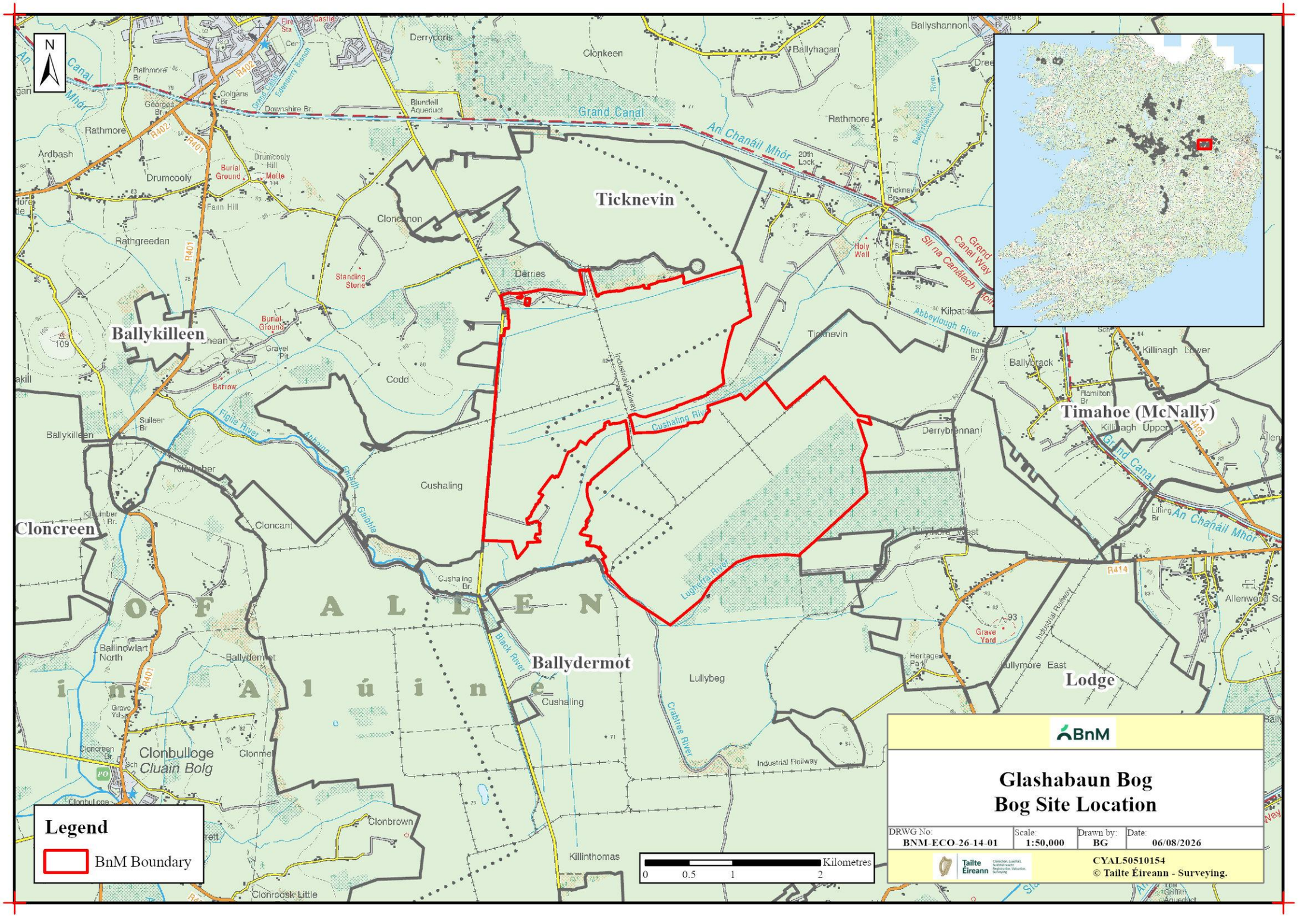
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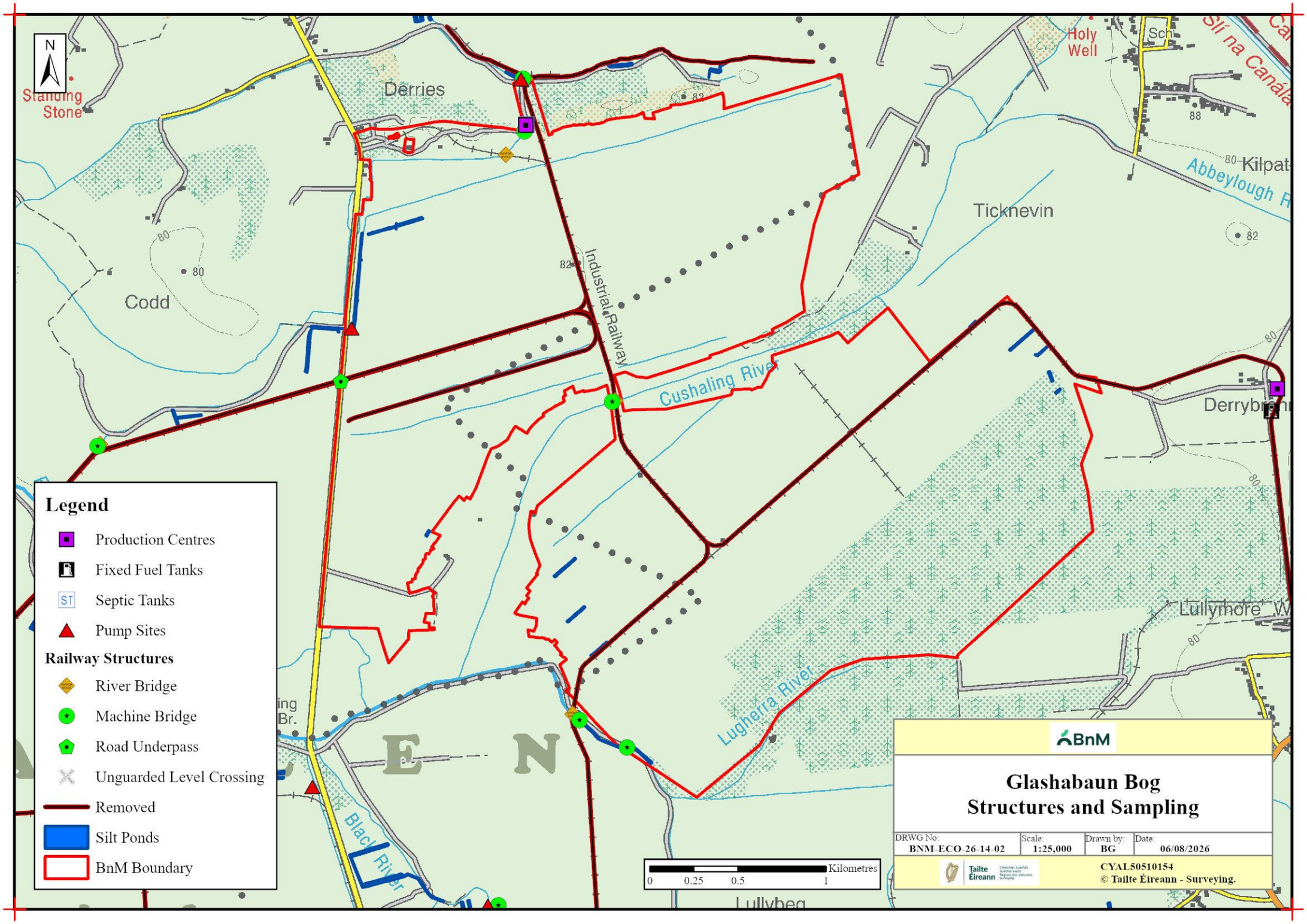
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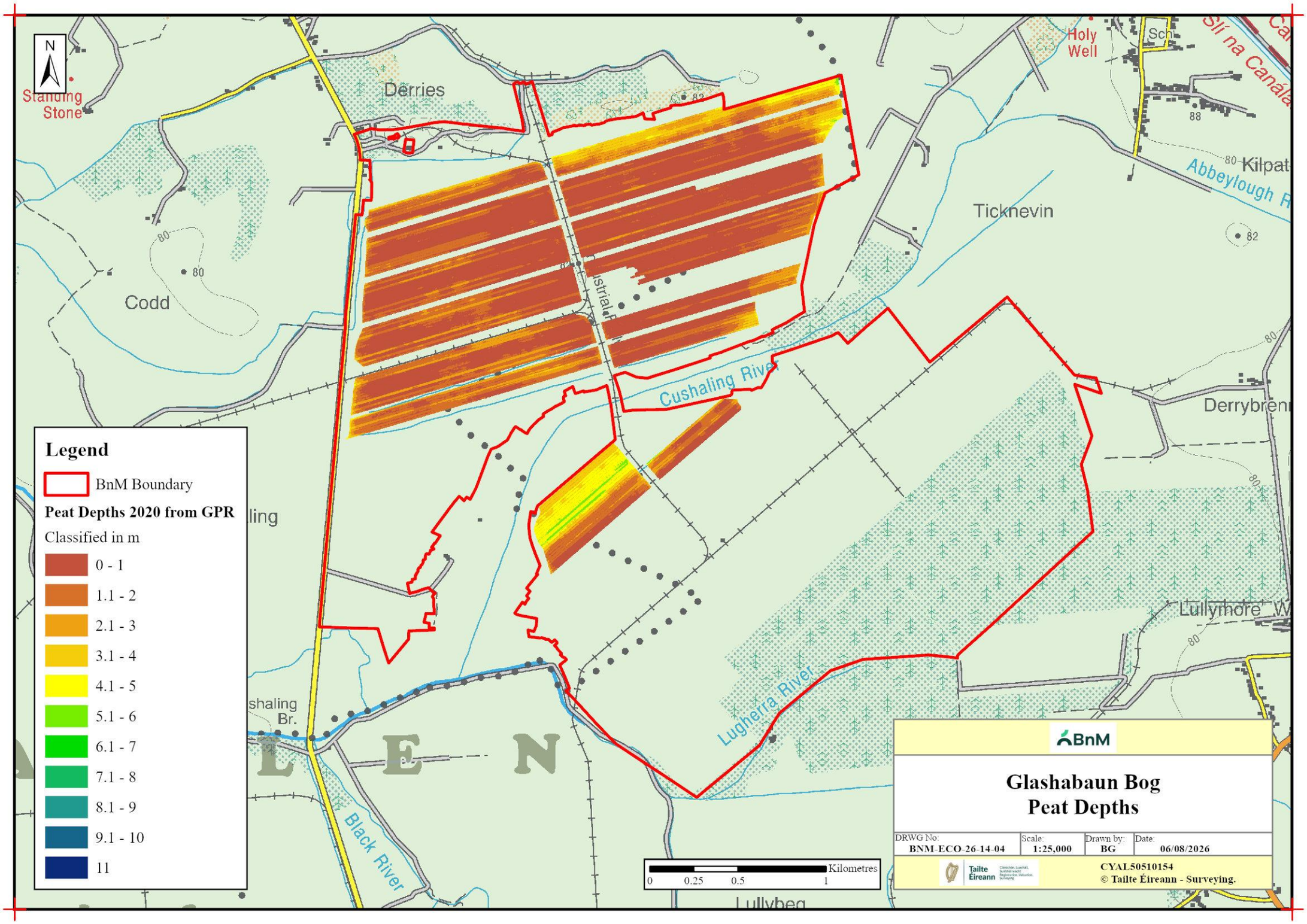
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Machine Bridge
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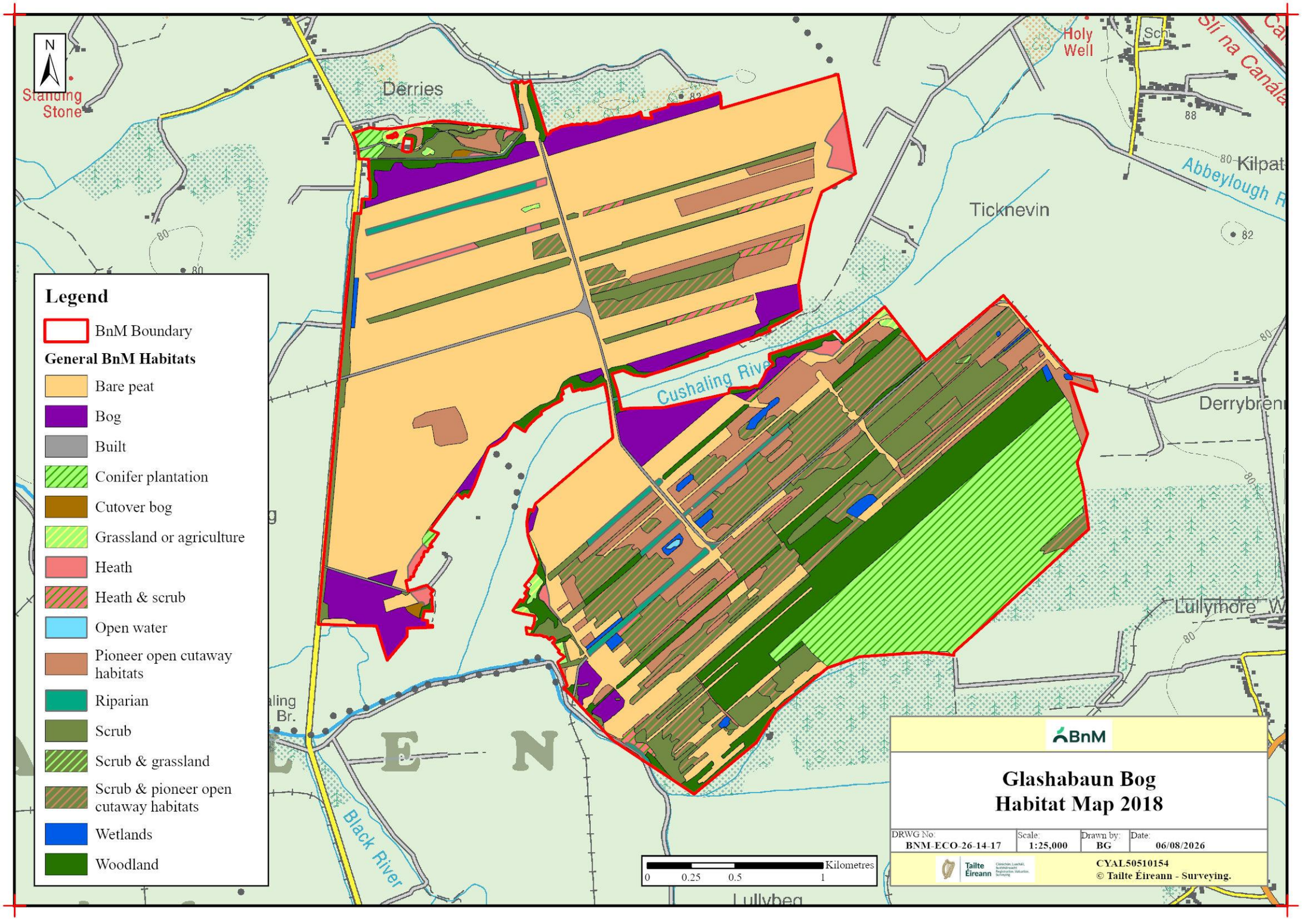
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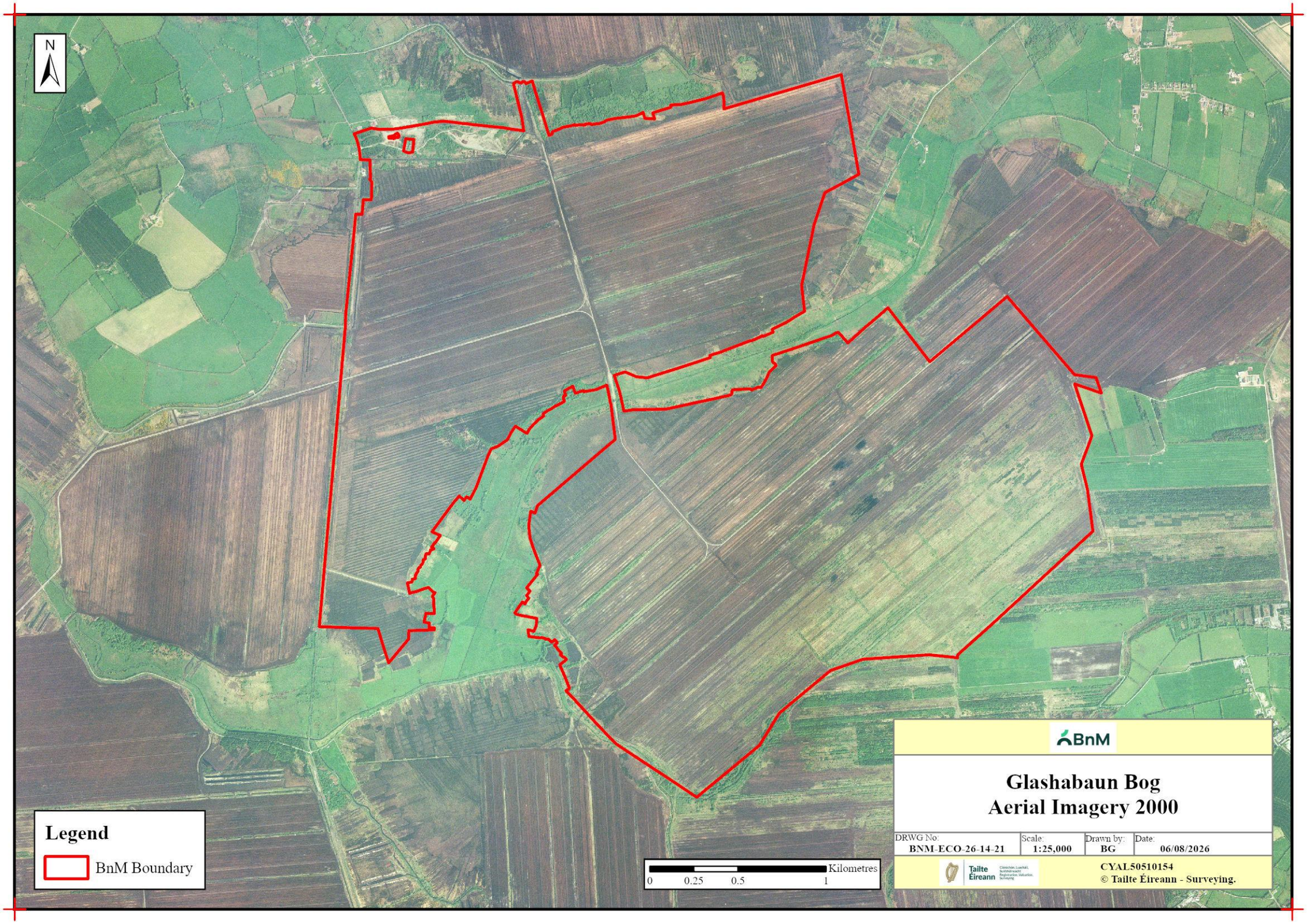
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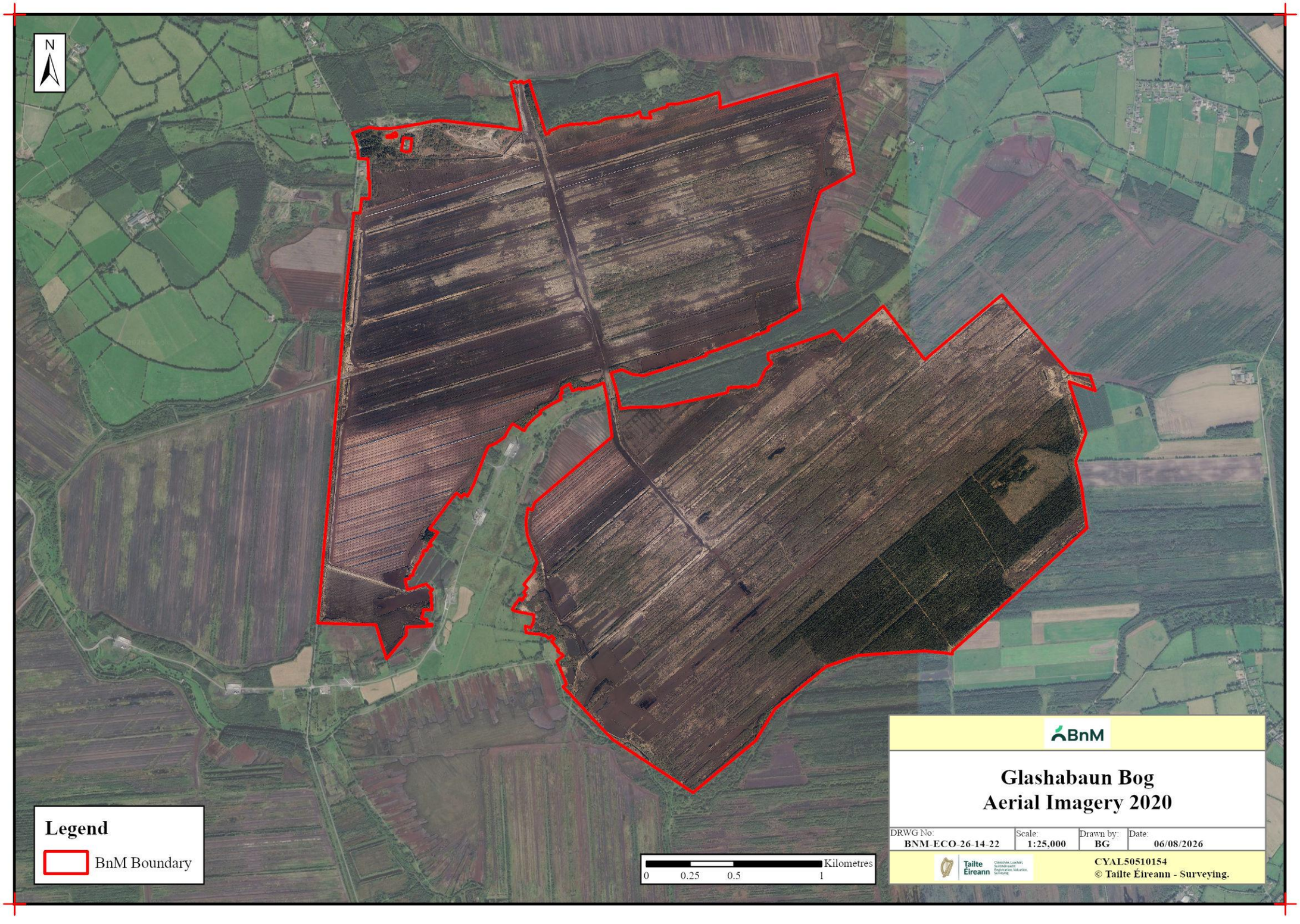
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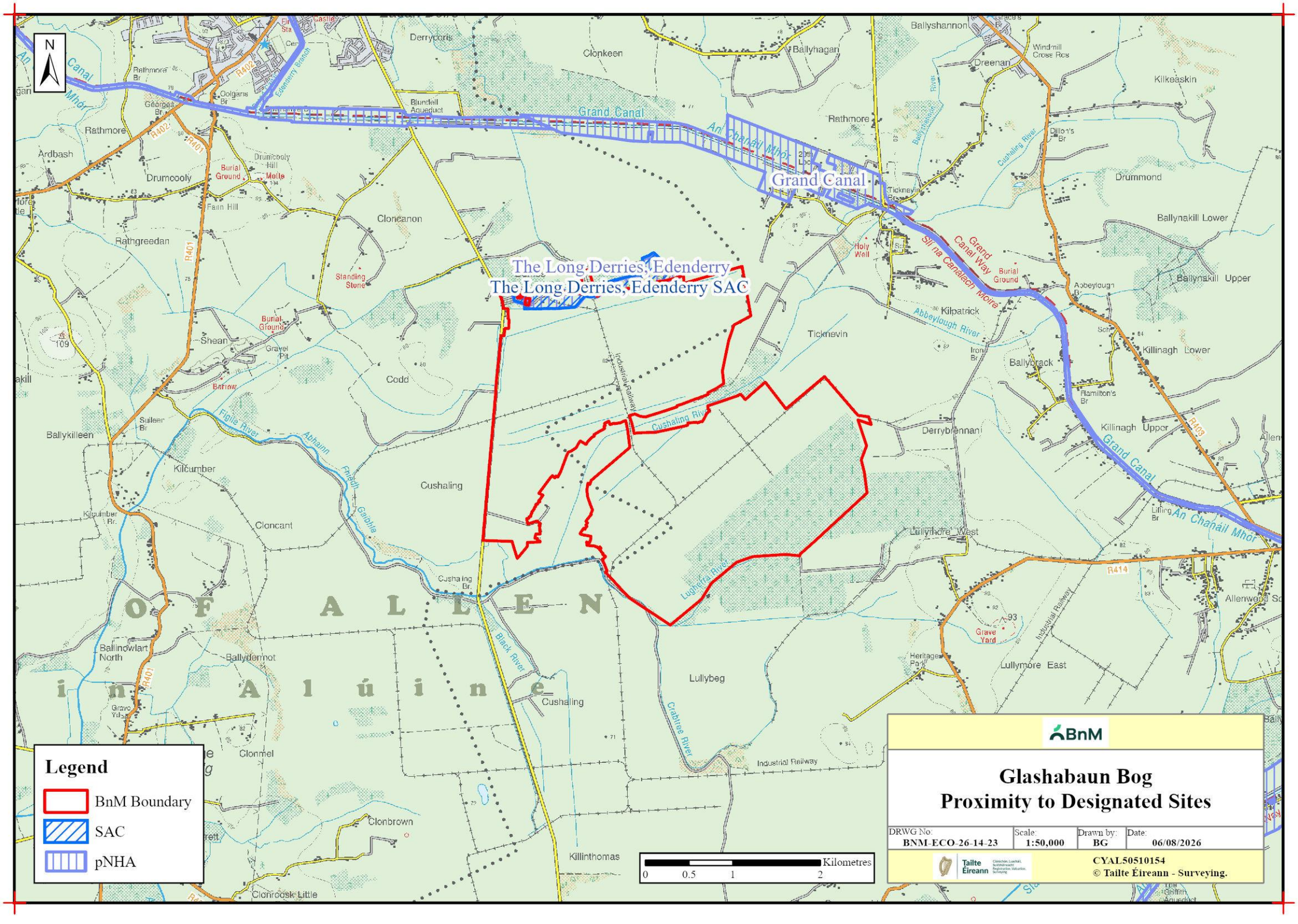
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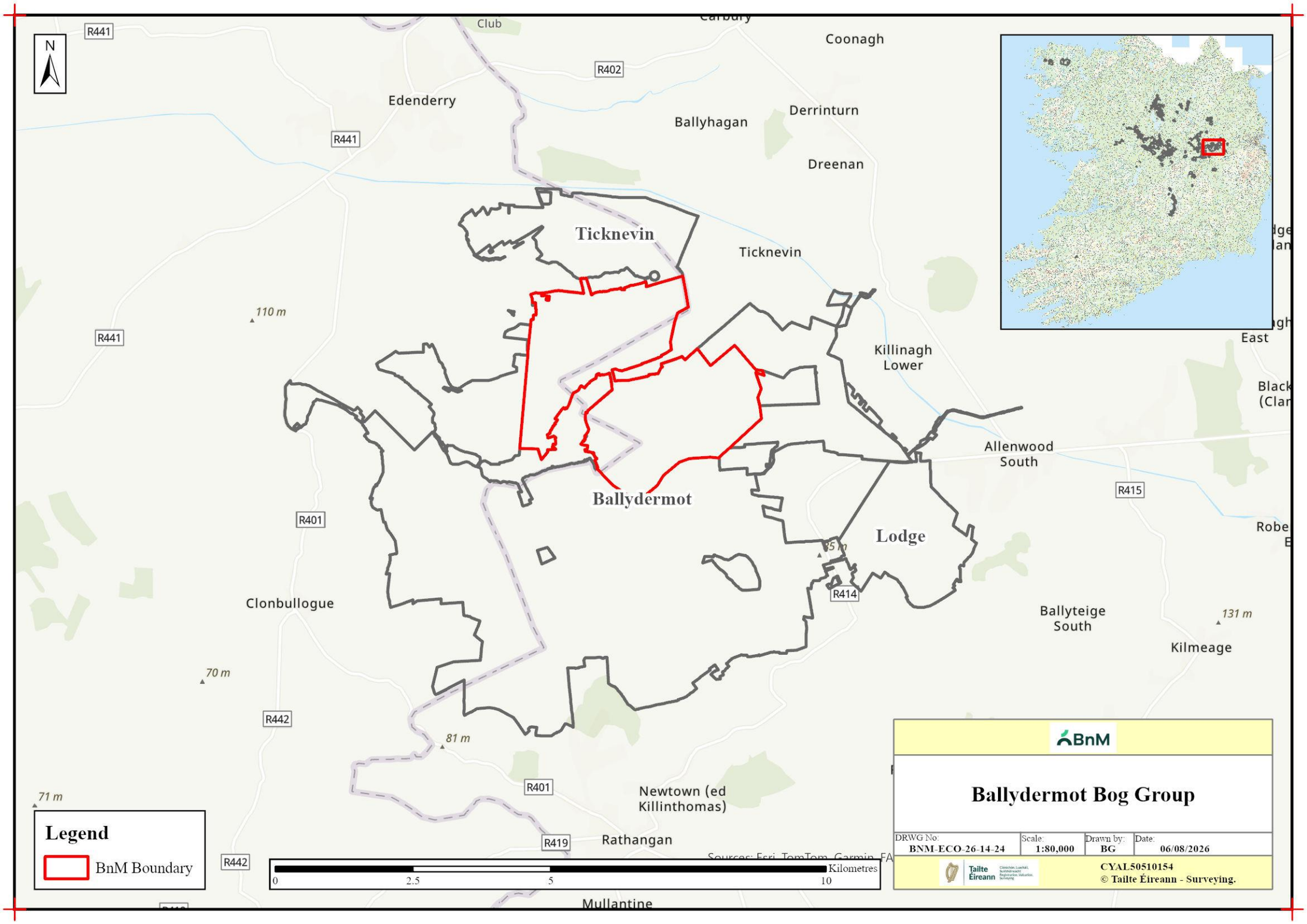
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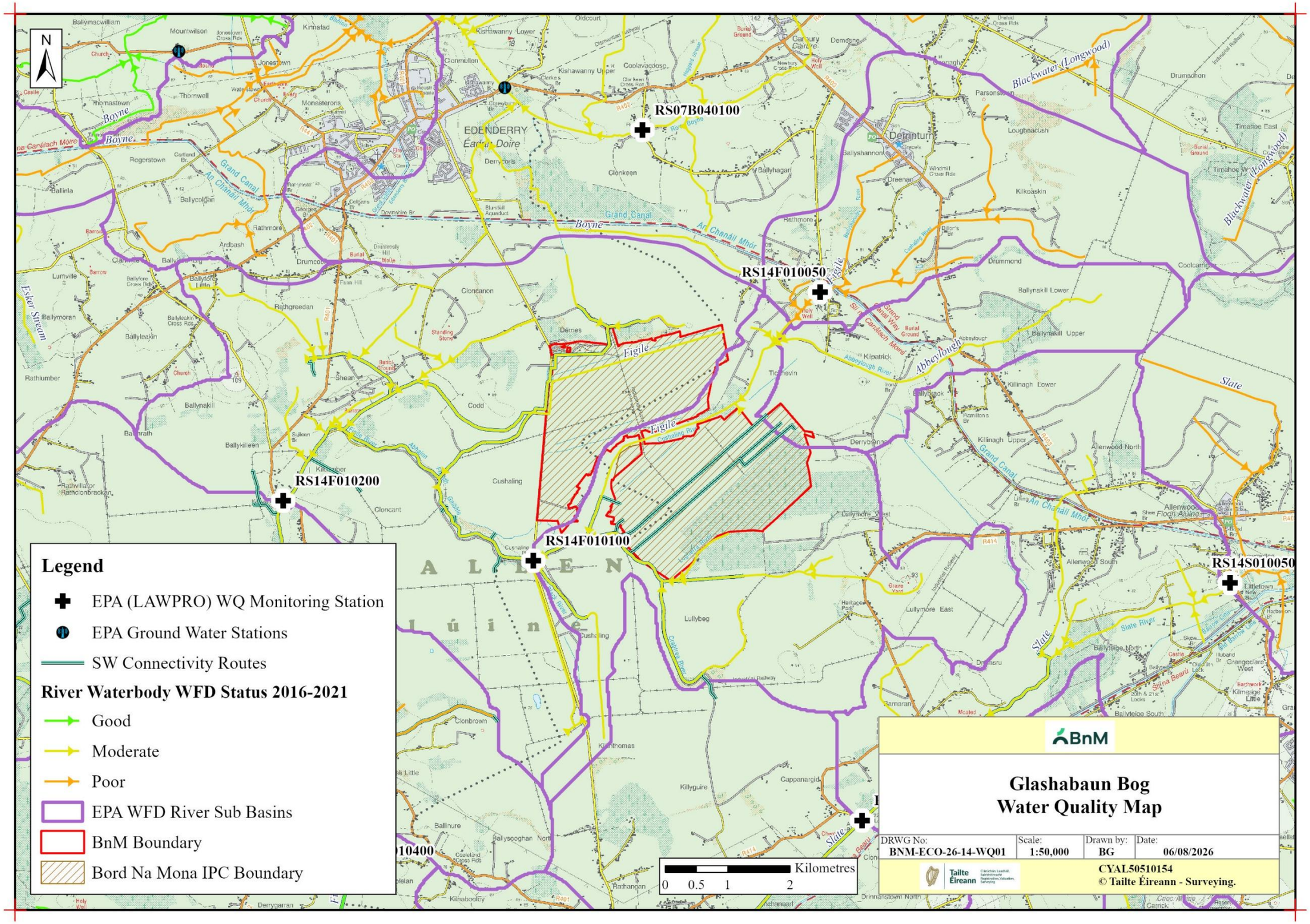
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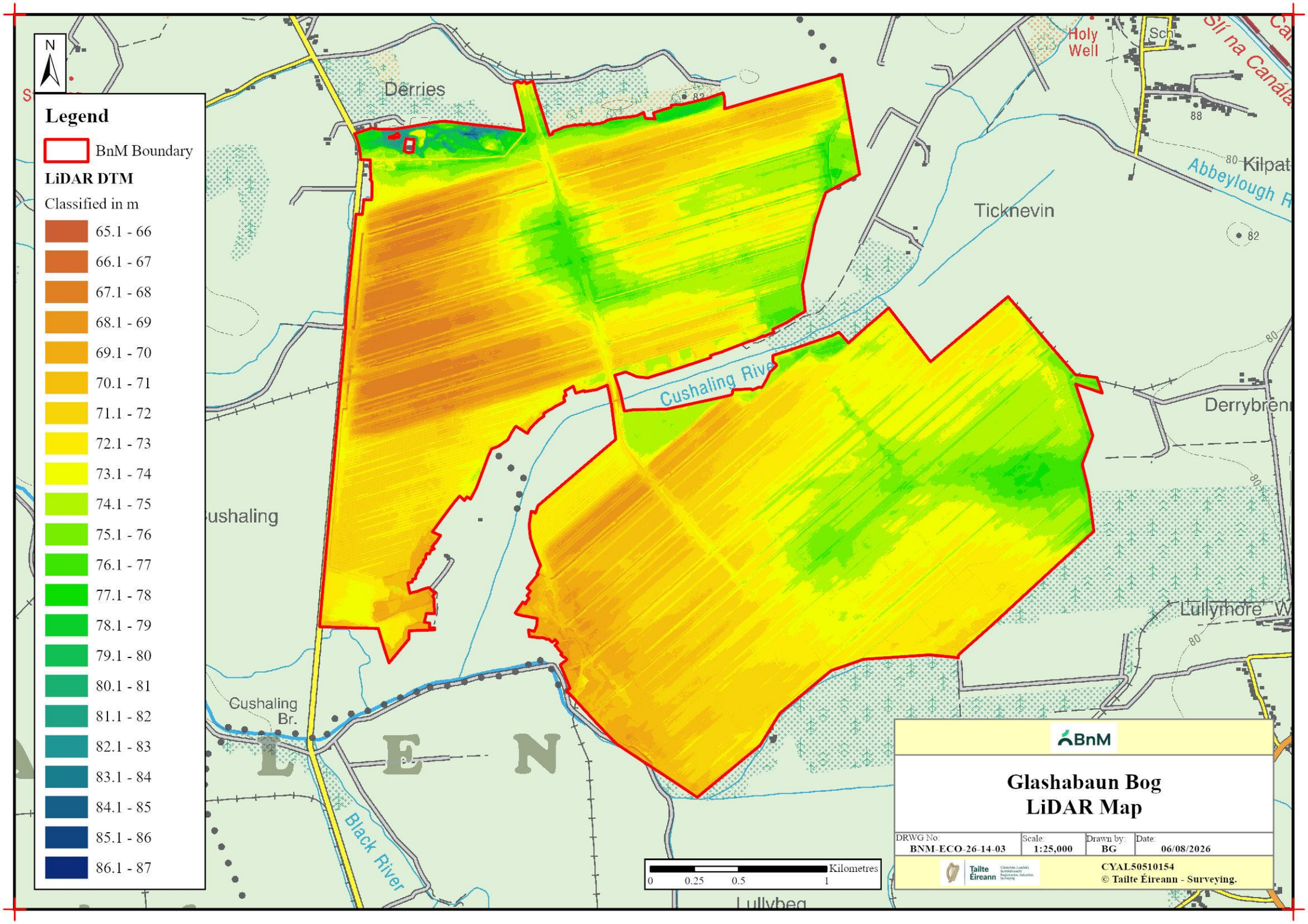
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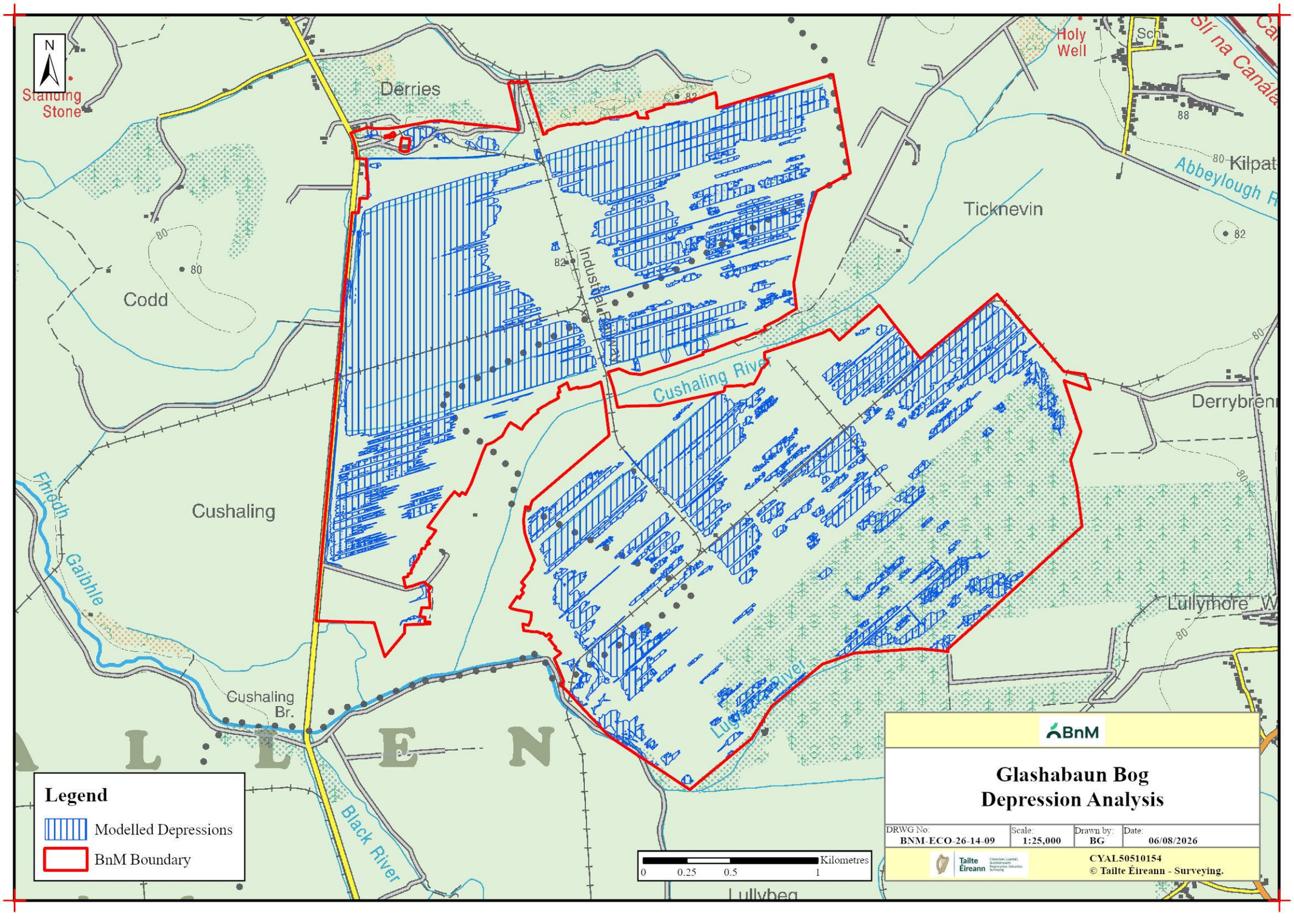
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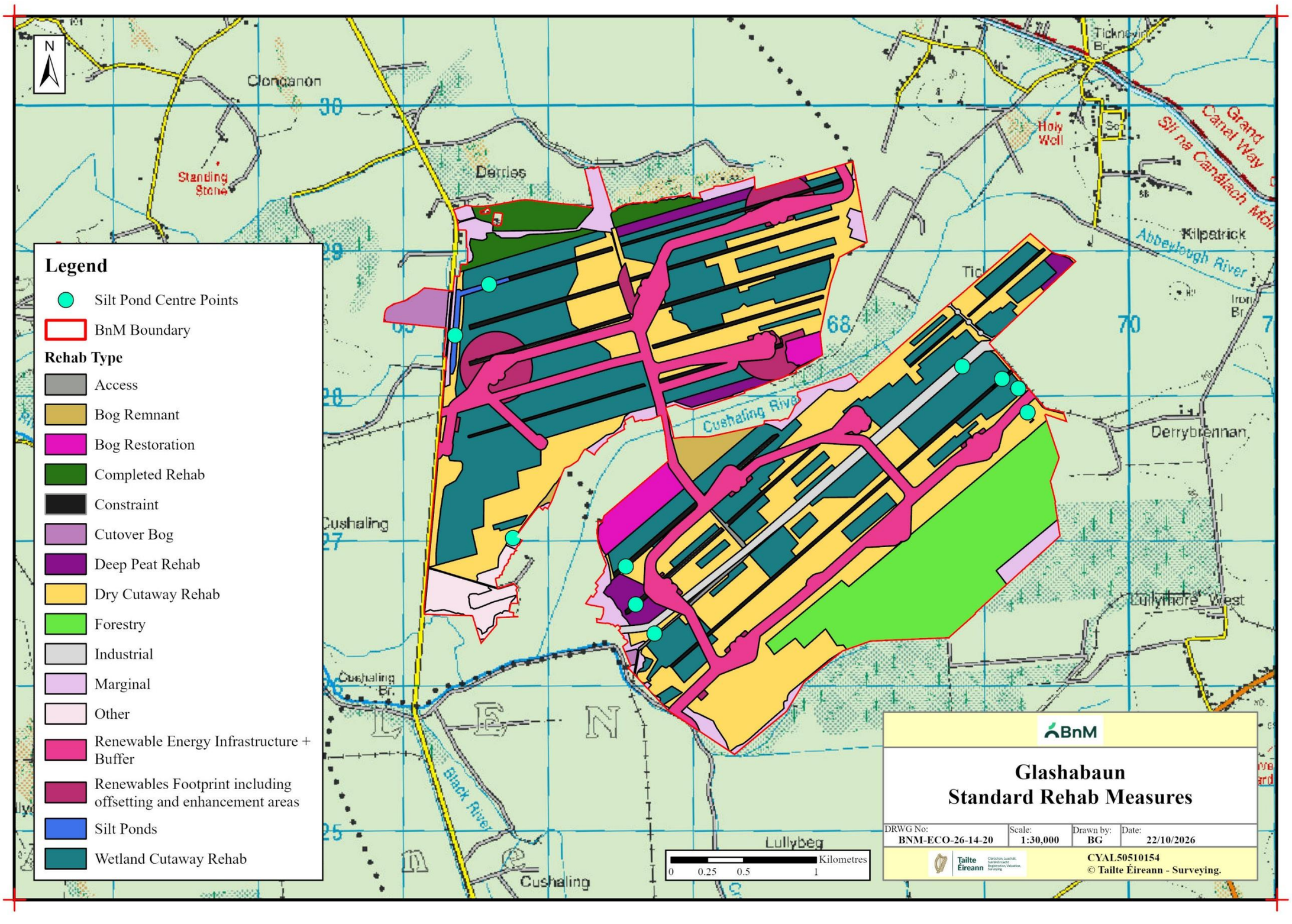



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Lullybeg
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BnM Boundary
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Glashabaun Bog
Depression Analysis
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Glashabaun Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

Draft

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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 BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Glashabaun Bog upon cessation of peat production and complements 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 Glashabaun Bog.

BnM have defined the key rehabilitation outcome at Glashabaun Bog as environmental stabilisation.

Any consideration of any other future after-uses for Glashabaun Bog, 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.

BnM are planning to develop a potential renewable energy project at Glashabaun Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

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Non-technical summary

- BnM (formerly Bord na Móna) is planning to rehabilitate Glashabaun Bog, in Counties Offaly and Co. Kildare, located approximately 4km south of Edenderry.
- Glashabaun Bog is a sub-section of a larger unit called Ballydermot Bog and is further subdivided into Glashabaun North and Glashabaun South.
- Glashabaun North Bog was in full industrial peat production since the 1950's and Glashabaun South since the 1950's. BnM Industrial peat harvesting finished at Glashabaun Bog in 2020. Glashabaun Bog supplied Edenderry Power Station up until its closure in 2020.
- BnM are planning to develop a potential renewable energy project at Glashabaun Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The wind farm planning boundary overlaps Glashabaun Bog and is considered as a constraint in the rehabilitation plan.
- Glashabaun North has a partially pumped bog drainage, with two pumps, whose water table is below the surrounding water table for part of the site. The pumps are located at the northern end of the bog adjacent to Ticknevin and at the northwestern bog boundary with Codd. Glashabaun South is a gravity-drained bog.
- A relatively large area of Coillte conifer forestry is located in the southern section of Glashabaun South.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing vegetation and promoting re-establishment of more typical cutaway peatland communities such as Birch woodland, Reedbeds, fen habitat and *Sphagnum*-rich embryonic bog communities.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures will be planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog 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.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and *Sphagnum* rich embryonic bog communities (on deeper peat); and wetlands with Reedbeds and Birch woodland on shallower peat. In time a naturalised peatland can be developed.
- It will take some time for vegetation and habitats to fully develop at Glashabaun Bog, and a peatland ecosystem to be restored. However, it is expected that most of the bog will be developing pioneer habitats after 5-10 years.
- The development of a range of habitats at Glashabaun Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses, and peatland rehabilitation is an opportunity to create new wetland habitats.

- This peatland rehabilitation plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen bog group (Ref. P0503-01). 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 Allen Bog Group comprises 2 main sub-groups: Allen-Clonsast and Allen-Lullymore. Glashabaun Bog is part of Ballydermot Bog within the Allen-Lullymore bog group (see Appendix I for details of the bog areas within the Allen-Lullymore bog group).

Glashabaun Bog is located in Couties Offaly and Co. Kildare, approximately 4km south of Edenderry. Glashabaun bog is located at the northern extent of the bogs within the wider footprint of Ballydermot Bog

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This **draft** rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Glashabaun Bog and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are NOT proposed as part of this draft Glashabaun rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Glashabaun will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

"*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 document covers the area of **Glashabaun Bog**. Parts of Glashabaun Bog (around the perimeter of the site) are currently being used by domestic turf cutters who have turbary rights. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting and turbary issues on Glashabaun Bog that are outside of the control of BnM. Nevertheless, BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

The proposed Water Supply Project – Eastern and Midlands Region (Irish Water) pipeline (taking water from Shannon to Dublin) crosses the central section of Glashabaun South and has been mapped as a constraint on the rehabilitation plan. It is expected that the footprint of the corridor will be rehabilitated post the construction of the proposed project.

The Long Derries, Edenderry SAC (NPWS site code: 000925) esker site is located in the northwest corner of the Glashabaun North and has been mapped as a constraint on rehabilitation mapping.

A relatively large area of Coillte conifer forestry is located in the southern section of Glashabaun South – this has also been mapped as a constraint.

BnM are planning to develop a potential renewable energy project at Glashabaun Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). This proposed wind farm project is located within Glashabaun Bog as well as the adjacent BnM bogs of Ballydermot, Barnaran, Blackriver, Codd, Derrybrennan, Killinagh, Lodge, Lullybeg, Lullymore and Ticknevin. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm has been taken into account in the preparation of this Rehabilitation Plan. Where proposed wind farm infrastructure overlaps with areas identified for rehabilitation, the timing and sequencing of rehabilitation measures will be coordinated with the proposed development. Accordingly, these areas are treated as a temporal consideration in relation to the implementation of rehabilitation measures.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Glashabaun Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Glashabaun Bog 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 or issues such as rights of way.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan'* (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2011 to 2026 inclusive), monitoring and desktop analysis, form the basis for the development of this 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

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.
- Feehan, J. (2004). A Long-Lived Wilderness. The Future of the North Midlands Peatland Network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.

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- 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, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- 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;
- BnM Annual Report 2025;
- 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 BnM's rehabilitation and Biodiversity Action Plan activities and will be contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Glashabaun Bog was surveyed between 2011-2016. Additional ecological walk-over surveys and visits have taken place at Glashabaun Bog between 2014-2026. 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 (2019), while mosses and liverworts nomenclature follows identification keys published by the Atherton *et al*. (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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3. SITE DESCRIPTION

Glashabaun Bog is a sub-section of a larger unit called Ballydermot Bog and is located in Counties Offaly and Co. Kildare, approximately 4km south of Edenderry (Grid reference: ITM 267400; 227359). It is further subdivided into Glashabaun North and Glashabaun South, divided by the Cushaling River/Figile River (EPA Code 14F01) which flows between the two subsites.

A secondary public road (L1001 Edenderry to Rathangan bog road) marks the western boundary of Glashabaun North, while the Figile River delineates the southern extent of Glashabaun North.

Part of the site is subject to hydrological management via pumping to support the former industrial peat production and its infrastructure. Pumping is ongoing during the decommissioning phase. Glashabaun North has a partially pumped bog drainage, with two pumps, whose water table is below the surrounding water table for part of the site. The pumps are located at the northern end of the bog adjacent to Ticknevin and at the northwestern bog boundary with Codd. Glashabaun South is a gravity-drained bog.

Peat extraction ceased at both sub-sites in 2020. Areas that more recently came out of peat production are still dominated by bare peat, whilst pioneer vegetation communities and scrub are developing on older cutaway habitats.

A significant portion of Glashabaun South has been out of production for some time and has developed more mature cutaway habitats such as Birch woodland and scrub. Part of the eastern side of Glashabaun South has been planted with conifers by Coillte in the 1990's. Several production fields adjacent to the conifer plantation have developed dense Birch scrub/woodland related to fertiliser applications and groundwork for conifer forestry development that was never carried out.

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland and other bogs in the wider Ballydermot Bog which are owned and managed by BnM.

See Drawing number BNM-ECO-26-14-01 titled Glashabaun Bog*: Site Location Map*, included in the accompanying Mapbook[1] , which illustrates the location of Glashabaun Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Glashabaun North Bog was in full industrial peat production since the 1950s until 2020. Glashabaun South was in peat extraction from the 1950's up until 2020.

A BnM industrial railway network occurred within the bog providing a link to Edenderry Power Station (now ceased). This railway has been decommissioned.

3.1.2 Current land-use

The Long Derries, Edenderry SAC (NPWS site code: 000925) esker site is located in the northwest corner of Glashabaun North. There is a remnant strip of habitat along the edge of the production bog where the transition between this esker site and the bog (PB1) has been retained.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Glashabaun Bog Map Book

A significant portion of Glashabaun South was planted with conifer forestry in the 1990's by Coillte.

There are some areas of active turbary outside the margins of the bog.

BnM are planning to develop a potential renewable energy project at Glashabaun Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project is located within Glashabaun Bog as well as the adjacent BnM bogs. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm infrastructure **partially** overlaps with the Glashabaun Bog (see drawing number BNM-ECO-26-14-20: Standard Rehab Measures); these (infrastructure) areas have been treated as a constraint in the rehabilitation plan.

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

  a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

  b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

xxv. All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3 Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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.

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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 Glashabaun Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station.

As the primary employer in many Midland counties, BnM 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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology[2] of Glashabaun North Bog is predominantly Lucan Formation (dark limestone & shale (`calp)) while Glashabaun South is predominantly underlain by Ballyadams Formation (crinoidal wackestone/packstone limestone) with some Allenwood Formation (thick-bedded limestone, locally peloidal) to the east and Lucan Formation to the northwest.

3.2.2 *Peat type and depths*

Glashabaun North generally has shallow peat remaining (0-1m). There seems to be somewhat deeper peat left on Glashabaun South compared to other production bogs. This peat has still been harvested to the fen layers. However, there are very little gravel mounds or sub-soil exposed on the site.

A sandy, marl-like sub-soil is found along the Figile River, where there are profiles exposed. This is likely to be alluvial in development.

The deeper pockets of peat over 2m may have the potential to develop embryonic *Sphagnum*-rich peat-forming communities if optimum hydrological conditions can be developed.

3.3 Key Biodiversity Features of Interest

The different cutaway habitats developing across the site reflects the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All sites have hydrological

[2] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0

gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and groundwater has a stronger influence.

Detailed ecological reports in relation to Glashabaun North and Glashabaun South are provided in Appendix II.

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present include:

- Bare peat
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff)
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway.)
- Pioneer calcareous grassland (gCal) (developing on old track)
- Purple Moorgrass-dominated grassland (gMol) (developing on margins of site).
- Gorse scrub (eGor) (developing on margins of site).
- Access routes (railways and paved tracks and associated verges)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated.)
- Rank dry meadow-type grassland (GS2) (found at southern margin).
- Raised bog (PB1) (dried remnant being invaded by scrub)
- Cutover bog (PB4) (small area formerly used to harvest peat).
- Open and emerging Birch scrub (eBir/oBir) and poor fen mosaic (pJeff)
- Dense Birch scrub (cBir) and woodland (BirWD)
- Conifer plantation (WD4) planted on cutaway bog.
- Pioneer wetland development with open water (OW), Soft Rush-dominated poor fen (pJeff) and Bog Cotton (pEang).
- Minor development of other poor fen communities dominated by Marsh Arrow Grass (pTrig) and Horsetail (pEq).
- Minor development of other pioneer cutaway communities such as Common Reed (pPhrag), rank grassland (gCo-An) and dry Heath (dHeath).

The most common habitats found around the margins of the site include:

- Birch woodland (WN7)
- Scrub (WS1) (Blackthorn scrub and Birch scrub)
- Raised bog remnants (PB1)
- Cutover bog (PB4)

[3] Categories in brackets refer to the current BnM classification system for vegetation communities, along with an equivalent Heritage Council habitat classification or Fossitt Code, where relevant.

- Ash-Hazel woodland (WN2) (along Lugherra River)
- Dense Bracken (HD1)
- Improved grassland (GA1) (along western margin)
- Wet grassland (GS4) (formerly improved along the margins of the site)

Glashabaun North

Glashabaun North is has developed pioneer poor fen vegetation type dominated by Soft Rush (*Juncus effusus*) and Bog Cotton (*Eriophorum angustifolium*). Downy Birch (*Betula pubescens*) scrub in various successional stages has developed across drier areas of the cutaway. Bare peat remains in areas that have more recently come out of peat production (as of 2020), particularly in the southwestern part of this subsection.

The Long Derries, Edenderry SAC partially overlaps the northwestern corner of Glashabaun North and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is located on a gravel ridge (esker). The SAC contains several species of conservation interest including Green-Winged Orchid (*Anacamptis morio*) a nationally rare plant species listed as 'vulnerable' on the Red List (Red List (Wyse *et al*., 2016).

This site also supports populations of Basil Thyme (*Clinopodium acinos*) and Blue Fleabane (*Erigeron acris*). Both species are nationally rare, Red-listed species with Blue Fleabane listed as "Least Concern" and Basil Thyme listed as 'Near Threatened' on Irelands Red List (Wyse *et al*., 2016). Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations. These species are not typical bog species and are likely to have come on to the production bog from nearby eskers or gravel pits. The presence of these species enhances the rare flora resource of Co. Offaly.

The site also contains a notable transition between calcareous grassland and scrub to peatland habitats. BnM had used the site in the past as a gravel pit, using gravel for the construction of railway embankments across BnM bogs.

Areas of intact remnant raised bog remain around the margins of this subsection. A large area of remnant raised bog remains in the southwestern corner; domestic turf cutting is ongoing in this area. Raised bog remnants also occur along the northern margins bordering the Long Derries, Edenderry SAC. These remnants are drained, however drain blocking has taken place in one section of drained bog in the northwestern part of the bog.

Close to the southeastern corner of the site, where Glashabaun North meets Glashabaun South, the Cushaling River flows between the two areas of bog.

Glashabaun South

Glashabaun South was formerly a sod peat production bog that was converted to the production of milled peat.

A significant portion of Glashabaun South has been out of production for some time and has developed more mature cutaway habitats such as Birch woodland and scrub. This bog is relatively dry, and older cutaway has largely revegetated, with only some smaller areas that where peat production was more recent (2020) remaining dominated by bare peat. There is minor wetland development in this site where there are localised drainage issues.

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Glashabaun South also support populations of Basil Thyme and Blue Fleabane. The presence of these species enhances the rare flora resource of Co. Kildare.

Glashabaun South has a variable topography and some of the higher ground towards the east was developed as conifer plantation. The majority of the eastern side of Glashabaun South was planted with conifers by Coillte. Several series of fields adjacent to the conifer plantation have developed dense Birch scrub/woodland. This woodland development may be related to fertiliser applications and groundwork for conifer forestry development that was never carried out. Large deep drains lined with mature Birch woodland run the length of the site and divide the site into several sub-sections.

See Appendix II for more detail on site, habitats and local features. See Drawing number BNM-ECO-26-14-17 titled *Glashabaun Bog: Habitat Map 2018*, included in the accompanying mapbook, which illustrates the habitats at Glashabaun Bog.

3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Glashabaun Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC).

Multiple mammal species have been recorded on or within 1 Km of the bog including Irish Hare (*Lepus timidus subsp. Hibernicus)*, Fox (*Vulpes vulpes*), Eurasian Badger (*Meles meles),* Stoat (*Mustela erminea*), Pine Marten (*Martes martes*) and European Otter (*Lutra lutra*).

The butterfly species Speckled Wood (*Pararge aegeria*), Small Heath (*Coenonympha pamphilus*) and Meadow Brown (*Maniola jurtina*) have all been recorded during BnM surveys. Several additional species of butterfly of conservation concern have been recorded at Glashabaun Bog including Dark Green Fritillary (*Speyeria aglaja*), Dingy Skipper (*Erynnis tages*), Marsh Fritillary (*Euphydryas aurinia*) and Wall (*Lasiommata megera*).

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Snipe (*Gallinago gallinago*), Wheatear (*Oenanthe oenanthe*), Stonechat (*Saxicola rubicola*), Wood Pigeon (*Columba palumbus*), Blue Tit (*Cyanistes caeruleus*), Wren (*Troglodytes troglodytes*), Meadow Pipit (*Anthus pratensis*), Pheasant (*Phasianus colchicus*), Blackbird (*Turdus merula*), Hooded Crow (*Corvus cornix*), Lesser Redpoll *(Carduelis flammea cabaret)* and Swallow (*Hirundo rustica*) have all been recorded during BnM ecology surveys.

Basil Thyme (*Clinopodium acinos*) and Blue Fleabane (*Erigeron acris*) have been recorded along the railway embankments at several locations. Both are Red-listed species with Blue Fleabane listed as "Least Concern" and Basil Thyme listed as 'Near Threatened' on Irelands Red List (Wyse Jackson *et al*., 2016). Several populations are present on railway tracks throughout Glashabaun or on areas of exposed gravel that are associated with the railway tracks as part of the 'weed' or recolonising flora. These species are not typical bog species and are likely to have come on to the former production bog from the Long Derries esker. The presence these species enhances the rare flora resource of Co. Offaly and Kildare.

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NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km hectad (N62) within which Glashabaun Bog is located include; Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Partridge (*Perdix perdix*). Grey Wagtail (*Motacilla cinerea),* Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (Saxicola rubetra), Woodcock (*Scolopax rusticola)* and Yellowhammer (*Emberiza citrinella*).Red-listed[5] listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Red Kite (*Milvus milvus*) and White-tailed Eagle (*Haliaeetus albicilla*).

Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

There are NBDC records for the high impact invasive species American Mink (*Neovison vison*) and Fallow Deer (*Dama dama*) at the bog.

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

The Long Derries, Edenderry SAC (Site Code: 000925) overlaps the north of Glashabaun North. There are no other European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Glashabaun Bog. Other EU Designated sites in proximity to Glashabaun SAC are as follows:

- Ballynafagh Lake SAC (site code: 001387) – 9.9 km east
- Mouds Bog SAC (site code: 002331) – 10.7 km southeast
- Ballynafagh Bog SAC (site code: 000391) – 10.9 km east
- Pollardstown Fen SAC (site code: 000396) – 12 km southeast
- River Barrow and River Nore SAC (site code: 002162) – 14.6 km south of Glashabaun

A number of non-statutory designated sites also occur in the wider area around Glashabaun Bog.

- The Long Derries, Edenderry pNHA, also designated under The Long Derries, Edenderry SAC, is located within the north of the bog.
- The Grand Canal pNHA (NPWS Site Code: 002104) - 0.9 km north
- Carbury Bog NHA (Site Code: 001388) - 5.4 km northeast
- Black Castle Bog NHA (NPWS Site Code: 000570) - 8.1 km northwest
- Hodgestown Bog NHA (NPWS Site Code: 001393) - 9.8 km east
- Ballina Bog pNHA (NPWS Site Code: 000390) - 11.2 km north

See drawing *BNM-ECO-26-14-23: Proximity to Designated Sites* in the accompanying map book.

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

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

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar sites located in proximity to Glashabaun Bog. The nearest Ramsar sites are Pollardstown Fen located approximately 12.2km southeast and Raheenmore Bog located approximately 20.2km west of Glashabaun Bog.

3.5 Hydrology and Hydrogeology

Glashabaun bog forms part of the Barrow Catchment (Catchment ID: 14) as defined by the EPA under the Water Framework Directive (WFD). The bog lies completely within the Figile_SC_010 sub-catchment.

An unnamed watercourse (River waterbody code: IE_SE_14F010200) flows along the northern boundary of Glashabun North in a westerly direction into Codd River (EPA Code 14C44). Cloncant River (EPA code: 14C41) flows a little to the south of this. Both rivers discharge to the Figile River (EPA code: 14F01). The Figile River (EPA code: 14F01) also referred to as the Cushaling River (OSI maps) separates Glashabaun North from Glashabaun South. An unnamed watercourse (River waterbody code: IE_SE_14F010100) flows along the southern boundary of Glashabaun South in a westerly direction into the Figile River.

Glashabaun North has a partially pumped bog drainage whose water table is below the surrounding water table for part of the site. Two pumps are located on the bog, one at the northern end of the site adjacent to Ticknevin and one along the northwestern margins. It can be expected that once pumps are turned off that water tables will rise internally and part of the site will develop as wetlands, depending on local topography and water courses.

GSI data indicates that Glashabaun North predomminantly lies within a locally important aquifer – bedrock which is Moderately Productive only in Local Zones. Glashabaun South predominantly lies on a regionally important aquifer – karstified (diffuse). An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m^3/d). Regionally important aquifers are capable of supplying regionally important abstractions (e.g. large public water supplies), or 'excellent' yields (>400 m^3/d). The continuous aquifer unit generally has an area of >25 km^2. Groundwater flow predominantly occurs through fractures, fissures and joints. 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.

Locally Important Aquifers, Moderately productive in Local Zones are aquifers with a limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water. In general, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres. Due to the low permeability and poor storage capacity, the aquifer has a low 'recharge acceptance'. Some recharge in the upper, more fractured/weathered zone is likely to flow along the relatively short flow paths and rapidly discharge

to streams, small springs and seeps. Groundwater discharge to streams ('baseflow') can significantly decrease in the drier summer months.

'Karstification' is the process whereby limestone is slowly dissolved away by percolating waters. It most often occurs in the upper bedrock layers and along certain fractures, fissures and joints, at the expense of others. Karstification frequently results in the uneven distribution of permeability through the rock, and the development of distinctive karst landforms at the surface (e.g. swallow holes, caves, dry valleys), some of which provide direct access for recharge/surface water to enter the aquifer. The landscape is characterised by largely underground drainage, with most flow occurring through the more permeable, solutionally-enlarged, interconnected fissure/conduit zones, which may be several kilometres long. Groundwater velocities through fissures/conduits may be high and aquifer storage is frequently low. Groundwater often discharges as large springs (>2,000 m^3/d), which range from regular and dependable to highly variable ('flashy'). There is strong interconnection between surface water and groundwater. The degree of karstification ranges from slight to intense. GSI recognises two types of karst aquifer: those dominated by diffuse flow (Rkd) and those dominated by conduit flow (Rkc).

Glashabaun Bog is located in an area mapped by GSI as moderate groundwater vulnerability with some areas of high vulnerability towards the northern boundary of Glashabaun North and the centre of Glashabaun South (GSI Map viewer). Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site.

Quaternary sediment maps show that Glashabaun Bog is underlain by cutover raised peat. The northern boundary of Glashabaun North is underlain by Eskers comprised of gravels of basic reaction. This area is associated with The Long Derries, Edenderry SAC. The northern boundary of Glashabaun South is associated with alluvium to the eastern extent. This combination of sediment is common in the wider context surrounding the site.

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 Glashabaun 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 bi-annual basis by BnM 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.

Glashabaun Bog has 9 surface water outlets to the Barrow Catchment (Catchment ID: 14). All nine outlets are directed to the River Figile (14F01). This river is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds, associated surface water emission points and monitoring and sampling locations are detailed in drawing numbers BNM-ECO-26-14-02 titled*: Structures and Sampling*, along with drawing number BNM-ECO-26-14-WQ01 titled*: Water Quality Map* included in the accompanying mapbook, which illustrate the various drainage and water quality infrastructure present at Glashabaun 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also 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*., 2017). Bog rehabilitation is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) 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 BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Glashabaun has been completed. This discharge will have improved 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 watercourse receptors and the Figile_SC_010 sub-catchment and will support the future status of the watercourses achieving Good Status. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

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

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.

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The parameters to be included (as per condition 6.2 of the IPC Licence) include monitoring for pH, suspended solids, total solids, total phosphorus, total ammonia, colour, and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.,* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al.,* 2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther *et al.*, 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Glashabaun 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. The majority of the bog will develop as Birch woodland on drier areas and peripheral headlands. Wetland mosaics are expected to develop on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors. Part of this bog is expected to develop regenerating wet deep peat vegetation on deep peat areas.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Glashabaun Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare peat, conifer plantation and pioneer vegetation in the former production area of Glashabaun Bog are assessed as **local importance (lower value)**.

Birch woodland/scrub, wetland, poor fen, on the form production area and marginal habitats including woodland, scrub, grassland and remnant raised bog, may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

The Long Derries, Edenderry SAC partially overlaps the northwestern corner of Glashabaun North and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. This area is considered to be **Internationally Important.**

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Glashabaun Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity, and other general topics over the years about Allen-Lullymore bog group, including Glashabaun Bog, with various stakeholders in relation to:

- IPCC Lodge Bog Nature Reserve and management plan (IPCC).
- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Proposed Water Supply Project – Eastern and Midlands Region pipeline (Irish Water).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Glashabaun Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Glashabaun Bog.

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

4.2 Topics raised by Consultees

N/A Yet as consultation has not commenced.

4.3 BnM response to topics raised during consultation

N/A Yet as consultation has not commenced.

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5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect planned renewable energy infrastructure or areas required for this proposed project.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of a peatland used for industrial peat production, in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies, where possible. However, this is dependent on the topography of the cutaway bog and the final drainage regime. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is already significant potential for the creation of wet cutaway habitats at this cutaway bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Glashabaun Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). this will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source.
- 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, 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 BnM). Reducing pressures due to former peat extraction activities at Glashabaun 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 BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g. Timahoe South and Lodge Bog in 2022-2023; Timahoe North Bog in 2025) and have previously carried out re-wetting and rehabilitation at Lullymore bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Glashabaun Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Glashabaun bog is part of the Allen-Lullymore bog group.
- The local environmental conditions of Glashabaun Bog mean that drain blocking and hydrological management to re-wet peat where possible are the most suitable rehabilitation approach for this site. Glashabaun Bog while largely comprising shallower peat does retain pockets of residual deep peat in places.
- The key goals and outcomes of rehabilitation set by BnM. BnM have defined the key goal and outcome of rehabilitation at Glashabaun Bog as **environmental stabilisation** and **optimising residual peat re-wetting,** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Wind Farm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Glashabaun Bog. In areas associated with proposed wind farm infrastructure, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- The cutaway is already developing a mosaic of scrub, woodland, wetland and cutaway peatland habitats. Much of this cutaway has largely stabilised. Rehabilitation is proposed to enhance residual peat re-wetting in these areas while taking account of existing habitats, future infrastructure and land-uses e.g. amenity).
- Rehabilitation of Glashabaun Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.
- **Potential land-use.** It is expected that BnM will update and finalise the draft rehabilitation plan for Glashabaun when a decision is made in relation to the wind farm planning application. BnM remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC license. The targeted rehabilitation measures set out in this Rehabilitation Plan will be implemented following completion of

the construction phase of the proposed Ballydermot Wind Farm in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.

- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM 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.
- **Turbary.** Turf cutting is apparent along the southern and eastern boundaries of Glashabaun North.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to BnM Archaeological Liaison Officer and the National Museum of Ireland (Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM 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.
- **Proposed Water Supply Project – Eastern and Midlands Region (Irish Water).** This proposed Irish Water Project crosses the central section of Glashabaun South. It is expected that the enhanced rehabilitation measures planned for this bog will be carried out in advance of the construction of the pipeline, which is still subject to planning consent. BnM do not propose to carry out any rehabilitation works within the footprint of the proposed Water Supply Project – Eastern and Midlands Region until a decision has been made by the relevant authorities in relation to the statutory consent applications for the project. It is expected that the footprint of the corridor will be rehabilitated post the construction of the proposed project.
- **Designated sites.** The Long Derries, Edenderry SAC (NPWS site code: 000925) overlaps the northwestern corner of the Glashabaun North and has been mapped as a constraint on rehabilitation mapping.
- **Coillte plantation.** An area of Coillte conifer forestry is located in the southern section of Glashabaun South – this has also been mapped as a constraint on the rehabilitation mapping.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Glashabaun Bog. The plan covers the short-term **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 Glashabaun Bog.

- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial drainage activities.

Rehabilitation is generally defined by BnM 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 a naturally functioning raised bog ecosystem
- mitigation of key emissions (e.g. potential suspended solids run-off).

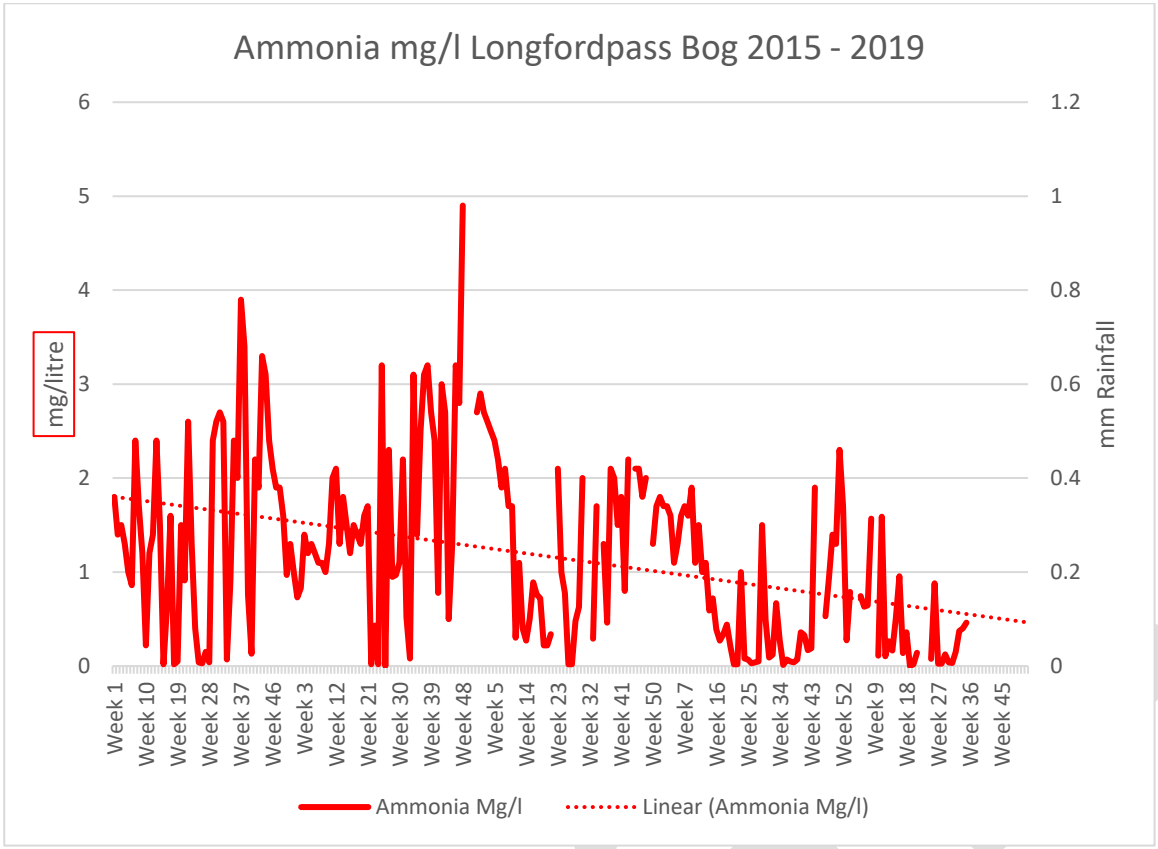
7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the area originally drained for industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation and increase in the area of potentially peat forming habitats. 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 BnM 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 Longford Pass 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 3 years, post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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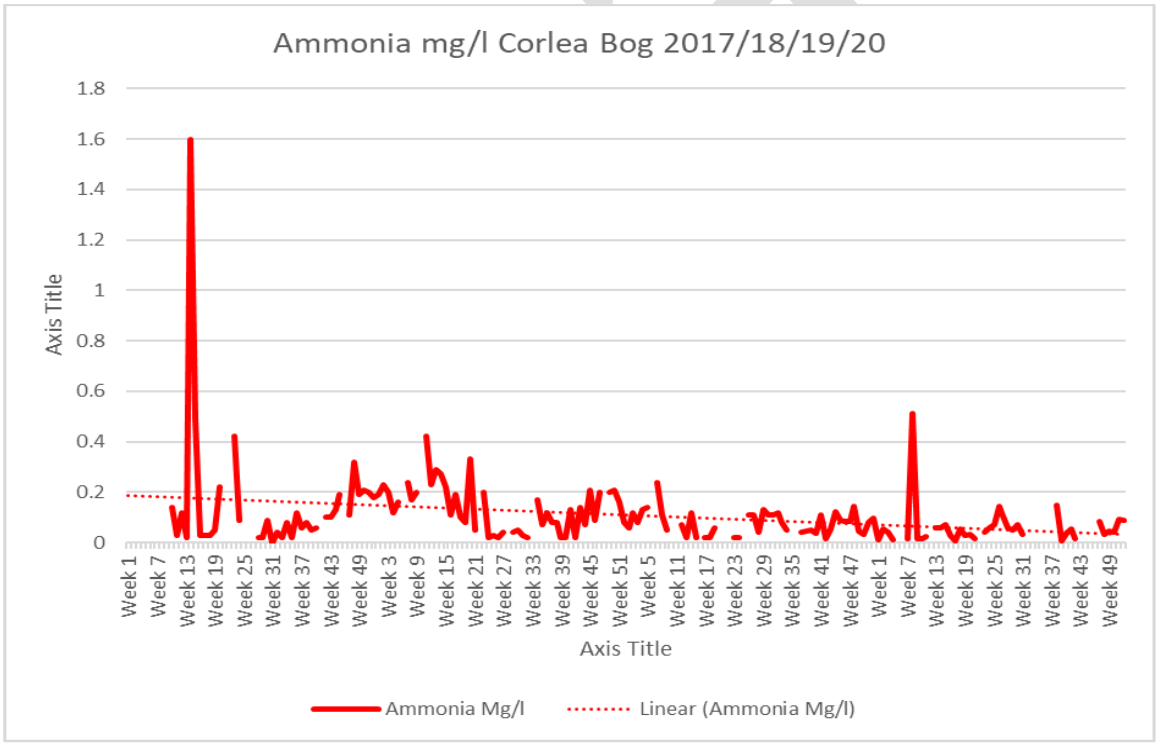


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

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

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and 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 based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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 and LiDAR surface maps, these are included in the accompanying mapbook as the drawings referenced below:

BNM-ECO-26-14-21: Aerial Imagery 2000

BNM-ECO-26-14-22: Aerial Imagery 2020

BNM-ECO-26-14-04: Peat Depths

BNM-ECO-26-14-03: LiDAR Map

BNM-ECO-26-14-09: Depression Analysis

The restoration and rehabilitation measures are provisionally outlined in drawing titled *BNM-ECO-26-14-20: Standard Rehabilitation Measures* in the accompanying mapbook.

These rehabilitation measures for Glashabaun Bog will include (see Table 8.1):

- Re-assessment of the pumping regime and removing pumps if this is desired and has no significant external impact or impacts on proposed future land-uses. Initial hydrological modelling indicates that a part of the site will develop a mosaic of wetland habitats with some permanent deeper water if pumps are decommissioned. 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 at outfalls and by adjusting piped drainage, where possible. 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 of surrounding rivers.
- A widespread drain-blocking programme and hydrological management will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat and deeper residual peat.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking (3/100 m), modifying outfalls and managing water levels with overflows.
- 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 rehabilitation measures at Glashabaun Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking) + modifying outfalls and managing water levels with overflows	20.9
Deep peat cutover bog	DPT2	More intensive drain blocking+ blocking outfalls and managing overflows (*analogous to best practise raised bog restoration for high bog)*	19.2
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	306.2
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway, targeted re-wetting, modifying outfalls and managing water levels with overflows	299.3
Marginal land	MLT1	No work required	52.5
Rehab Complete	Rehab Complete	Rehab Complete	28.7
Silt Pond	Silt Pond	Silt Ponds	3.7
Ballydermot Wind Farm	Wind Farm Infrastructure + Buffer	Wind Farm infrastructure areas including turbine bases, carparks, internal access roads and turning points, crane hard stand, met mast and peat and spoil areas.	134.6
	Renewables Footprint	Areas associated with the proposed Ballydermot Wind Farm where rehabilitation measures will be appropriately sequenced including temporary construction compounds, enhancement areas; scrub planting	25.6
Constraint	Constraint	Access tracks, proposed Uisce Éireann pipeline corridor, turf cutting, bog remnant, retained drainage infrastructure and forestry)	225.6
Total Area			**1116.5**

Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

8.1 Completed and Ongoing

- Rehabilitation (drain blocking using peat dams) has taken place in one small section (10.94ha) of drained bog along the northwestern margins of Glashabaun North bog in 2018 (adjacent to the Long Derries, Edenderry SAC).
- A significant part of the site has already re-vegetated, with colonisation of pioneer vegetation with Birch woodland now predominating. Bare peat areas within the older cutaway areas are reducing. Natural re-colonisation of the cutaway so far has been quite effective. Other parts of the site (younger cutaway) are naturally colonising for more than 10 years and are developing a mosaic of cutaway habitats. Natural re-colonisation of the cutaway so far has been quite effective.

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

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Glashabaun Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).

- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out
- 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) is to be 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.
- Carry out Appropriate Assessment (AA) of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA in the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- 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.

8.4 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 9 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.

8.5 Timeframe (when finalised)

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions.
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation**: Decommission silt-ponds, if necessary.

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8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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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.
- 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.
- Monitoring results will be maintained, trended 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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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 BnM 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.

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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 have 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

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APPENDIX I. BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow catchment, and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and Timahoe South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied an old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly, via the BnM industrial railway. Many bogs were in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long-term peat extraction activity reduced the peat depth on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen-Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Lullymore in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Lullybeg by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 and 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow

piped outfall. Some cutaway bog at Lullymore, used as spread grounds for sod peat, was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly Conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries, Edenderry SAC (site code: 000925) is located in the Lullymore Bog sub-group, south of Ticknevin Bog and north of Glashabaun North. Glashabaun Bog (northern sub section) overlaps the SAC and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is an esker and BnM used the site in the past to extract gravel for the construction of railway embankments across BnM bogs. Rare plants including Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by BnM. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation is ongoing.

A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC Licence Ref. P0503-01, and current, indicative peat production status, is outlined in Table Ap-1.

Table Ap-1 Allen-Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Parts completely cutaway Parts still have deep peat	Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.		
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since the 1950s. Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Glashabaun South	569	Peat extraction since 1950s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.		
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss *Sphagnum* inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023
Lullybeg	271	Peat extraction since the 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2004	Draft 2026
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group – amenity	1992	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019 Majority of bog still has relatively deep peat	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production. Cloncannon bog remnant – zoned for biodiversity Mostly bare peat. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2019	Draft 2026
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection	N/A	N/A
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab ongoing

See Drawing number BNM-ECO-26-14-24 titled Bog Group Map, included in the accompanying Mapbook which illustrates the location of Glashabaun Bog and the Allen – Lullymore Bog Group in context to the surrounding area.

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Glashabaun North**	**Area (ha):**	780.28 Ha (area of production bogs)
Works Name:	Ballydermot	**County:**	Offaly/Kildare
Recorder(s):	MMC & DF	**Survey Date(s):**	8th September 2011 Long Derries 2014/2015.

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Birch-dominated scrub (eBir, oBir, cBir,) (also found in mosaic with poor fen communities)
- Birch woodland (BirWD) (older section, possibly developed on cutover bog rather than cutaway.)
- Pioneer calcareous grassland (gCal) (developing on old track)
- Purple Moorgrass-dominated grassland (gMol) (developing on margins of site).
- Gorse scrub (eGor) (developing on margins of site).
- Access routes (railways and paved tracks and associated verges)
- Scrub (WS1) (found on the undeveloped margins of site. Birch and Gorse-dominated.) (Codes refer to Heritage Council habitat classification, Fossitt 2000, See Appendix II.)
- Rank dry meadow-type grassland (GS2) (found at southern margin).
- Raised bog (PB1) (dried remnant being invaded by scrub)
- Cutover bog (PB4) (small area formerly used to harvest peat).

Description of site

This sub-site is part of Ballydermot Bog and is located approximately 4km south of Edenderry in Co Offaly. A secondary public road (Edenderry to Rathangan bog road) divides this area in two – Glashabaun North to the east and Codd 2 to the west. A BnM railway crosses through Glashabaun North and Codd 2. The majority of the site is in active peat production.

Glashabaun North

The bog is divided into three parts by the railway which runs N-S and has a branch running west about two-thirds of the way along its length. Peat production fields in Glashabaun North are orientated SSW to NNE. There are several large arterial drains dividing several series of fields.

The eastern section is dominated by bare peat although some sections have been out of production for a number of years and have developed a pioneer poor fen vegetation type dominated by Soft Rush and Bog Cotton. Birch is also present in these areas of cutaway, especially the drier areas.

The majority of Glashabaun North is in full production but occasional small areas appear to have been out of production in recent years. These areas contain pioneer poor fen and scrub. Linear strips of scrub have also developed alongside the deeper drains that run in an east west orientation.

The southernmost part of the site contained an area of intact remnant raised bog. Domestic turf cutting was common in this area. The area of intact raised bog had been ditched and was dry with a domination of Heather.

Close to the southeastern corner of the site, where Glashabaun North meets Glashabaun South, the Cushaling River flows between the two areas of bog. This river had flows under a railway bridge and a general use bridge. The Cushaling contained some natural river features such as riffles and pools and as such is likely to create good quality for fish and invertebrates. An Otter spraint was clearly visible here.

Significant areas of domestic turf cutting are occurring along the southern and eastern boundaries of the site.

Basil Thyme and Blue Fleabane

Basil Thyme and Blue Fleabane were noted at several locations along the railway. Basil Thyme has not been recorded at this site before and would not be a typical species of cutaway bog. This species was probably unlikely to have been present on the site prior to the development of the cutaway. The exposed gravel along the railway embankments is a perfect habitat for this species. One of its main known populations in Co. Offaly is located close by at the Long Derries cSAC, Edenderry. This site was a BnM gravel pit and material from this site was used to make railway embankments. The spread of Basil Thyme from the Long Derries along the BnM railway network has been recorded in the past (Feehan pers. comm. 2011).

In the long-term, it could be expected that these railway embankments will re-vegetate with grassland and scrub as they go out of use, which will not favour this species. Occasional track maintenance is likely to be beneficial for this species as it will keep the gravel embankments exposed and prevent development of dense vegetation, which would be unsuitable for this species. Other BnM operations are not likely to have a significant impact on the status of this species. One possible solution is to develop some of the main railway line as an amenity walkway when production ceases. A suitable management regime to maintain the habitat of these rare plant species could easily be developed in association with the development and maintenance of these walkways. This will be considered within the wider context of the Derrygreenagh and Ballydermot Bogs, which are viewed as strongholds for the species in east Offaly. Consultation and licensing will be required with NPWS.

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

The Long Derries, Edenderry SAC (NPWS site code 000925) is partially located in the northwest corner of the site. This cSAC was selected for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The site contains several species

of conservation interest including including Flora Protection Order species Green-Winged Orchid (*Orchis morio*). The site also contains a notable transition between calcareous grassland and scrub to peatland habitats.

BnM had used the site in the past as a gravel pit, although this activity has now ceased (check usage within SAC boundary). Gravel was extracted for the construction of railway embankments across BnM bogs. Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot and Derrygreenagh. The Long Derries esker is likely to have been the source of these new populations.

The Long Derries is located on a gravel ridge (esker). This area has been used as a gravel quarry by BnM in the past and at present some sections of railway line are stored here. Gravel extraction appears to have ceased. A conifer plantation (private but within BnM GIS boundary) has been established to the west of this area and is comprised of Scot's Pine, Sitka Spruce with some Birch. Much of the site has developed scrub (WS1) vegetation including Blackthorn, Hawthorn, Ash, Willow, Elder and Sycamore. A small area of mature Ash woodland also exists on the site. The remainder of this area comprises gravel areas where gravel extraction has taken place and open grassland. The calcareous grassland (GS1) includes Creeping Bentgrass, Sheep's Bit, Hawkweed, Knapweed, Blue Fleabane, Cocksfoot, Bracken, Hogweed, Plantain, Wild Strawberry, Sweet Vernal-grass, Devil's Bit-Scabious, Quaking Grass, Carline Thistle, Basil Thyme, Yarrow, Glaucous Sedge, Yorkshire Fog, Wild Carrot, Yellow Rattle, Bramble, Eyebright, Slender St. John's Wort and Bird's Foot Trefoil. Similar vegetation types were also colonising the disused quarry areas that were mainly comprised of bare gravel.

Of particular note is the fact that Basil Thyme and Blue Fleabane occur in the Long Derries in high numbers. Both species are nationally rare, Red-listed species with Blue Fleabane listed as "Least Concern" and Basil Thyme listed as 'Near Threatened' on Irelands Red List (Wyse *et al*., 2016). Several populations are present on former railway track routes throughout Glashabaun or on areas of exposed gravel that are associated with the railway tracks as part of the 'weed' or recolonising flora. These species are not typical bog species and are likely to have come on to the production bog from nearby eskers or gravel pits. The presence of these species enhances the rare flora resource of Co. Offaly and Kildare.

Green-winged Orchid is also reported to occur here and is also Red-Listed species listed as 'Vulnerable' on Irelands Red List (Wyse *et al*., 2016). This species, however, has not been recorded in some time. Evidence that Badger and Pine Marten occur here was also noted during the ecological survey.

A house is located in on the esker but is not located on the BnM property. Although barriers have been erected at two points on the site people are still entering the site for quad biking, cutting timber and rubbish burning. Immediately to the south of the Long Derries esker lies a strip of intact raised bog that was dry and degraded and dominated by Heather.

Adjacent habitats and land-use

Wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), scrub (WS1), Birch woodland (WN7), cutaway bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

Watercourses (major water features on/off site)

- This section of Ballydermot drains towards the Figile River and is located in the South-Eastern Barrow catchment. White Clawed Crayfish was recorded from the Figile River during drainage works in the 1990's.
- The Cushaling River flows close to the southern boundary of Glashabaun South and separates Glashabaun South from Glashabaun North.

Peat type and sub-soils

No sub-soil was exposed in the production bog. Gravelly sub-soil was exposed in some of the silt ponds to the north of the site.

Fauna biodiversity

Birds

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

- Other more common birds noted on the site included Meadow Pipit, Pheasant and Swallow.

Mammals

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

- Hare
- Fox
- Badger (Long Derries)
- Pine Marten (Long Derries)
- Otter (Cushaling River)

Other species

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

- Frog

Activities on the site

Activities on the site include:

- Standard BnM operations related to milled peat production.
- Use of Long Derries gravel pits for Quad Biking
- Use of Long Derries for timber harvesting
- Use of Long Derries for rubbish dumping and burning
- There are extensive private (commercial?) sod peat operations at the south-west corner of Glashabaun North and along the eastern boundary.

References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

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

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Ecological Survey Report

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

Bog Name:	**Glashabaun South**	**Area (ha):**	561.3 ha
Works Name:	Ballydermot	**County:**	Kildare/Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	6-7/09/2011

Habitats present (in order of dominance)

The most common cutaway habitats present at this site include:

- Open and emerging Birch scrub (eBir/oBir) and poor fen mosaic (pJeff) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Dense Birch scrub (cBir) and woodland (BirWD)
- Conifer plantation (WD4) planted on cutaway bog.
- Bare peat (BP) sod peat production areas
- Pioneer poor fen dominated by Soft Rush (pJeff) and/or Bog Cotton (pEang).
- Pioneer wetland development with open water (OW), Soft Rush-dominated poor fen (pJeff) and Bog Cotton (pEang).
- Minor development of other poor fen communities dominated by Marsh Arrow Grass (pTrig) and Horsetail (pEq).
- Minor development of other pioneer cutaway communities such as Common Reed (pPhrag), rank grassland (gCo-An) and dry Heath (dHeath).

Other habitats found around the margins of this site (not on production bog/cutaway) include:

- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)
- Scrub (WS1) (Blackthorn scrub and Birch scrub)
- Raised bog remnants (PB1)
- Cutover bog (PB4)
- Ash-Hazel woodland (WN2) (along Lugherra River)
- Dense Bracken (HD1)
- Improved grassland (GA1) (along western margin)

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- Wet grassland (GS4) (formerly improved along the margins of the site)

Description of site

This survey report covers the BnM production bog Glashabaun South and the un-surveyed section of Derrybrennan. Glashabaun South was formerly a sod peat production bog that was converted to the production of milled peat. Large deep drains lined with some mature Birch woodland run the length of the site and divide the site into several sub-sections. The site also contains a railway on an embankment that connects Glashabaun North to Derrybrennan. Basil Thyme and Blue Fleabane were recorded along the railway embankment at several locations.

The majority of the east side of Glashabaun South has been planted with conifers by Coillte. Several series of fields adjacent to the conifer plantation have developed dense Birch scrub/woodland. This woodland development may be related to fertiliser applications and groundwork for conifer forestry development that was never carried out.

The majority of the site is relatively dry. It has a variable topography and some of the higher ground towards the east was developed as conifer plantation. There is minor wetland development in this site where there are localised drainage issues. However, some of the lowest ground towards the south-west of the site is not developing wetland as expected as it is being used for sod peat, and drainage is probably quite efficient in these areas and being looked after. After sod peat cutting has ceased, there could be opportunities to increase wetland cover with localised drain-blocking.

The south-east corner of Glashabaun South is still somewhat open due to recent sod peat production. There are several long fields of bare peat used as spread-grounds between mature Birch scrub/woodland. The younger less developed sections of cutaway in this area generally contain open Birch scrub (oBir) and poor fen dominated by Soft Rush (pJeff). There are several very small wetland areas with some Bottle Sedge and Bog Cotton-dominated poor fen vegetation.

The south-east corner of Glashabaun South also has an unusual marginal zone dominated by Blackthorn-dominated scrub. This seems to have developed on an old farm (marked on the OSI 6 inch map) called Shanavoola where there is likely to have been some mineral soil exposed along the rivers. The Blackthorn-dominated scrub transitions to Birch scrub/woodland where peat is present. There is also some rank GS2 type grassland at one location (old works area?) with tall tussocks of Tufted Hairgrass, False Oatgrass, Purple Moorgrass and Cocksfoot and includes species such as Meadowsweet, Hedge Woundwort, Hogweed and some patches of Bramble and Raspberry.

The southern end of Glashabaun South also has some large areas of bare peat that are being used for commercial sod-peat production. Two remnant areas of high bog are being cut for sod peat at this location. The southern half of the production-related cutaway is dominated by open or emergent Birch scrub in mosaic with poor fen dominated by Soft Rush. The cutaway is somewhat younger further west so there is less scrub development and more areas with poor fen or mosaic of scattered Soft Rush with bare peat. There is only minor development of wetlands in association with open water (pJeff/pEang/pPhrag/OW) and it appears that some wet areas have become dry and colonised by Soft Rush. There are several wetter areas along the western side of the production-related cutaway where Common Reed and increased cover of Bog Cotton-dominated poor fen has developed.

The northern part of this sub-section was a mix of production areas (bare peat) intermixed with areas that have been out of production in recent years and were vegetated with a mixture of pioneer poor fen (Soft Rush and

Bog Cotton) and pioneer scrub. Occasional small areas of calcareous grassland (gCal) have also begun to develop on any exposed gravel. Linear strips of scrub that run parallel to the deeper drains have also developed. These habitats are well developed and are comprised mainly of closed Birch scrub with some sections of dry heath also present.

Some areas of poor fen vegetation have recently been removed from the northeastern corner of the site in preparation of forest establishment. This area was also deep ploughed.

To the south of the railway line a sizeable area of cutaway has emerged. This area contains a mixture of scrub that is on the verge of being classified as Birch woodland (WN7) and pioneer poor fen vegetation such as Soft Rush, Bog Cotton and Bottle Sedge. Emergent Birch was also a feature of much of the poor fen areas.

The mid-western side of this sub-section contained a mixture of Birch woodland and conifer plantation. The Birch woodland was dominated by Birch and it may have been planted. The Birch appeared to be doing better than the Spruce in many locations, especially along the western edge of the conifer plantation.

A small area within the conifer plantation within Glashabaun South is marked on the land-use maps as production related. This area is located at the centre of the conifer plantation and was never planted. The vegetation is this area consists of Heather and Birch with some areas of bare peat remaining.

Basil Thyme and Blue Fleabane

Basil Thyme and Blue Fleabane were noted at several locations along the railway. Basil Thyme has not been recorded at this site before and would not be a typical species of cutaway bog. This species was probably unlikely to have been present on the site prior to the development of the cutaway. The exposed gravel along the railway embankments is a perfect habitat for this species. One of its main known populations in Co. Offaly is located close by at the Long Derries SAC, Edenderry. This site was a BnM gravel pit and material from this site was used to make railway embankments. The spread of Basil Thyme from the Long Derries along the BnM railway network has been recorded in the past (Feehan pers. comm. 2011).

In the long-term, it could be expected that these railway embankments will re-vegetate with grassland and scrub as they go out of use, which will not favour this species. Occasional track maintenance is likely to be beneficial for this species as it will keep the gravel embankments exposed and prevent development of dense vegetation, which would be unsuitable for this species. Other BnM operations are not likely to have a significant impact on the status of this species. One possible solution is to develop some of the main railway line as an amenity walkway when production ceases. A suitable management regime to maintain the habitat of these rare plant species could easily be developed in association with the development and maintenance of these walkways. This will be considered within the wider context of the Derrygreenagh and Ballydermot Bogs, which are viewed as strongholds for the species in east Offaly. Consultation and licensing will be required with NPWS.

Forestry and potential forestry on site

There is a large block of conifer forestry towards the eastern side of Glashabaun South. This was developed by Coillte. The majority of the plantation is dominated by either Sitka Spruce or Lodgepole Pine. There is a small Oak plantation also associated with this area of forestry. Much of this plantation seems to be performing well. Small sections have failed.

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One point of interest is that there is excellent Birch colonisation and development around the conifer plantation. This may be related to fertiliser applications and groundwork for forestry development that was never carried out.

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

None

The nearest designated site to this sub-section of Ballydermot is 1.5 km NE to the Long Derries SAC (NPWS site code 000925).

Adjacent habitats and land-use

Wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), scrub (WS1), Birch woodland (WN7), cutover bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

Watercourses (major water features on/off site)

- This section of Ballydermot drains towards the Figile River and is located in the South-Eastern Barrow catchment.
- The Figile River flows west along the south side of Glashabaun South. The Lugherra River flows south along the south-east boundary of the site (forming the boundary with Lullybeg). The Lugharra river meets the Figile River around Shanovoola (old farm) and flows west as the Figile River. All of the rivers have been channelized in deep embankments.
- The Cushaling River flows between Glashabaun North and South and flows south where it meets the Figile River.

Peat type and sub-soils

There seems to be somewhat deeper peat left on Glashabaun South compared to other production bogs. This peat has still been harvested to the fen layers. However, there are very little gravel mounds or sub-soil exposed on the site.

A sandy, marl-like sub-soil is found along the Figile River, where there are profiles exposed. This is likely to be alluvial in development.

Fauna biodiversity

Birds

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

- Snipe (2)
- Wheatear (2)
- Stonechat
- Several other common species such as Wren, Blackbird, Red Poll, Pheasant, Blue Tit, Meadow Pipit, Wood Pigeon and Grey Crow were recorded on the site.
- A local farmer reports that Grey Partridge are breeding on his farm. They are probably recent releases.

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Mammals

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

- Hare
- Badger signs
- Stoat
- Otter
- Fox

Other species

Several butterflies were noted including Speckled Wood, Small Heath and Meadow Brown.

Activities on the site

Activities on the site include:

- Milled peat production by BnM
- Commercial sod-peat production
- Conifer forestry (Coillte)
- Unauthorised access with quads and scrambler bikes

References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

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

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

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

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

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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 Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 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 BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2020, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM lands. The Bord na Móna Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This

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includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and BnM'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.

14 BnM commitments

BnM 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.

In line with BnM'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. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. 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.

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APPENDIX VI. 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 BnM 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, stockpile covering, pumps, septic tanks and fuel tanks.

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

Item	Description	Glashabaun Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

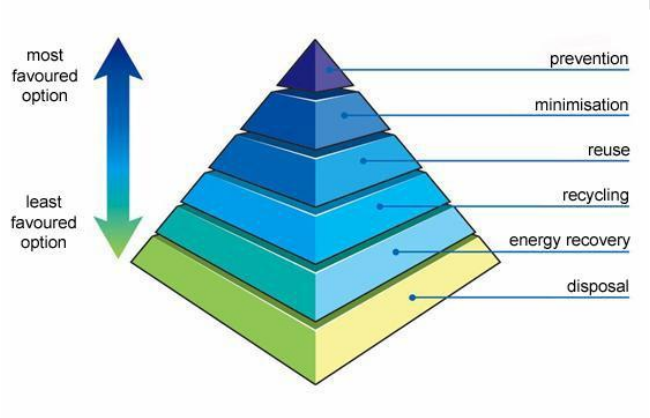
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 cutover 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

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

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER, 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement**

of ecological conditions in damaged wildlands through the **reinstatement of ecological processes**. In general, BnM 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 acrotelm – 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.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

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 IPC Licence's Ref. P0503-01 in the Allen-Lullymore Group of Bogs in Counties Offaly and Kildare.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.
- 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.

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- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.
- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

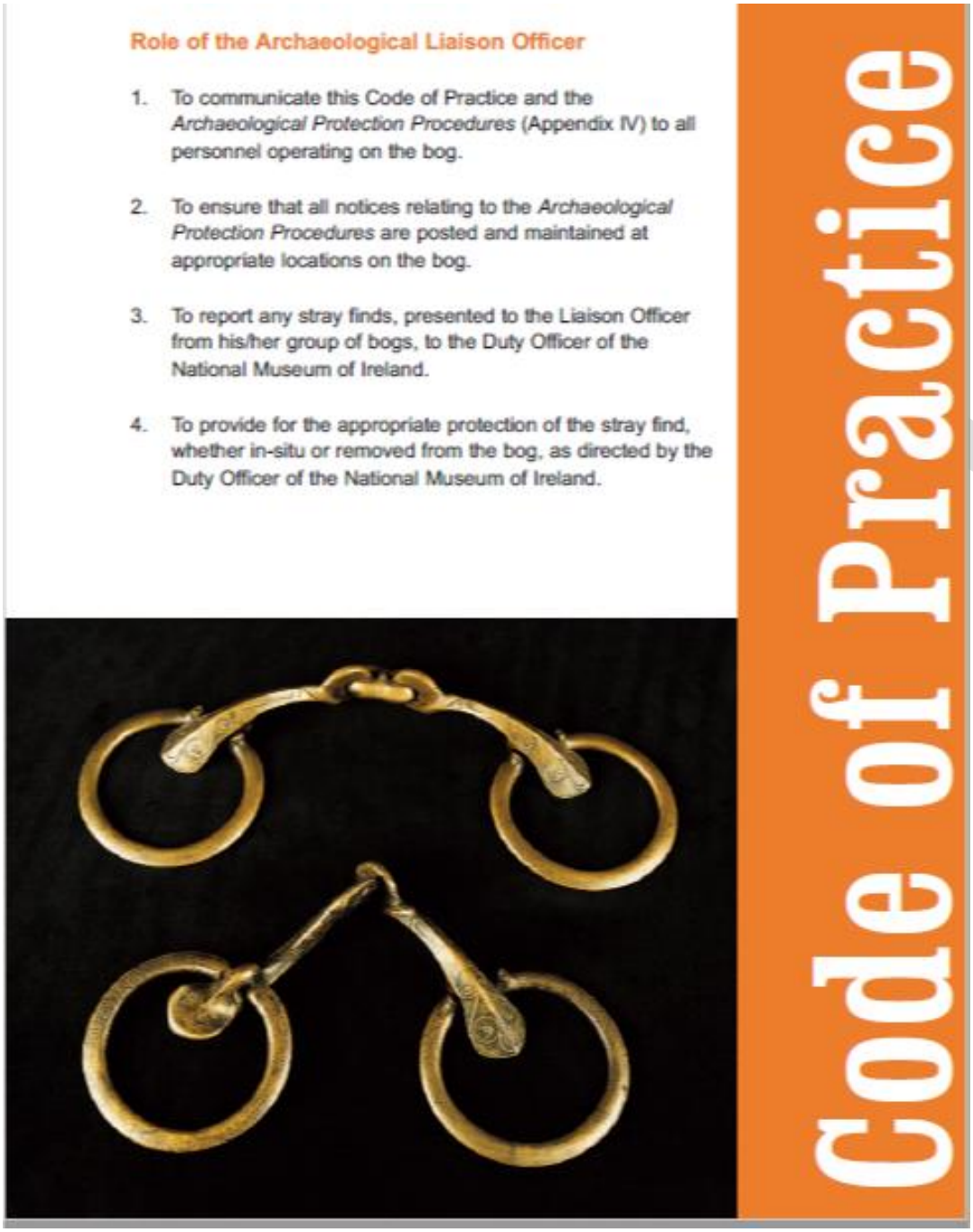
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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- 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/resources/faqs/environment--you/faq-listing/ 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 X. 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.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:
- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:
- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:
- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Killinagh Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

Draft

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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 BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Killinagh Bog upon cessation of peat production and complements 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 Killinagh Bog.

BnM have defined the key rehabilitation outcome at Killinagh Bog as environmental stabilisation.

Any consideration of any other future after-uses for Killinagh Bog, 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.

BnM are planning to develop a potential renewable energy project at Killinagh Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

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Non-technical summary

- BnM is planning to rehabilitate Killinagh Bog, Co. Kildare. Killinagh Bog is located adjacent to Lullymore and approximately 2km west of Allenwood.
- Killinagh Bog was in industrial peat production since the 1930s and supplied milled peat for electricity production and latterly sod moss for the horticulture industry. The site was part cutaway in the 1990s. Industrial peat production at this site ceased in 2020.
- The majority of the site has now vegetated and developing pioneer and maturing habitats. Part of the site was also developed as a forestry trial in 2010.
- BnM are planning to develop a potential renewable energy project at Killinagh Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The wind farm planning boundary overlaps Killinagh Bog and is considered as a constraint in the rehabilitation plan. Killinagh Bog will be rehabilitated as part of the Ballydermot Wind Farm development or at a later date. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing vegetation and promoting re-establishment of more typical cutaway peatland communities such as Birch woodland and fen habitat.
- It will take some time for vegetation and habitats to fully develop at Killinagh, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures will be planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog 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.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and *Sphagnum* rich embryonic bog communities (on deeper peat); and wetlands with Reedbeds and Birch woodland on shallower peat. In time a naturalised peatland can be developed.
- The development of a range of habitats at Killinagh Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape.
- This peatland rehabilitation plan does not outline future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen bog group (Ref. P0503-01). 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 Allen Bog Group comprises 2 main sub-groups: Allen - Clonsast and Allen - Lullymore. Killinagh Bog is part of the Allen-Lullymore bog group (see Appendix I for details of the bog areas within the Allen bog group).

Killinagh Bog is located in Co. Kildare, adjacent to Lullymore and approximately 2km west of Allenwood. Killinagh bog is located at the northeastern extent of the bogs within the wider footprint of Ballydermot Bog.

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This **draft** rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Killinagh Bog and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are **NOT** proposed as part of this draft Killinagh rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Killinagh will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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 document covers the area of **Killinagh Bog**. Parts of Killinagh Bog (around the perimeter of the site) are currently being used by domestic turf cutters who have turbary rights. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting and turbary issues on Killinagh Bog that are outside of the control of BnM. Nevertheless, BnM 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.

A relatively large area (85.8ha) of Coillte conifer forestry was planted in the western section of Killinagh in the 1980's. Part of the central area of the eastern section of the bog (62.5 ha) was developed as a forestry trial in 2010. Norway Spruce (*Picea abies*) was planted in open parts of the bog (some formerly planted with Reed Canary-grass (*Phalaris arundinacea*) as part of a biomass trial) that was developed with a deep ploughing treatment to aerate the peat and sub-soil. These areas have been mapped as a constraint on the rehabilitation plan.

BnM are planning to develop a potential renewable energy project at Killinagh Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). This proposed wind farm project is located within Derrybrennan Bog as well as the adjacent BnM bogs of Ballydermot, Barnaran, Blackriver, Codd, Derrybrennan, Glashabaun, Lodge, Lullybeg, Lullymore and Ticknevin. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm has been taken into account in the preparation of this Rehabilitation Plan. Where proposed wind farm footprint overlaps with areas identified for rehabilitation, the timing and sequencing of rehabilitation measures will be coordinated with the proposed development. Accordingly, these areas are treated as a temporal consideration in relation to the implementation of rehabilitation measures.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Killinagh Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Killinagh Bog 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 or issues such as rights of way.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan'* (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2012 to 2026 inclusive), monitoring and desktop analysis, forms the basis for the development of this 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

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.
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- 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, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- 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 2022-2027;
- BnM Annual Report 2025;
- 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 BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Killinagh Bog was surveyed in 2012. Additional ecological walk-over surveys and visits have taken place at Killinagh Bog between 2015-2026. 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 (2019), while mosses and liverworts nomenclature follows identification keys published by the Atherton *et al*. (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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3. SITE DESCRIPTION

Killinagh Bog is a sub-section of a larger unit called Ballydermot Bog and is located adjacent to Lullymore and 2 km west of Allenwood in Co. Kildare. A regional road (R414) between Lullymore and Allenwood forms the southern boundary of the site. The former horticultural facility, An Foras Taluntais Peatland Research Station, at Lullymore is located to the south-west of the site. An old works area is located near the northern end of the site on some mineral sub-soil.

Industrial peat extraction at Killinagh has been ceased since 2020. Part of the bog at Killinagh was developed for forestry in 2010. The majority of the site has vegetated and contains typical cutaway habitats with Birch scrub/woodland and some wetland vegetation in patches with pioneer poor fen (Rush-dominated) and Reedbeds. The northern section is much more mature and contains dense Birch scrub and woodland. The majority of the northern section is dry but there are some areas with impeded drainage where there is standing water and wetland vegetation is developing. Younger Rush-dominated and Bog Cotton-dominated poor-fen is more predominant to the south of the site. Some bare peat is present in the southern section adjacent to the road where there has been more recent sod peat extraction. Killinagh has a gravity drainage system.

See Drawing number *BNM-ECO-26-14-01 Killinagh Bog: Site Location Map*, included in the accompanying Mapbook[1] , which illustrates the location of Killinagh Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Killinagh Bog was in full industrial peat extraction since the 1930's and supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Much of Killinagh Bog is now cutaway and the majority of the original raised bog has now been removed.

Part of this site has been used for a BnM biomass trial with Reed Canary-grass in the past. The biomass trial area was then planted with conifer forestry as a trial in a partnership project with the Forest Service and Coillte. Up to 45 ha of the site was developed as a forestry trial (deep ploughing of cutaway, mixed planting of conifers and broad-leaves). A small proportion of the area comprises scrub and is included as a biodiversity feature (within the forestry development) that will be allowed to develop naturally. Norway Spruce (45 Ha) was planted in open parts of the site (some formerly planted with Reed Canary-grass as part of a biomass trial) that was developed with a deep ploughing treatment to aerate the peat and sub-soil.

The forestry plot was being thinned/managed to support the conifer development and to supply woody biomass for Dublin Zoo up to 2021.

Part of the site was used to store biomass material for Edenderry Power. This activity has now ceased.

A small section of the site at the south-west corner had been used for a Blueberry production trial in the past.

The former industrial bog railway was an active link to Edenderry Power station (EPL) (now ceased). This railway has been decommissioned.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Killinagh Bog Map Book

3.1.2 Current land-use

The main land-use is the forestry trial. The remaining area is developing as cutaway bog with a mosaic of habitats.

There is an extensive BnM industrial railway network throughout this area (now ceased).

There are some areas of active turbary along the northeastern margin of the site. These are mapped in the accompanying Mapbook.

BnM are planning to develop a potential renewable energy project at Killinagh Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project is located within Killinagh Bog as well as the adjacent BnM bogs. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm footprint **partially** overlaps with the Killinagh Bog (see drawing number BNM-ECO-26-14-20: Standard Rehab Measures); while no infrastructure is planned within the Killinagh Bog boundary any footprint areas have been treated as a constraint in the rehabilitation plan.

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

  a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

  b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3 Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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

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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 Killinagh Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPL).

As the primary employer in many midland counties, BnM 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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The bedrock geology[2] of Killinagh Bog is predominantly nodular and muddy limestone and shale (Boston Hill Formation) surrounded by unbedded limestone (Waulsortian limestones). Thick-bedded limestone, locally peloidal (Allenwood Formation) underlies the western part of the site.

The sub-soils are classed as cutover peat. There is some exposed limestone till to the north of the site. Part of this area was used as a former works area.

3.2.2 *Peat type and depths*

Much of Killinagh Bog is now cutaway and the majority of the original raised bog has now been removed. In general, between 0.5-1.5 of residual peat remains. There is some exposed sub-soil at the northern end (limestone till).

3.3 Key Biodiversity Features of Interest

The different cutaway habitats developing across the site reflects the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All sites have hydrological gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and ground-water has a stronger influence.

The northern part of the site does contain some Birch scrub and woodland and pioneer poor fen communities that are almost completely vegetated and display typical diversity for this habitat. Some of the poor fen vegetation in the central and southern section has standing water and a well-developed wetland moss layer is developing.

[2] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0

The margins of the bog support habitats such as scrub, cutover bog, Birch woodland and remnant bog.

The former railway track gravel beds (glacial till) support populations of Basil Thyme (*Clinopodium acinos*). Basil Thyme is a nationally rare plant species listed as 'Near Threatened' on Irelands Red List (Wyse-Jackson *et al*., 2016)). Several populations are present on railway tracks throughout the wider Ballydermot bog unit or on areas of exposed gravel that are associated with the railway tracks as part of the 'weed' or recolonising flora. It is not a typical bog species and is likely to have come on to the former production bog from nearby eskers or gravel pits. Its presence enhances the rare flora resource of Co. Kildare.

A detailed ecological report for Killinagh is provided in Appendix II.

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present include:

- Birch scrub with emergent (eBir), open (oBir) and closed scrub (cBir) all present (WS1).
- Pioneer poor fen communities, with Soft Rush-dominated vegetation (pJeff) are most common, and Bog Cotton-dominated vegetation (pEang) less prominent. Minor amounts of Campylopus-dominated (pCamp), Bottle Sedge-dominated (pRos) and Arrowgrass-dominated vegetation (pTrig) present (PF2).
- Small amounts of pioneer Heather-dominated vegetation (dHeath) around the edges of the site (PB4).
- Minor amounts of Reedbeds dominated by Common Reed (pPhrag) (FS1).
- Relatively small areas of temporary open water (tOW).
- Conifer plantation (WD4).
- Several dry grassland communities around the yard including dry calcareous grassland (gCal) and a Cocksfoot-Sweet Vernal grass community (gCo-An) (GS1). The yard also contains small patches of scrub (WS1) and a short treeline (WL2). Scrub (WS1) dominated by Gorse has also developed in other parts of the site.

The most common habitats found around the margins of the site include:

- Birch woodland (WN7)
- Scrub (WS1) (found on the undeveloped margins of site)
- Raised bog (PB1)
- Cutover bog (PB4) (several small fragments)
- Conifer Plantation (WD4))
- Silt Ponds (Silt) with associated habitats such as scrub

See Appendix II for more detail on site, habitats and local features.

[3] Categories in brackets refer to the current BnM classification system for vegetation communities, along with an equivalent Heritage Council habitat classification or Fossitt Code, where relevant.

See Drawing number *BNM-ECO-26-14-17 Killinagh Bog: Habitat Map 2018*, included in the accompanying mapbook, which illustrates the habitats at Killinagh Bog.

3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Killinagh Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC). Multiple mammal species have been recorded on or within 1 Km of the bog including Irish Hare (*Lepus timidus subsp. Hibernicus)*, Fox (*Vulpes vulpes*), Eurasian Badger (*Meles meles),* Pine Marten (*Martes martes*), Fallow Deer (*Dama dama*) and European Otter (*Lutra lutra*).

The butterfly species Peacock (*Aglais io*), Common Blue (*Polyommatus icarus*), Large White (*Pieris brassicae*) and Small Tortoiseshell (*Aglais urticae*) have all been recorded during BnM surveys. There are NBDC records for species of conservation concern Dingy Skipper (*Erynnis tages*), Marsh Fritillary (*Euphydryas aurinia*), Small Heath (*Coenonympha pamphilus*) and Wall (*Lasiommata megera*) at Killinagh. Common Frog was also recorded on the bog.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Snipe (*Gallinago gallinago*), Wren (*Troglodytes troglodytes*), Robin (*Erithacus rubecula*), Meadow Pipit (*Anthus pratensis*), Pied Wagtail (*Motacilla alba yarrellii*), Blackbird (*Turdus merula*), Stonechat (*Saxicola rubicola*), Hooded Crow (*Corvus cornix*) and Magpie (*Pica pica*) have all been recorded during BnM ecology surveys.

NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km squares (N62, N72) which Killinagh intersects include; Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Partridge (*Perdix perdix*). Grey Wagtail (*Motacilla cinerea),* Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Red Grouse *(Lagopus lagopus)*, Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola)* and Yellowhammer (*Emberiza citrinella*). Red-listed listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Nightjar *(Caprimulgus europaeus)*, Red Kite (*Milvus milvus*) and White-tailed Eagle (*Haliaeetus albicilla*).

Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

NBDC holds records for the high impact invasive species Fallow Deer (*Dama dama*) and New Zealand Flatworm (*Arthurdendyus triangulatus*) regarded as a medium impact invasive species. A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

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

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Killinagh Bog. The nearest EU Designated sites are as follows:

- The Long Derries, Edenderry SAC (Site Code: 000925) - 5 km from Killinagh.
- Mouds Bog SAC (site code: 002331) – 9 km from Killinagh
- Ballynafagh Lake SAC (site code: 001387) – 9 km from Killinagh.
- Ballynafagh Bog SAC (site code: 000391) – 9 km from Killinagh
- Pollardstown Fen SAC (site code: 000396) – 11 km from Killinagh.
- River Barrow and River Nore SAC (site code: 002162) – 18 km from Killinagh

A number of non-statutory designated sites also occur in the wider area around Killinagh Bog. The Long Derries, Edenderry pNHA, also designated under The Long Derries, Edenderry SAC is located 5 km from Killinagh. The Grand Canal pNHA (NPWS Site Code: 002104), occurs approximately 3km north of Killinagh. Carbury Bog NHA (Site Code: 001388) occurs approximately 7.5 km north and Black Castle Bog NHA (NPWS Site Code: 000570) occurs approximately 14 km northwest. Ballina Bog pNHA (NPWS Site Code: 000390), occurs approximately 14 km north of Killinagh. Hodgestown Bog NHA (NPWS Site Code: 001393), occurs approximately 8 km east of Killinagh.

See drawing *BNM-ECO-26-14-23: Proximity to Designated Sites* in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar sites located in proximity to Killinagh Bog. The nearest Ramsar sites are Pollardstown Fen located approximately 11km southeast and Raheenmore Bog located approximately 27 km west of Killinagh Bog.

3.5 Hydrology and Hydrogeology

Killinagh bog forms part of the Barrow Catchment (Catchment ID: 14) as defined by the EPA under the Water Framework Directive (WFD). The majority of the bog lies within the Slate_SC_010 sub-catchment, with the western section within the Figile_SC_010.

Killinagh Bog discharges to the Killinagh River (EPA code 14k17). This river is located to the east of Killinagh. The Killinagh River flows south to the Slate River (EPA 14501).

GSI data indicates that the majority of Killinagh Bog lies within a locally important aquifer – bedrock which is Moderately Productive only in Local Zones. The western part of the bog lies within a regionally important aquifer – Karstified (conduit). An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m^3/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.

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters ('baseflow') and large (>2,000 m^3/d), dependable springs may be associated with these aquifers.

Killinagh Bog is located in an area mapped by GSI as of low and moderate groundwater vulnerability (GSI Map viewer). Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low/moderate risk of any groundwater contamination occurring at this site.

Quaternary sediment maps show that Killinagh Bog is generally underlain by cutover raised peat. This combination of sediment is common in the wider context surrounding the site.

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 or silt control measure 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 or silt control measure treatment arrangement as required in Condition 6.6. of the licence. Industrial peat production has now permanently ceased at Killinagh 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 or other silt control measures' is excavated on a bi-annual basis by BnM 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.

Details of nearby silt ponds and monitoring and sampling locations are detailed in Drawing numbers *BNM-ECO-26-14-02 Killinagh Bog: Structures and Sampling*, along with Drawing number *BNM-ECO-26-14-WQ01 Killinagh Bog: Water Quality Map* included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at and around Killinagh Bog.

There will be 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also 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*., 2017). Bog rehabilitation is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) 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 BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Killinagh has been completed. This discharge will have improved 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 watercourse receptors and the Slate_SC_010 sub-catchment and will support the future status of the watercourses achieving Good Status. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Water quality monitoring will be established. 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.

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 monitoring for pH, suspended solids, total solids, total phosphorus, total ammonia, colour, and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al*. (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther *et al.,* 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Killinagh 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. The majority of the bog will develop as Birch woodland on drier areas and peripheral headlands. Fen, Reedswamp and wet woodland will develop in the wetter cutaway areas.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Killinagh Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare peat and pioneer vegetation communities in the former production area of Killinagh Bog is assessed as **local importance (lower value)**.

Scrub, Birch woodland and raised bog may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Killinagh Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity, and other general topics over the years about Ballydermot Bog within Allen-Lullymore bog group, including Killinagh Bog, with various stakeholders in relation to:

- Forestry trial with the Forest Service (2009).
- Forestry management with Coillte.
- IPCC Lodge Bog Nature Reserve and management plan (IPCC).
- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Killinagh Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Killinagh Bog.

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

4.2 Topics raised by Consultees

N/A Yet as consultation has not commenced.

4.3 BnM response to topics raised during consultation

N/A Yet as consultation has not commenced.

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect planned renewable energy infrastructure or areas required for this proposed project.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Integrating rehabilitation measures with existing land-use (e.g. conifer forestry). It is not proposed to change or affect any conifer or commercial forestry.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of a peatland used for industrial peat production, in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is some potential for the creation of wet cutaway habitats at Killinagh Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Killinagh Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. The site has already developed pioneer and maturing cutaway habitats and is largely stabilised.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). this will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- 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, very little bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-

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wetting across the entire bog, 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 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 BnM). Reducing pressures due to former peat extraction activities at Killinagh 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 BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g. Timahoe South, and Lodge Bog in 2022-2023) and have previously carried out re-wetting and rehabilitation at Lullymore bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Killinagh Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Killinagh bog is part of the Allen-Lullymore bog group.
- The local environmental conditions of Killinagh Bog mean that targeted drain blocking is the most suitable rehabilitation approach for this site.
- The key goals and outcomes of rehabilitation set by BnM. BnM have defined the key goal and outcome of rehabilitation at Killinagh Bog as **environmental stabilisation and optimising residual peat re-wetting,** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Wind Farm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Killinagh Bog. In areas associated with proposed wind farm footprint including habitat management measures, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- The cutaway is already developing a mosaic of Birch scrub/woodland, wetland and cutaway peatland habitats. Much of this cutaway has largely stabilised already. Rehabilitation is proposed to enhance residual peat re-wetting across the site while taking account of current (forestry) and future (way-leave) land-use.
- Current land-use includes forestry, where drainage will be maintained, and this will be treated as a constraint.
- Rehabilitation of Killinagh Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent. Killinagh is relatively dry due to natural topography and is developing Birch woodland. The topography of the area in addition to the forestry means there is limited scope for wide-spread re-wetting.
- **Potential land-use.** It is expected that BnM will update and finalise the draft rehabilitation plan for Killinagh when a decision is made in relation to the wind farm planning application. BnM remain fully

committed to rehabilitating the whole bog and meeting the conditions of the IPC license. The targeted rehabilitation measures set out in this Rehabilitation Plan will be implemented following completion of the construction phase of the proposed Ballydermot Wind Farm in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.

- **Land-use**. Part of the bog has been predominantly developed for forestry. The drainage of this area will have to be maintained.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM 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.
- **Turbary.** There is active turbary and turf-cutting along the eastern margin.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to BnM Archaeological Liaison Officer and the National Museum of Ireland (Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Killinagh 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 Killinagh Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial drainage activities.

Rehabilitation is generally defined by BnM 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 a naturally functioning raised bog ecosystem.
- mitigation of key emissions (e.g. potential suspended solids run-off).

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

- Rewetting of residual peat in the area originally drained for industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat forming habitats. 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 BnM 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 Longford Pass 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 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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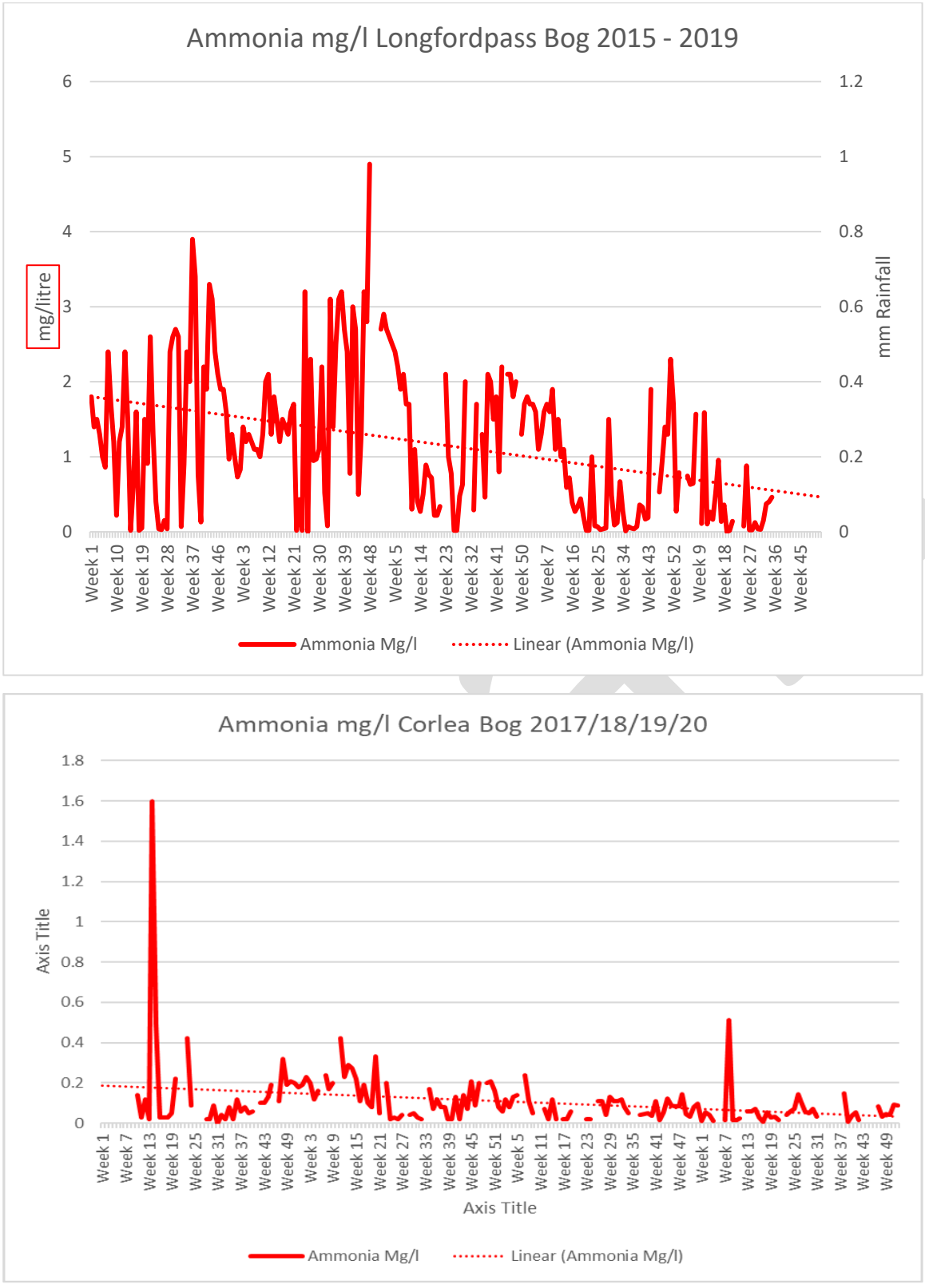


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected time-frames.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and 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 based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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, LiDAR surface maps and Depression analysis, these are included in the accompanying mapbook as the drawings referenced below:

BNM-ECO-26-14-21: Aerial Imagery 2000

BNM-ECO-26-14-22: Aerial Imagery 2020

BNM-ECO-26-14-03: LiDAR Map

BNM-ECO-26-14-09: Depression Analysis

The restoration and rehabilitation measures are provisionally outlined in drawing titled *BNM-ECO-26-14-20: Standard Rehabilitation Measures* in the accompanying mapbook.

These rehabilitation measures for Killinagh Bog will include (see Table 8.1):

- Much of the cutaway has already vegetated and stabilised. A targeted drain-blocking programme will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat. This targeted drain-blocking will have to consider land-use constraints (forestry).
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures may include modifying outfalls and managing water levels with overflows.
- Silt control measures will be created as part of the rehabilitation measures and will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt pond will be continually inspected and maintained, where appropriate. When it is deemed that the silt pond is not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt pond will be reviewed. The silt pond or measure 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 rehabilitation measures at Killinagh Bog.

Type	Code	Description	Area (Ha)
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	78.7
Wetland cutaway	WLT1	Modifying outfalls, targeted drain-blocking and managing water levels with overflows to re-wet cutaway	9.2
Marginal land	MLT1	No work required	11.7

Type	Code	Description	Area (Ha)
Forestry	Forestry	Rehab Complete - Forestry	87.5
Ballydermot Wind Farm	Renewables Footprint	Areas associated with the proposed Ballydermot Wind Farm where rehabilitation measures will be appropriately sequenced including habitat management	62.2
Constraint	Constraint	Constraints (Access and bog remnants)	7.7
Total Area			**257.0**

Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

8.1 Completed and Ongoing

- Part of Killinagh bog was developed as a forestry trial (45 ha). This forestry (mixed conifers and broad-leaves) has established as immature woodland and is considered to be rehabilitated.
- A significant portion of the have already developed vegetation cover and are developing a mosaic of typical cutaway peatland habitats including Birch woodland. Natural re-colonisation of the cutaway so far has been quite effective. Some areas remain bare peat – former headlands, travel paths and areas used for peat extraction until recently. These bare peat areas are shrinking as vegetation develops and consolidates.

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

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Killinagh Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements will be carried out
- 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) will be 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.
- Appropriate Assessment (AA) of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- 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.

8.4 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 9 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.

8.5 Timeframe (to be adjusted when finalised)

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions.
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation**: Decommission silt-ponds, if necessary

8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a ‘standard’ rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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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:

- Silt control measures will be created as part of the rehabilitation measures and will be retained and maintained during the rehabilitation phase.
- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt control measures, 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.
- 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.
- Monitoring results will be maintained, trended 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 monitoring for pH, suspended solids, total solids, total phosphorus, total ammonia, colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds or silt control measures will be carried out over a two-year cycle.
- 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 BnM 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.

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 have 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.

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APPENDIX I. BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow catchment, and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and Timahoe South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied an old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly, via the BnM industrial railway. Many bogs were in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long-term peat extraction activity reduced the peat depth on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen-Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Lullymore in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Lullybeg by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 and 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow

piped outfall. Some cutaway bog at Lullymore, used as spread grounds for sod peat, was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly Conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries, Edenderry SAC (site code: 000925) is located in the Lullymore Bog sub-group south of Ticknevin and Glashabaun Bog (northern sub section) overlaps the SAC and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is an esker and BnM used the site in the past to extract gravel for the construction of railway embankments across BnM bogs. Rare plants including Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by BnM. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation is ongoing.

A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC Licence Ref. P0503-01, and current, indicative peat production status, is outlined in Table Ap-1.

Table Ap-1 Allen-Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Parts completely cutaway Parts still have deep peat	Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.		
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since the 1950s. Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Glashabaun South	569	Peat extraction since 1950s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Draft 2026
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss Sphagnum inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023
Lullybeg	271	Peat extraction since the 1930's. Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2004	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group – amenity.	1992	Draft 2026
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019 Majority of bog still has relatively deep peat	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production. Cloncannon bog remnant – zoned for biodiversity Mostly bare peat. Expected to be part of the proposed Ballydermot Wind Farm, which is currently in pre-planning.	2019	Draft 2026
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection	N/A	N/A
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab complete

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See Drawing number *BNM-ECO-26-14-24* titled *Bog Group Map*, included in the accompanying Mapbook which illustrates the location of Killinagh Bog and the Allen – Lullymore Bog Group in context to the surrounding area.

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the entire bog, which comprises 175 ha. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.

Bog Name:	Killinagh (Part of Lullymore & Lodge Bogs)	**Area (ha):**	175 26 ha (433.07 acres)
Works Name:	Ballydermot	**County:**	Kildare
Recorder(s):	MMC & DF	**Survey Date(s):**	12/10/2009, 05/2015, 08/2016

Habitats present (in order of dominance)

The most common habitats present on the industrial cutaway include:

- Bare peat.
- Birch scrub with emergent (eBir), open (oBir) and closed scrub (cBir) all present. (Habitat codes refer to BnM habitat classification – Appendix II).
- Pioneer poor fen communities, with Soft Rush-dominated vegetation (pJeff) are most common, and Bog Cotton-dominated vegetation (pEang) less prominent. Minor amounts of *Campylopus*-dominated (pCamp), Bottle Sedge-dominated (pRos) and Arrowgrass-dominated vegetation (pTrig) present.
- Small amounts of pioneer Dry Heath dominated by Ling Heather (dHeath) around the edges of the site
- Minor amounts of Reedbeds dominated by Common Reed (pPhrag)
- Relatively small areas of temporary open water (tOW)
- A small amount of failed conifer plantation (WD4)
- Several dry grassland communities around the yard including dry calcareous grassland (gCal) and a Cocksfoot-Sweet Vernal grass community (gCo-An). A small amount of a Purple Moorgrass community (gMol) is present around the edge of this exposed mineral area where there is transition to the cutaway peat. The yard also contains small patches of scrub (WS1) and a short tree-line (WL2). Scrub (WS1) dominated by Gorse has also developed in other parts of the site. (Habitat codes refer to Heritage Council classification – Fossitt 2000 – Appendix II).

Description of site

This site is located near Lullymore in Co. Kildare and is known as Killinagh Bog. It is actually a sub-site and is part of a larger bog called Ballydermot, with a smaller section being assigned to an adjacent bog (to the south) called Lodge Bog.

The majority of the bog is classified as cutaway and a smaller section (the section within Lodge Bog) is classified as production-related cutaway. A yard is located near the northern end of the site on some mineral sub-soil. An old unused horticultural facility with glasshouses is located to the SW of the site.

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The site is enclosed in a shallow basin by a local road that runs along part of the southern boundary and by a paved track that runs along the western boundary that separates the site from adjacent forestry and improved farmland. There is some higher ground at the edges of the site adjacent to these boundaries. The site slopes in general towards the SE corner which seems to be the wettest part of the site. There are several lower former production fields through the site where shallow standing water has collected.

The majority of the SE section of the site contains bare peat, which is slowly re-vegetating out from the drains with pioneer poor fen and Birch scrub communities. Several fields are more completely vegetated with pioneer poor fen vegetation. Bulrush appears in the drains in this area and there are some pools of standing water.

The NE section is much more mature in terms of re-colonisation and contains much more vegetation cover including dense closed Birch scrub and open sections with mainly poor fen vegetation and small patches of Reedbeds. The majority of this section is dry but there are some areas (lower fields) with impeded drainage where there is standing water and wetland vegetation is developing.

The western half is somewhat more vegetated with pioneer poor fen vegetation and emerging Birch scrub. Several fields in this section have also been planted with Reed Canarygrass as part of the Biomass trial and this covers an extensive area.

There are small amounts of other habitats around the site such as dry Heath, which is found around the edges on drier, more elevated areas. A very small area at the SW corner (~1 ha) contains some conifers (Lodgepole Pine). Dry grassland predominates around the exposed mineral island where the yard is located at the north end of the site. Several patches of scrub have also developed in this area.

Potential forestry on site

Sections of the site with bare peat, light cover of Rush-dominated vegetation and the Reed Canarygrass trial will be afforested. Areas with Birch scrub will be kept intact and will be left as biodiversity areas within the plantation.

Designated areas in locality (cSAC, NHA, pNHA, SPA other)

The site is within 1 km of the Grand Canal pNHA (NPWS site code 002104).

Adjacent habitats and land-use

Habitats and land-use around the site include improved grassland (GA1) used by grazing livestock (on mineral soil); tillage (BC1) (on mineral soil); conifer forestry (WD4) (planted on cutaway in Ballydermot); cutover bog (PB4) where sod-peat is being actively cut using sausage machines; and some intact raised bog (high bog (PB1) where peat is being cut from face-banks. A local road passes along the southern boundary of the site.

Watercourses (major water features on/off site)

There are no major water courses around the site apart from the Grand Canal that is located 1 km east of Killinagh.

There are small pockets of open water on the site.

Drains on the site drain towards streams linked to the Slate River, which is part of the River Barrow catchment.

Peat type and sub-soils

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The whole of the site has been mapped as cutover bog (GSI soils and sub-soils map) including the area around the yard to the north where some mineral sub-soil is exposed.

Fauna biodiversity

Several bird species were noted on the site. These included:

- Snipe (7) using the pioneer fen habitats,
- Wren (4), Robin (5), Meadow pipit (8), Robin (3), Pied Wagtail (3) Tit (~10) Blackbird (1) using scrub around the site,
- Stonechat (1) using scrub.
- Other species included Grey Crow (3) and Magpie (2) flying over site.
- Sticklebacks (fish) were noted in some of the open water areas.
- Mammals using the site included: Rabbit (several sightings and visible signs); Hare (visible signs); Fox (visible signs); Deer (probably Fallow) (visible signs).
- Common Frog also noted.

Fungal biodiversity

Lactarius vietus (Grey Milkcap), *Leccinum scabrum* (Brown Birch Bolete), *Hygrocybe miniata* (Vermilion waxcap)

Activities on the site

- Sod peat has been cut recently from the cutaway on the site (along the south side). Some of the bog (within the BnM property boundary at the north end) is managed privately and is being cut for peat. This activity is now ceased (2023).
- A yard located at the north end of the site is disused but infrastructure is still present.

Habitats developed on industrial cutaway

Pioneer Poor Fen communities (pJeff)

This is the most common poor fen community found on the site. It is prominently dry and is dominated by *Juncus effusus*. Other species present include *Agrostis stolonifera*, *Cirsium palustre*, *Hypochaeris radicata*, *Mentha aquatica*, *Dactylis glomerata*, *Rumex acetosa*, *Epilobium* sp., *Anthoxanthum odoratum*, *Potentilla anserina*, *Equisetum* sp., *Holcus lanatus*, *Calluna vulgaris*, *Salix aurita*, *Rubus fruticosus*, *Campylopus introflexus*, *Senecio jacobaea*, *Carex demissa, Calliergonella cuspidata Pedicularis sylvatica*, *Potentilla erecta*, *Eriophorum angustifolium* and *Triglochin palustris*. Some sections have mats of *Campylopus introflexus* developing on bare peat between the tussocks of *Juncus effusus*.

Pioneer Poor Fen communities (pEang)

This habitat is much less common compared to the *Juncus effusus*-dominated vegetation. It is found in the wetter areas, in some of the lower fields and in areas where the drainage is impeded. Small patches are appearing among-side the edges of drains. It is generally dominated by a mono-specific sward of *Eriophorum angustifolium* and includes several other species.

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A more diverse community with a well-developed moss layer is found in the NE section of the site. This vegetation has developed in some wetter areas where there is standing water in some lower fields. The vegetation is dominated by *Eriophorum angustifolium* and it also contains *Juncus articulatus*, *Mentha aquatica*, *Juncus effusus*, *Hydrocotyle vulgaris*, *Potamogeton* sp., *Galium palustre*, *Equisetum* sp. and *Equisetum fluviatile*. There are extensive carpets of *Calliergonella cuspidata* and several other mosses such as *Rhytidiadelphus squarrosus, Brachythecium rutabulum, Polytrichum commune, Bryum sp and Aulacomnium palustre*. One large hummock of *Sphagnum* moss containing *S. capillifolium* and *S. subnitens* was found in this area.

Pioneer Poor Fen communities (pTrig)

This habitat is quite minor in extent compared to the latter two communities. Very small patches dominated by *Triglochin palustris* were colonising the bare peat along the edges of drains or in association with the pEang and pJeff in the SE section of the site.

Pioneer Poor Fen communities (pRos)

This community is present but is relatively minor in extent. It is somewhat unusual in that it appeared in drier conditions compared to those found at other sites. Small patches of mono-specific sward of *Carex rostrata* were found along the southern boundary of the site in association with the pJeff and eBir.

Pioneer Poor Fen communities (pPhrag)

There are several small stands of *Phragmites australis* on the site but these are not extensive and are not associated with open water or any of the temporary open water on the site.

Typha latifolia is present in some of the drains, particularly in the south-east part of the site. However, it does not form extensive stands any-where on the site.

Reed canary-grass sward (BC1)

This community is dominated by *Phalaris arundinacea* and was planted as a trial Biomass crop. Overall it has grown with a reasonable cover and covers an extensive area of several fields where it was planted. Growth within the fields is variable with average plant heights fluctuating. Some fields also contain *Juncus effusus* and other plant species growing amongst the crop. Several sections have failed and the *Phalaris* cover is patchy and dominated by bare peat or other species.

Temporary Open Water complexes (OW)

This habitat was quite minor in extent. Shallow open water was noted at several locations on the site, predominately in the south-east section and in some of the lower fields that were present on the site. The shallow water generally covered bare peat and there was little associated aquatic vegetation.

Riparian areas (Rip)

Drains with aquatic vegetation are regularly found throughout the site. Drains with the best developed aquatic and emergent vegetation are found in the south-east section and in a large drain/silt pond zone, which divides the northern from the southern section. Part of a wide drain was vegetated with *Agrostis stolonifera* and also continued some *Ranunculus* sp. (Crowfoot). Other drains contained *Nasturtium officinale* along with *Typha latifolia*.

***Betula pubescens* scrub (mainly eBir & oBir, some cBir)**

This community is found throughout the site but is best developed in the NE section. Some of the scrub is well-developed and can be classified as closed *Betula* scrub. The average height of the scrub was 2-4 m but some more mature *Betula pubescens* extended to 8-10 m high. The scrub is predominantly dominated by *Betula pubescens* with occasional *Salix aurita*. *Salix cinerea* and young naturally seeded *Pinus contorta* trees are also present. The ground cover contains bare peat as well as *Juncus effusus*, *Dryopteris dilatata*, *Dryopteris affinis, Holcus lanatus, Rubus fruticosus, Agrostis stolonifera, Hypochaeris radicata, Calluna vulgaris, Cirsium palustre, Angelica sylvestris, Taraxacum sp., Fragaria vesca, Dactylis glomerata, Aira praecox, Plantago lanceolata, Centaurea nigra, Rumex acetosella, Anthoxanthum odoratum, Deschampsia*

caespitosia, Ulex europaeus and Heracleum sphondylium. Some extensive mats of *Campylopus introflexus* were present as well as patches of *Polytrichum* sp.

***Calluna vulgaris*-dominated community (dHeath)**

This community was found along the southern boundary on some higher ground at the ends of the fields. It was primarily dominated by *Calluna vulgaris*. There was significant cover of bare peat present. Other species present included *Betula pubescens*, *Ulex europaeus*, *Molinia caerulea*, *Campylopus introflexus* and *Juncus effusus.*

Dry grassland communities (gCal, gCo-An)

These communities are found around the yard at the northern end of the site and form a mosaic with the patches of scrub. The majority of the grassland can be classified as dry calcareous grassland that is in various stages of maturity. Some of this area is still re-vegetating and could be classified as recolonising bare ground (ED3). This grassland is dominated by a range of species including *Centaurea nigra*, *Carex flacca, Agrostis stolonifera, Lotus corniculatus* and *Anthoxanthum odoratum*. It also contains *Dactylis glomerata*, *Holcus lanatus*, *Mentha aquatica*, *Phleum pratense*, *Molinia caerulea*, *Linum catharticum*, *Vicia cracca*, *Succisa pratensis*, *Equisetum* sp., *Rubus fruticosus*, *Filipendula ulmaria*, *Juncus inflexus*, *J. effusus*, *J. articulatus*, *Potentilla anglica, Cirsium palustre, Cirsium arvense, Cirsium vulgare, Hypochaeris radicata, Hieracium pilosella, Carex demissa, Calluna vulgaris, Pedicularis sylvatica, Daucus carota, Achillea millefolium, Festuca rubra, Briza media, Deschampsia caespitosia, Senecio jacobaea* and *Hypericum pulchrum. Pteridium aquilinum* appears in some small patches associated with the edges of scrub.

The other grassland community (gCo-An) is dominated by *Dactylis glomerata* and is tall and tussocky. It also contains a significant amount of Anthoxanthum odoratum and *Deschampsia caespitosia* in places. Other species present included *Potentilla anserina, Cirsium arvense, Taraxacum sp., Trifolium sp., Plantago lanceolata, Calystegia sp. (Bindweed), Juncus inflexus, Heracleum sphondylium, Tussilago farfara, Agrostis stolonifera, Festuca rubra, Filipendula ulmaria, Achillea millefolium* and *Ranunculus repens.* This grassland is being colonised by *Ulex europaeus* and *Salix aurita* and small bushes are present. This grassland community has probably developed where the mineral soil is deeper and or more fertile.

Scrub (WS1)

This habitat has developed around the yard area. Several dense patches of scrub containing *Ulex europaeus*, *Betula pubescens*, *Salix cinerea*, *Salix aurita*, *Sambucus nigra* and *Rubus fruticosus* have developed in this area. *Pteridium aquilinum* is frequently found around the edges of some of these patches.

Tree-line (WL2)

A short tree-line was planted at the north end of the site in the yard area. This tree line contained mature *Pinus contorta* and several *Fraxinus excelsior*

<u>Other Habitats (around the fringe of the bog)</u>

Cutover Bog (PB4)

This habitat was found in a small strip along the southern boundary and adjacent to the local road. It contained a disused railway track. The peat is quite dry and the vegetation is dominated by *Calluna vulgaris*. Other species present included *Erica tetralix*, *Molinia caerulea*, *Potentilla erecta*, *Dactylorhiza* sp., *Centaurea nigra*, *Carex flacca* and *Briza media*.

A second small area of cutover bog is located at the SE corner of the site and is separated from the main body of the bog by a small track on a ridge. This area contains some abandoned cutover bog that is vegetated with *Ulex europaeus*-scrub, *Betula pubescens*-dominated scrub and some *Calluna vulgaris*-dominated vegetation.

This habitat is also found at the northern end of the site. This area is found north of a bank and drain that divides the industrial cutaway from this section. The cutover bog is in various stages of re-colonisation, from bare peat where there active cutting to re-vegetating sections that contain *Eriophorum angustifolium*, *Trichophorum cespitosum*, *Rhynchospora*

alba, *Calluna vulgaris*, *Erica tetralix*, *Narthecium ossifragum*, *Eriophorum vaginatum, Campylopus introflexus* and *Molinia caerulea*. Older ridges in this area are vegetated with *Calluna vulgaris*, *Molinia caerulea* and *Myrica gale*.

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[5] will be adhered with throughout all rehabilitation measures and activities.

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

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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 Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2026-2030

The All-Ireland Pollinator Plan 2026-2030 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in the 2000's, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM 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 BnM'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.

14 BnM commitments

BnM 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.

In line with BnM'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. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. 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.

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APPENDIX VI. 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 BnM 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, stockpile covering, pumps, septic tanks and fuel tanks.

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

Item	Description	Killinagh Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Not relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

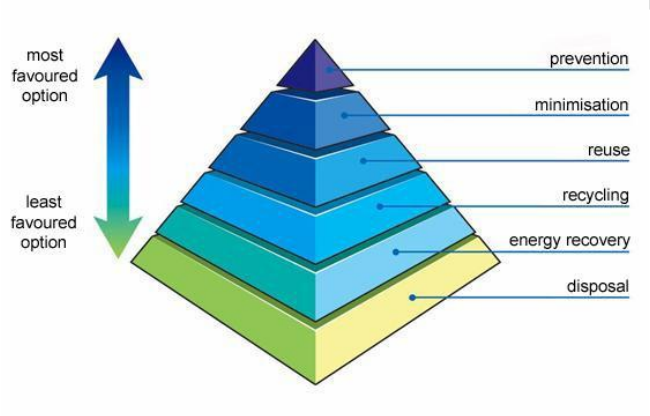
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 cutover 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

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

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER, 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement**

of ecological conditions in damaged wildlands through the **reinstatement of ecological processes**. In general, BnM 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 acrotelm – 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.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

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 IPC Licence's Ref. P0503 in the Allen-Lullymore Group of Bogs in Counties Offaly and Kildare.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.
- 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.

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- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.
- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

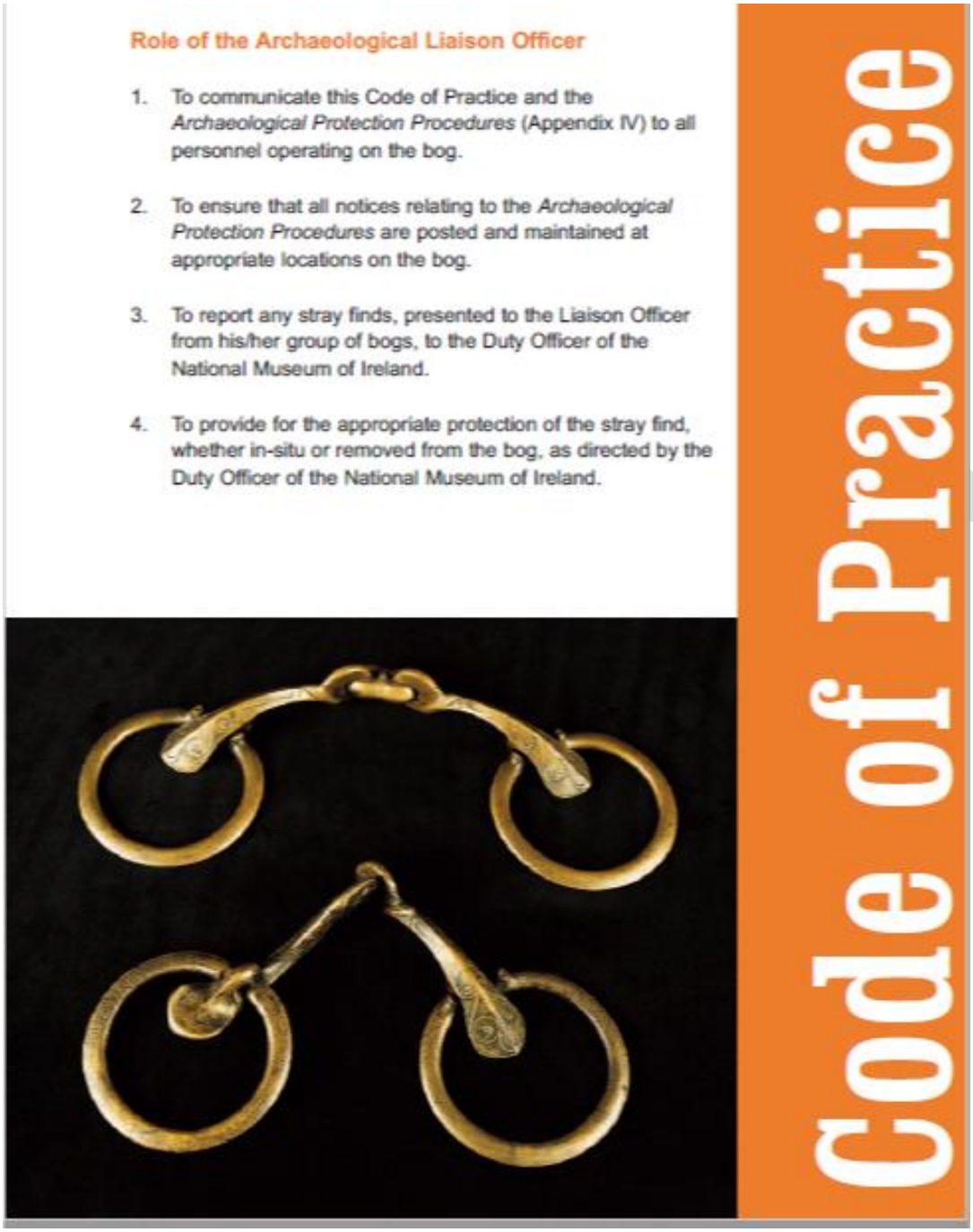
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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- 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/resources/faqs/environment--you/faq-listing/ , 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 X. 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.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Killinagh Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet	
Document Name:	Killinagh Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Draft v0.1**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	11	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	CS	MMcC
Date:	06/08/2026	06/08/2026	06/08/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):		JB	CS
Date:		22/10/2026	23/10/2026

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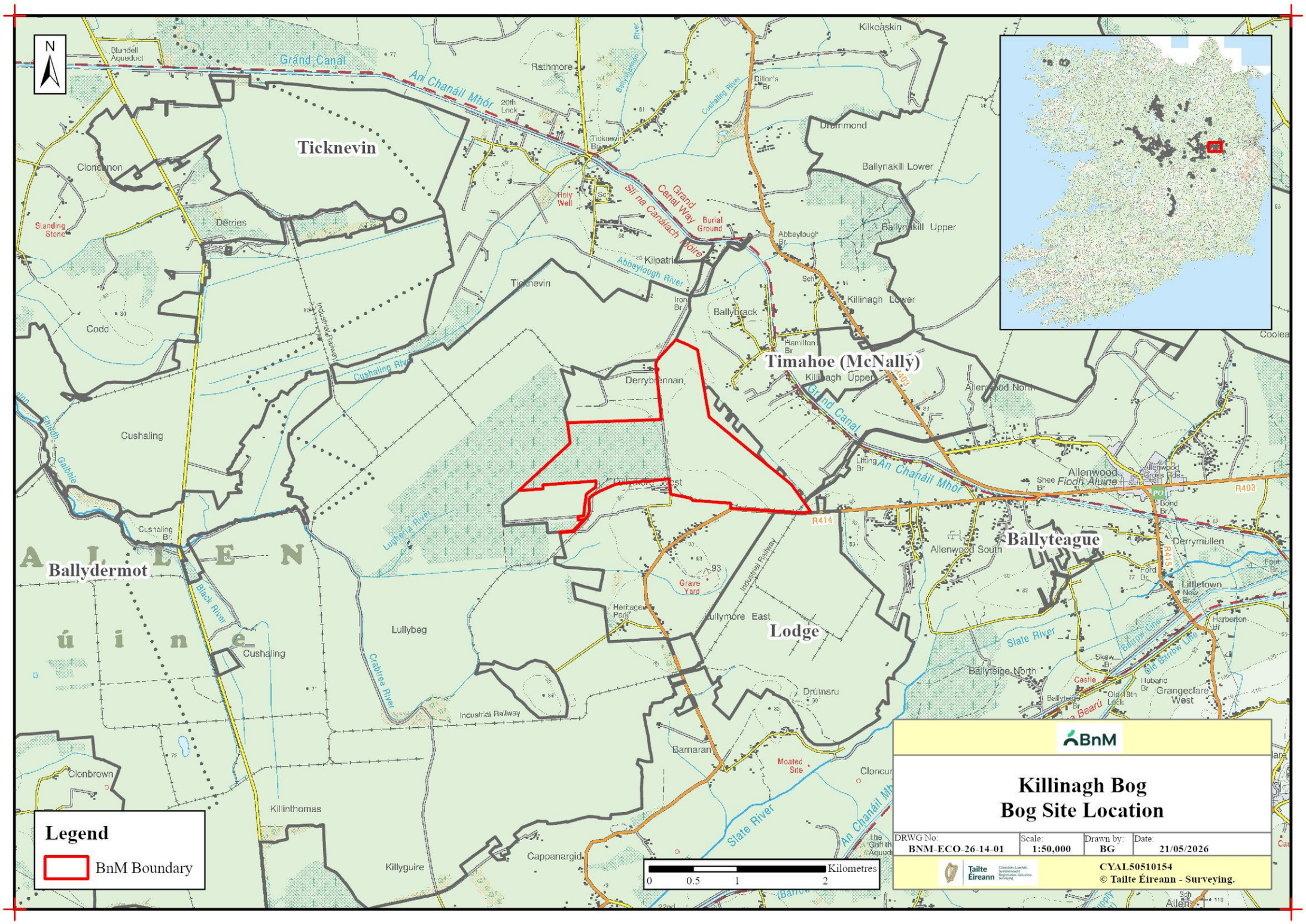
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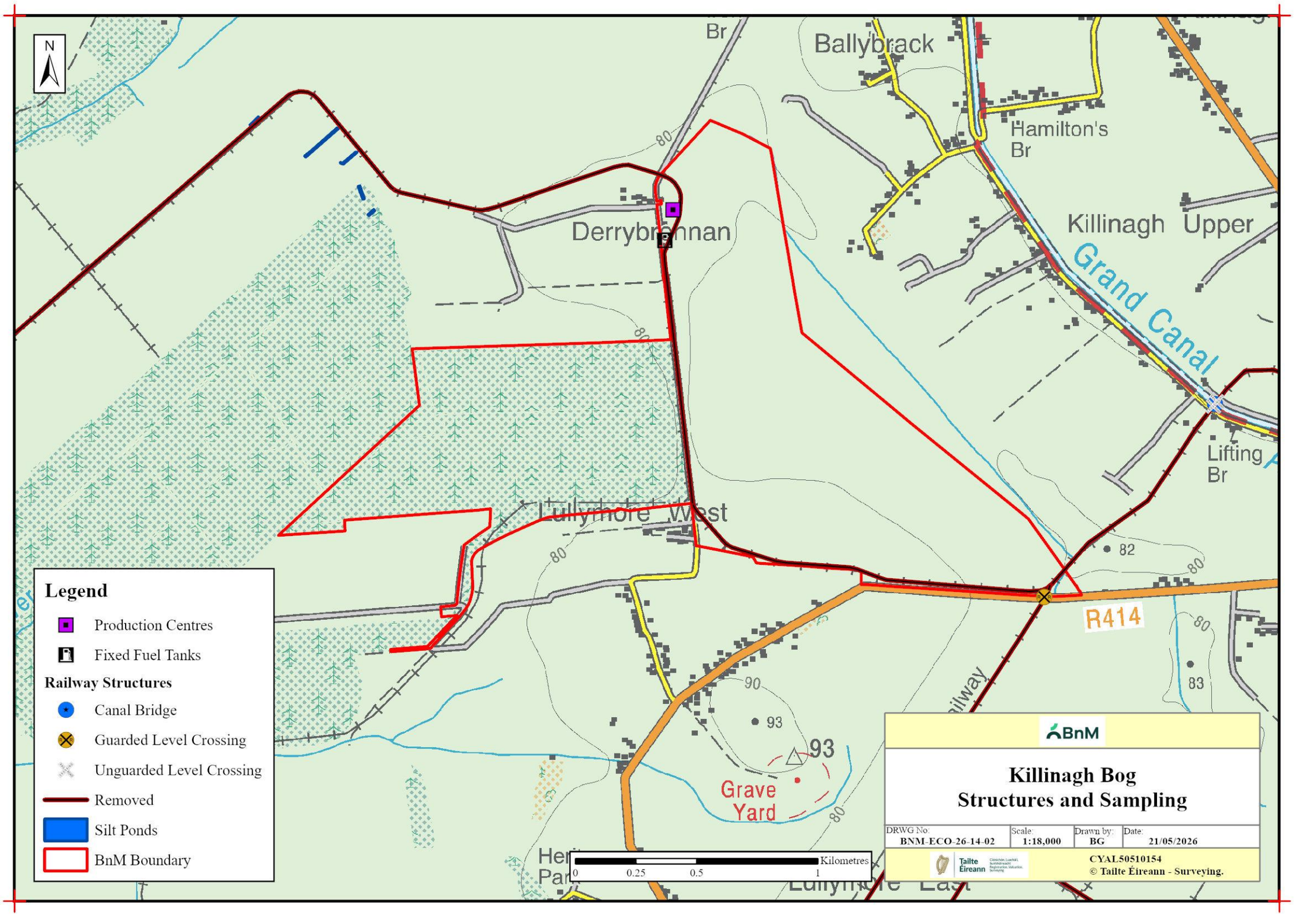
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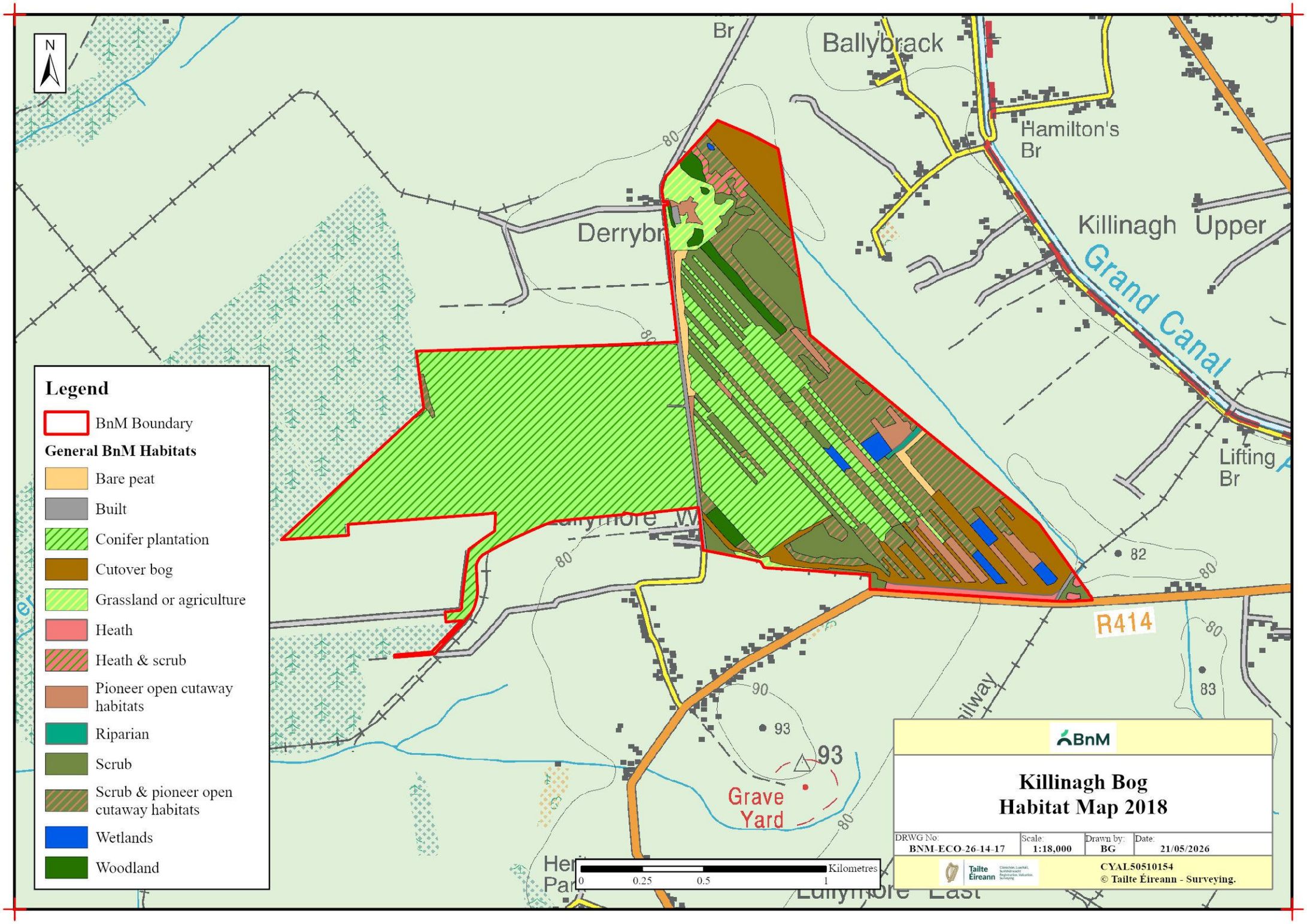
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Ballybrack
Hamilton's Br
Killinagh Upper
Grand Canal
Derrybrennan
Lifting Br
Lullymore West
R414
Grave Yard
Lullymore East
80
90
93
82
83
Legend
Production Centres
Fixed Fuel Tanks
Railway Structures
Canal Bridge
Guarded Level Crossing
Unguarded Level Crossing
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BnM Boundary
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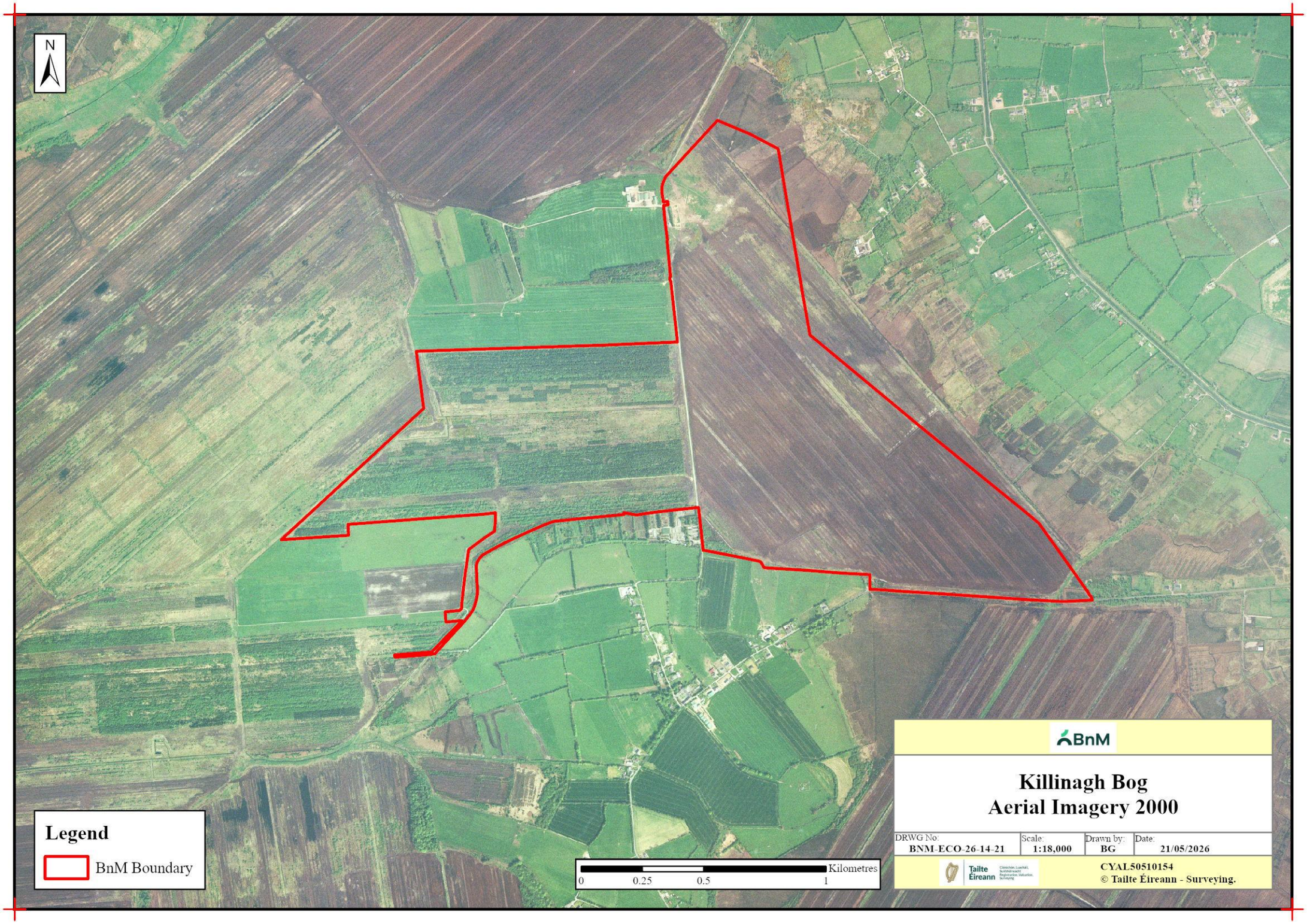
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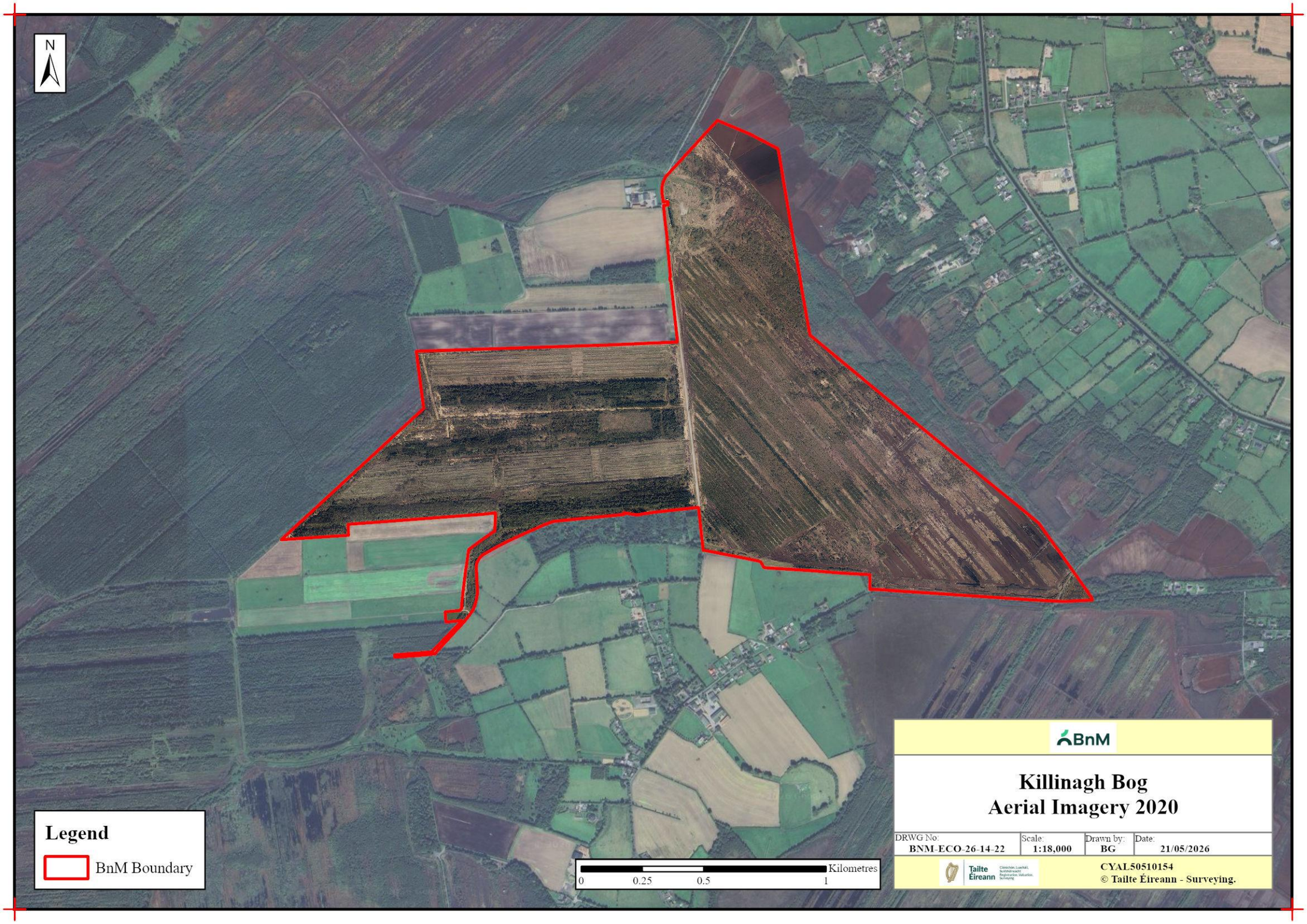
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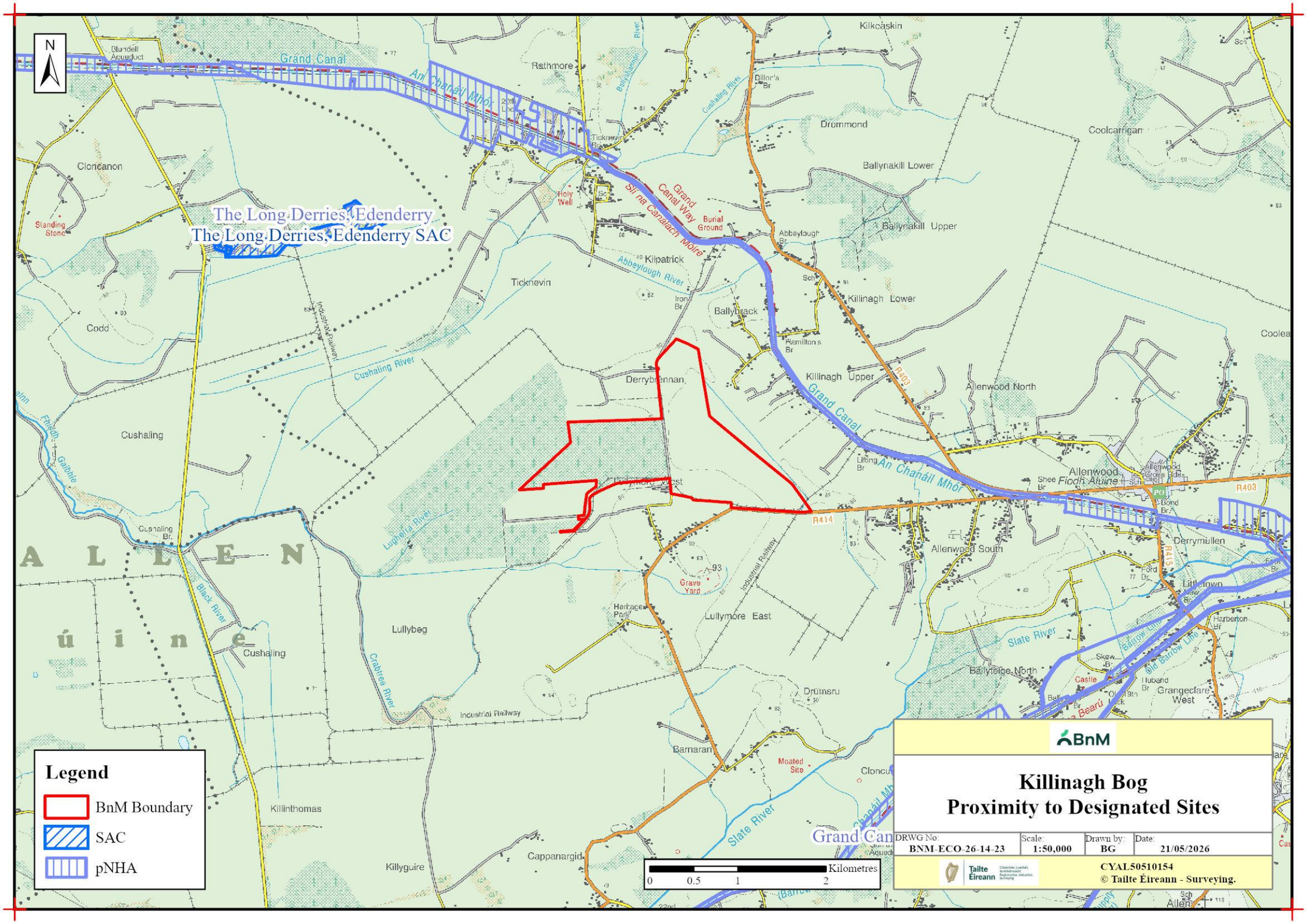
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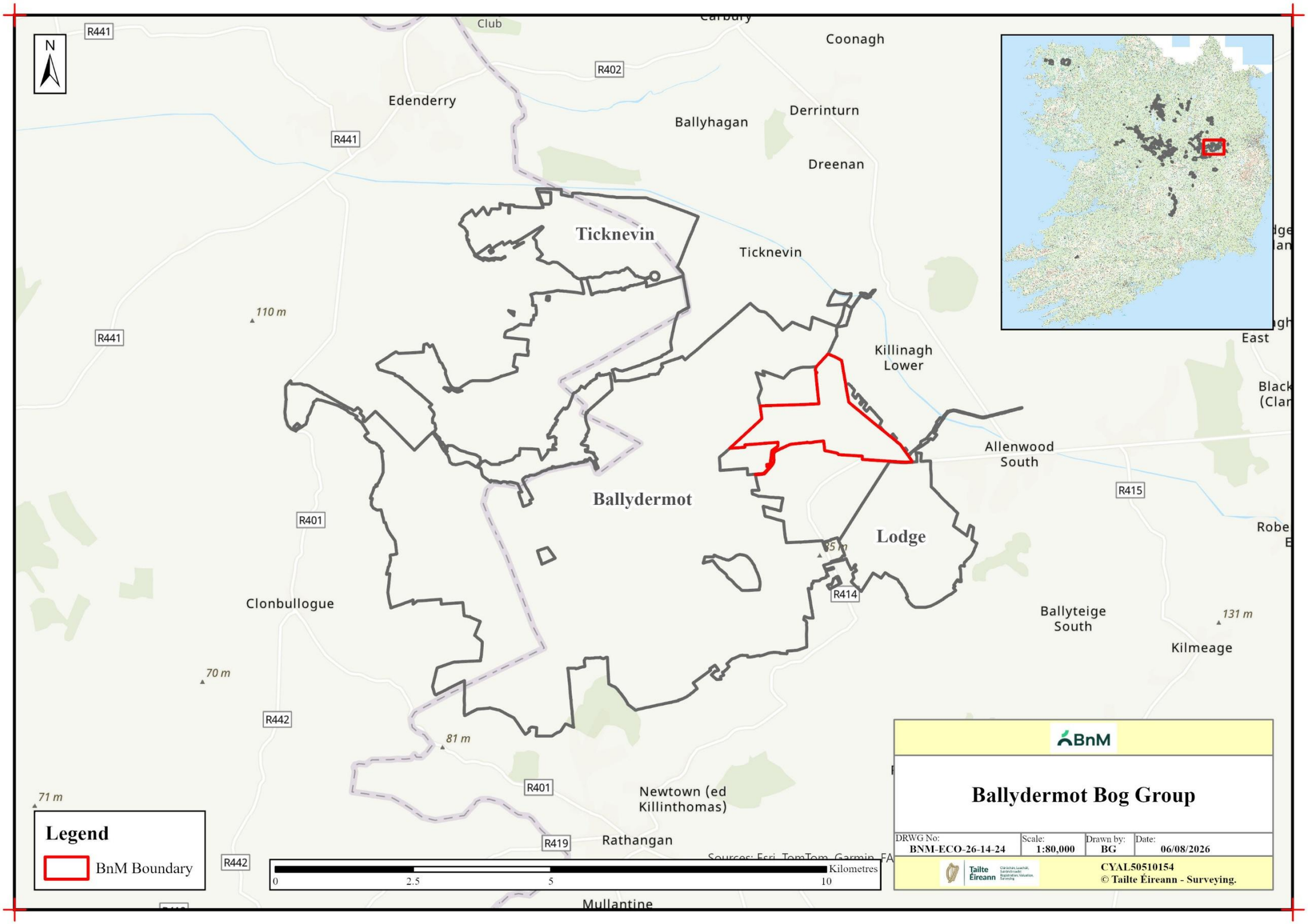
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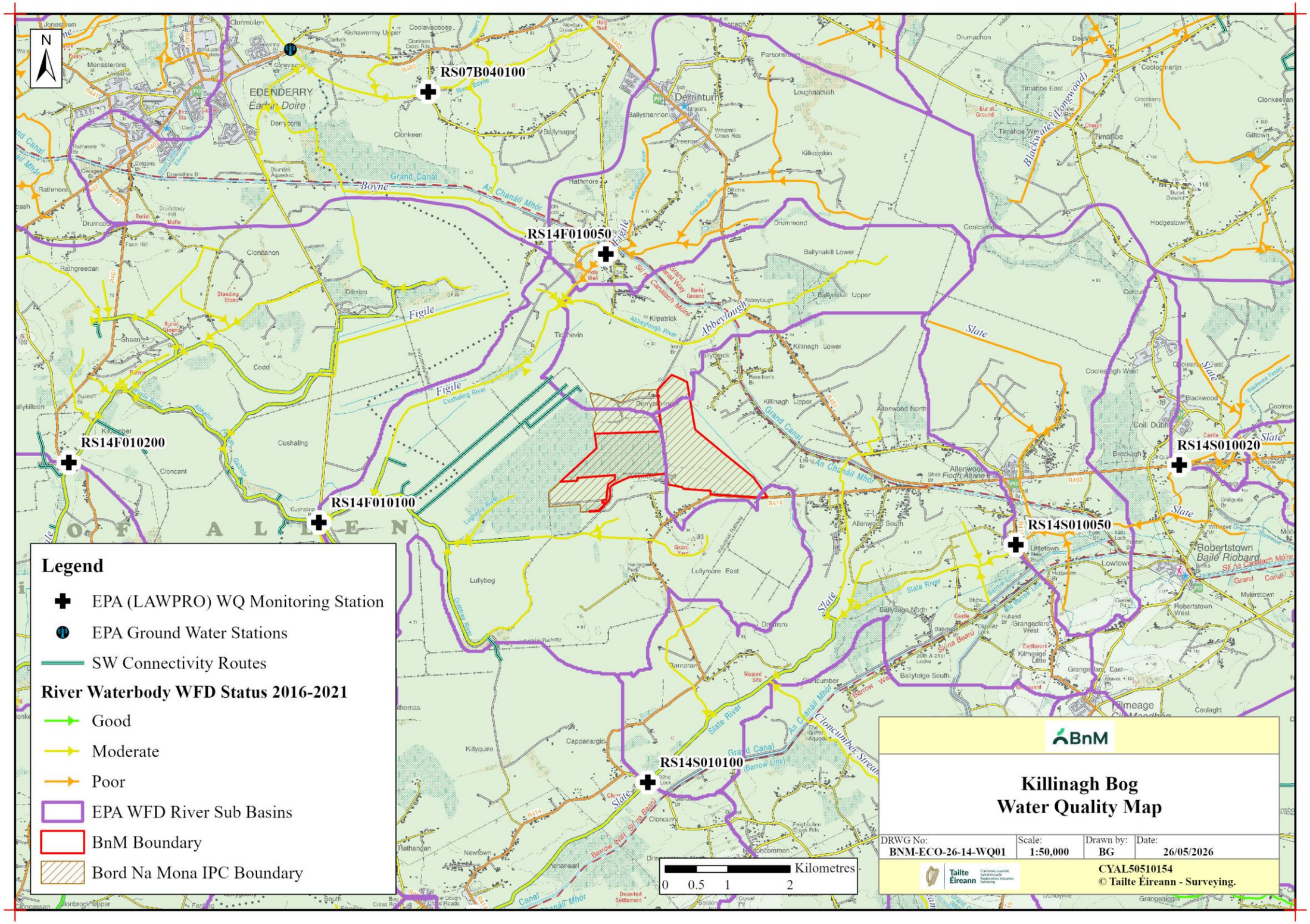
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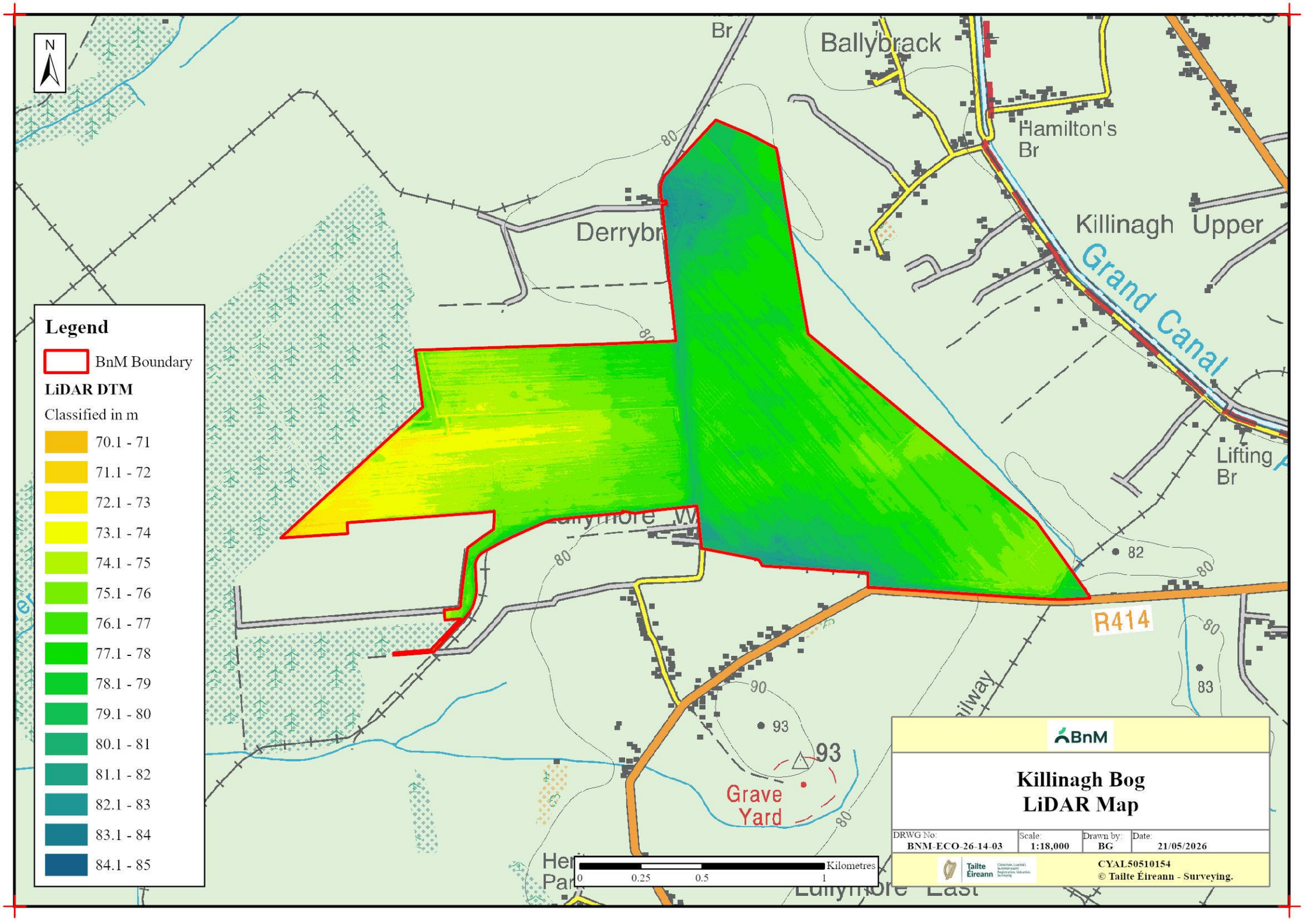
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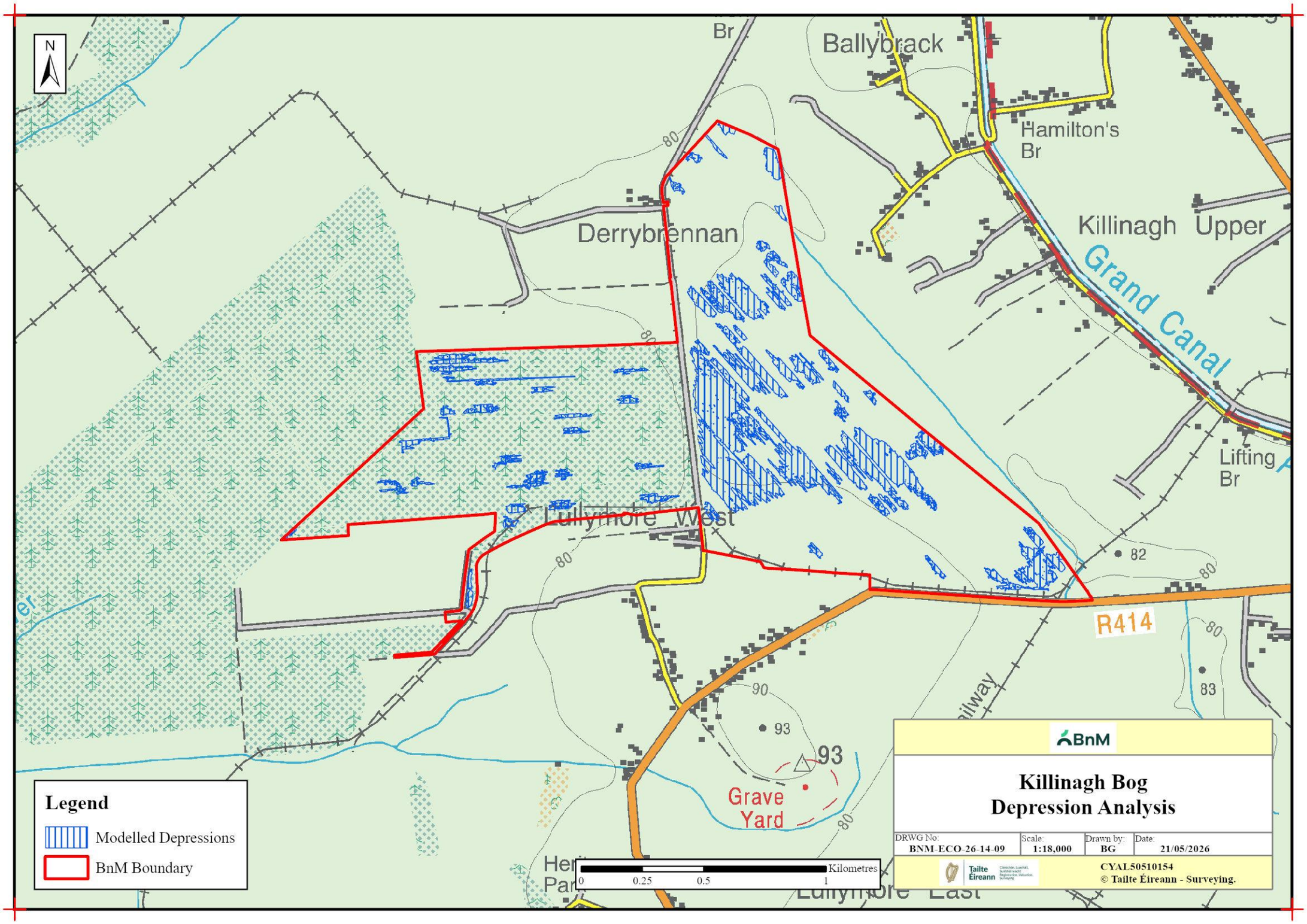
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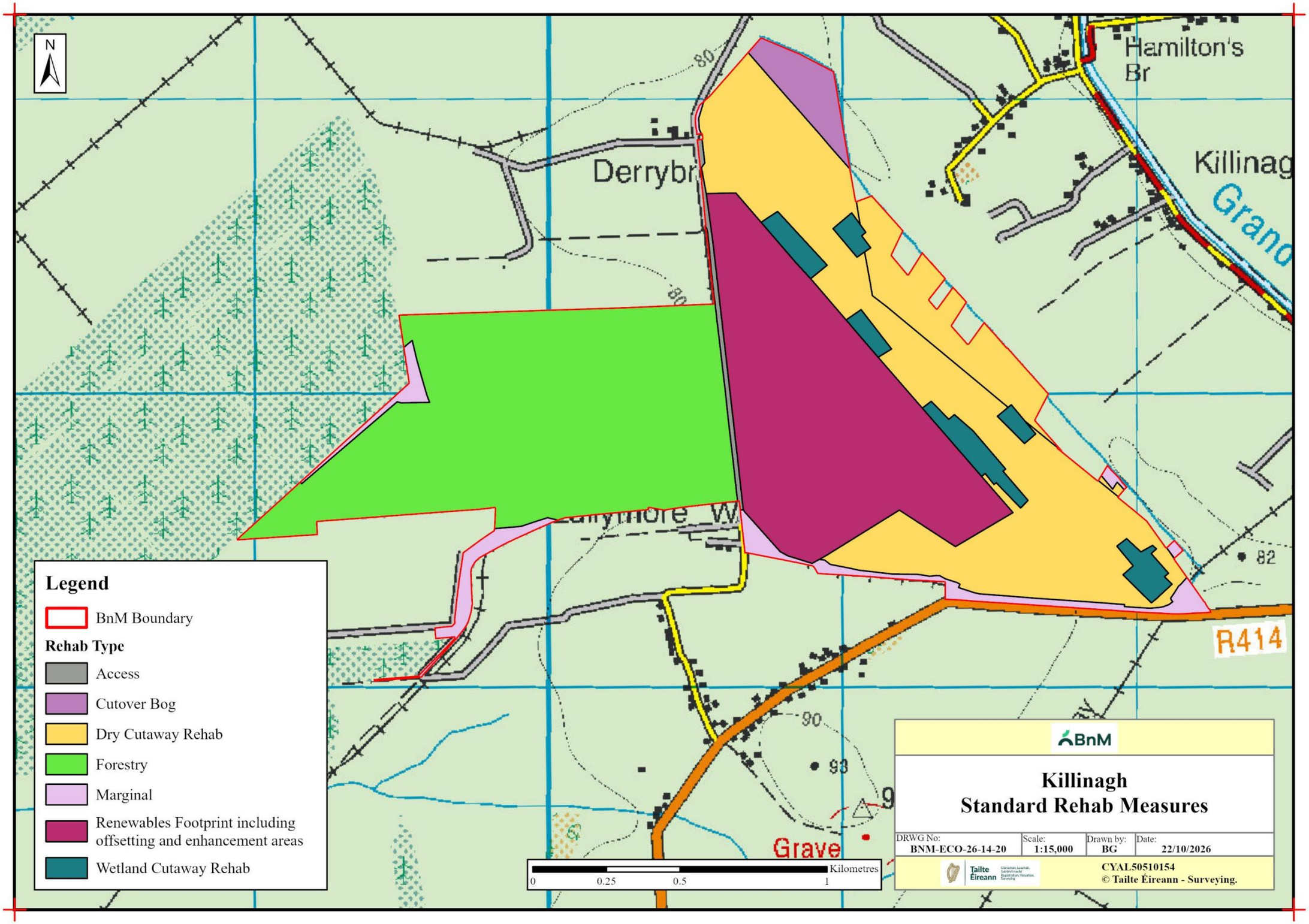



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Derrybrennan
Killinagh Upper
Grand Canal
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Lullymore West
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Killinagh Bog
Depression Analysis
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Rehabilitation Maps

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Bord na Móna

Lodge Bog

Cutaway Bog Decommissioning and Rehabilitation Plan

2022

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

> "*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 Lodge 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 Lodge Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0503-01, 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 Lodge 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 Lodge Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland and wetland habitats.

Any consideration of any other future after-uses for Lodge Bog, such as amenity, will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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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 Lodge Bog Decommissioning and Rehabilitation Plan – Addendum 1 for more details.

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NON-TECHNICAL SUMMARY

- Bord na Móna is planning to rehabilitate Lodge Bog, located in Lullymore East, Co. Kildare.
- Lodge bog was a BnM production bog used for peat extraction and is located adjacent to Lullymore and is 3 km west of Allenwood in Co. Kildare. It was part of the former Ballydermot bog group and used to supply milled fuel peat as part of the Derrygreenagh group to Edenderry Power Station. A small area was used to supply sod moss for horticultural use.
- Peat harvesting is now finished at Lodge Bog.
- This is happening as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, and minimising impacts to downstream. Essentially this means putting a 'wet skin' of plants and mosses back on the peat. The bog was drained in the past to allow milled peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- 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 can not be restored back 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 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 site is expected to still be a reduced carbon source for some time, but eventually the carbon sink function can re-establish in suitable conditions in parts of the bog, as peat-forming conditions are restored. This will take some time.
- The development of a range of habitats in Lodge 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 and peatland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new wetland and peatland habitats.
- Lodge Bog was drained and developed for industrial peat production in the 1970s. Peat production ceased in 2020. Much of the centre and west of the site has begun to revegetate, with the eastern part of the site dominated by bare peat. A small part of the western part of the site has already been subject to rehabilitation in 2018 and has established pioneer peatland and wetland habitats.
- Bord na Móna are currently developing a proposal for wind energy development that includes Lodge Bog. This project is known as Ballydermot Windfarm. This project is currently in the pre-planning stage and where part of the planned infrastructure occurs within Lodge bog, these areas have been constrained from this rehabilitation plan. Infrastructure will include connecting roads, cabling, a sub-station and supporting infrastructure. No wind turbines are proposed for Lodge Bog. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site. The proposed renewable energy project is expected to have

a small footprint on Lodge Bog. In advance of this proposed planning submission, it is planned to rehabilitate **the majority** of Lodge Bog in 2022. Any remaining rehabilitation will be carried out after the renewable energy construction is complete.

- Measures proposed for Lodge Bog include internal drain blocking and other measures required to raise water levels to the surface of the peat (changing levels of pipes for example). Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth. In addition, cell bunding is proposed in areas of residual deep peat.
- These rehabilitation measures will be planned by a team consisting of ecologists, hydrologists and engineers. It is a principle of Bord na Móna rehabilitation planning that no actions will be taken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the site via the existing outlets.
- Bord na Mona plan to carry out this work in 2022.
- It will take some time for vegetation and habitats to fully develop at Lodge bog, and a peatland ecosystem to be restored. However, it is expected that most of the site with bare peat will be developing pioneer habitats after 5-10 years. Other areas where pioneer habitats have already established will continue to develop.
- 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.
- The western marginal remnant of Lodge Bog containing remnant high bog and birch woodland was gifted to the IPCC by Bord na Móna in 2005. It is now managed by the IPCC as a nature reserve and is not part of the scope of this rehabilitation plan.

SUMMARY

Name of bog: Lodge **Area:** 408 ha

Site description:

- Lodge Bog was drained and developed for industrial peat production in the 1970's. Lodge Bog formerly supplied milled horticultural peat and fuel peat. Industrial peat production ceased in 2020.
- Lodge had a partially pumped drainage regime to support industrial peat extraction.
- The former peat production footprint now comprises bare peat, mosaics of pioneer vegetation and some emergent scrub habitats. Some active drainage channels are present on site.
- Peat depths are varied across the site. A large portion of the east of the site contains peat depths in excess of 2.6 metres. Much of the central portion of the site contains shallow peat, largely between 0-1 metre, with deeper peat at the bog boundary/near headlands.
- Lodge bog is drained by the Slate River, located adjacent to the south of the site boundary. The Slate River is a tributary of the Figile River, which is in turn a tributary of the River Barrow.

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.
- Carrying out enhanced rehabilitation with the application of enhanced peat rehabilitation measures to re-wet peat and slow water movement across the site. The site has developed a mosaic of pioneer cutaway habitats in some areas; notably on shallow peat/gravel ridges or in low lying wetter depressions. Rehabilitation will focus on targeted actions to raise water levels in areas where there is still significant bare peat cover. This site will develop a mosaic of compatible wetland and cutaway peatland habitats.
- Part of the west of the site has previously been subject to some rehabilitation. These areas have developed a mosaic of wetland (Reedswamp and poor fen) and pioneering Birch woodland. As such, these areas are now largely vegetated and stabilising.
- Optimising hydrological conditions for the development of fen, reed swamp and wet woodland on shallow cutaway peat, and eventually naturally functioning peatland and wetland habitats.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- 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 wetland and peatland habitats. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021.

Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Lodge Bog.
- EPA IPC Licence - Ref. PO-503-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.
- The enhanced rehabilitation measures defined in the Scheme (PCAS), which are designed to exceed/meet the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Lodge Bog, in particular, optimising **climate action benefits**.

- The local environmental conditions of this bog. Lodge Bog has variable environmental characteristics with a range of residual peat depths, and variable hydrology and topography. Lodge is suited to cutaway wetland development, particularly in the central and western sections where low lying areas occur.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- Minimising potential impacts on neighbouring land. Some boundary drains around Lodge Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Proposed land-use. Bord na Móna are currently developing a renewable energy project called Ballydermot Windfarm. This proposed project is in the pre-planning stage. The proposed renewable energy project has a small footprint on Lodge Bog.

Criteria for successful rehabilitation:

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

- Rewetting of residual peat in the former area of industrial peat production to slow water movement across the site to retain silt, accelerating the development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation) through the creation of compatible fen, reed swamp, wet woodland and other wetland and peatland habitats.
- Stabilising or reducing key emissions to water (e.g. potential silt-run-off). This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed (IPC Licence validation).
- Reducing pressure from peat production on the local river catchment (WFD) (IPC Licence validation). This will be measured by the EPA WFD monitoring programme.
- Optimising the extent of suitable hydrological conditions to optimise climate action (Climate action verification).
- Reduction in carbon emissions (Climate action verification). 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 site on a trajectory towards establishment of a mosaic of compatible habitats including fen, reed swamp, wet woodland, heath, scrub, embryonic *Sphagnum*-rich peat forming communities, birch woodland habitats, where conditions are suitable, and eventually towards a reduced carbon source/carbon sink (Climate action verification). These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning peatland habitats to fully develop at Lodge 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 drainage management assessment.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will be a combination of targeted drain blocking, peat field re-profiling, modifying outfalls and water level management.
- Phase 2 measures may include fertiliser application targeting bare peat areas on headlands, high fields and other areas, and further water level management.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning schedule.
- Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2021-2022. Short-term planning actions.
- 2022. Short-term practical actions.
- 2022-2024. Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- 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 Lodge Bog, as required to meet Condition 10 of the IPC Licence, is defined as:

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

Additional Monitoring:

- The monitoring and validation of re-vegetation via natural colonisation and changes in bog condition will be carried out using an aerial survey, after rehabilitation measures are implemented. 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 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.
- Monitoring as part of Climate Action Verification is dependent on support from PCAS or other external funding.

Validation and IPC Licence surrender

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

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

1. INTRODUCTION

Lodge Bog is located adjacent to Lullymore and is 3 km west of Allenwood in Co. Kildare, see Drawing no. *BnM_DR23_21_01 'Bog Site Location'*, Appendix XIII. Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Allen-Lullymore bog group (Ref. 503). It was part of the former Ballydermot bog group. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the cutaway boglands within the licensed area. The bog is part of the Lodge bog group (see Appendix II for details of the bog areas within the Allen-Lullymore bog group, Ref. 503).

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. Ref. PO 503-01:

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

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

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

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

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

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

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

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

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

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

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

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

1.1 Constraints and Limitations

This document only covers the area of Lodge Bog, see Drawing no. *BnM_DR23_21_01 'Bog Site Location'*, Appendix XIII.

Bord na Móna are currently developing a renewable energy project called Ballydermot Windfarm. This proposed project is in the pre-planning stage. The proposed renewable energy project has a small footprint on Lodge Bog. This area has been constrained from this plan. Any further peatland rehabilitation measures integrated into the proposed windfarm constraint area will **either** be in association with a proposed 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 Lodge bog when this renewable energy development is complete. 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 Lodge Bog, such as renewable energy, 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.

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

Parts of Lodge Bog (outside the areas owned and under the control of Bord na Móna) are currently being used by domestic turf cutters for intensive private sod peat production. 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 Lodge Bog that are outside of the control of Bord na Móna. Nevertheless, Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way.

2. METHODOLOGY

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

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

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

2.1 Desk Study

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

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
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Additional on-line resources were also incorporated into the desk study, including:

- Lullymore Integrated Pollution Control Licence;
- Lullymore Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);

- National Parks & Wildlife Services Article 17[1] and Article 12[2] data;
- 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 2021;
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

A number of stakeholders have been identified during the course of Bord na Móna's rehabilitation and Biodiversity Action Plan activities and will be contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. Additional ecological walk-over surveys and visits have taken place at Lodge Bog in 2021 to inform rehabilitation planning and habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent site walk-over surveys and visits, and updates to baseline data.

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

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

[1] https://www.npws.ie/publications/article-17-reports

[2] https://www.npws.ie/status-and-trends-ireland%E2%80%99s-bird-species-%E2%80%93-article-12-reporting

3. SITE DESCRIPTION

Lodge Bog is located adjacent to Lullymore and is 3 km west of Allenwood in Co. Kildare, see Drawing no. *BnM_DR23_21_01 'Bog Site Location'*, Appendix XIII. The location of Lodge bog within the Ballydermot bog group (Ref. 503) is provided in Drawing no. *BnM_DR23_21_24 'Bog group map'*, Appendix XIII. Other BnM bogs in the area include Killinagh to the north and Ballydermot (Barnaran) to the west. There is a BnM rail network connecting Lodge Bog to Barnaran and the wider Ballydermot network, see Drawing no. BnM_ DR23_21_02_"*Structures and sampling"*, Appendix XIII. Lodge bog is bounded by the R414 along part of the northern boundary, and this road separates Lodge Bog from the adjacent Killinagh bog. It also divides Lodge Bog from the adjacent Barnaran bog to the west.

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. Several sections of remnant raised bog are located along the margins of the site, see Drawing no. BnM_DR23_21_17 '*Current habitat map*', Appendix XIII. A small area within the east of the site has also been used for the production of domestic turf. A small area of plantation forestry also occurs in the wider area, outside the northwest of the site.

Lodge Bog has a partially pumped bog drainage whose water table will be below the surrounding water table for part of the site. It can be expected that if pumps are turned off or pumping is reduced that water tables will rise internally and part of the site will develop wetlands, depending on local topography and water courses. There are a series of deep trench drains through the bog at regular intervals that form part of the main drainage system. These drains are open and are flanked by high fields on both sides. There are two main catchments located within the bog, separated by the central east-west railway line and travel path. A number of silt ponds occur in close proximity to the eastern boundary of the site. Lodge bog is drained by the Slate River, located adjacent to the south of the site boundary. The Slate River is a tributary of the Figile River, which is in turn a tributary of the River Barrow.

The majority of the production bog is dominated by bare peat cover. A narrow band of raised bog remnant, scrub and birch woodland separates the site from the Slate River to the southeast. A relatively large part of the bog containing remnant high bog, birch woodland and some scrub along the western margin was gifted to the IPCC by BnM in 2005. It is now managed by the IPCC as a nature reserve and is intensively monitored. There is a small amount of pioneer cutaway vegetation developing at Lodge Bog (production-related cutaway). The ends of several fields have come out of production along the south-west margin of the bog where peat has been exhausted and the mixed till sub-soil is now exposed. These fields are colonising with a range of pioneer communities, dominated by poor fen. Some of the more-established vegetation is dominated by Soft Rush and Bog Cotton on lower fields where it is wetter. This area has now been re-wetted (2017) as part of a rehabilitation trial. Some dry grassland has developed along the railway on the central headland. The railway has been un-used for some time and parts are being overgrown with scrub.

3.1 Status and Situation

3.1.1 Site history

- Lodge Bog was originally developed as a sod peat bog and was only converted to milled peat in 2000. A small area to the south of the site continued to be used for commercial sod moss production. A rail line through Lodge is still present.

3.1.2 Current land-use

Industrial peat production has now permanently ceased at Lodge Bog. Bord na Móna are currently developing a proposal for wind energy development that includes Lodge Bog. This project is known as Ballydermot Windfarm. This project is currently in the pre-planning stage.

Some small areas of turbary and former licenced plots also occur within the site boundary.

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

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

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the 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

Published bedrock and Quaternary geological maps only present the shallowest deposits encountered and fail to present in information on the buried peat substrate. Coring carried out by RPS in 2021 across Lodge Bog provided further insight into the deposits underlying the site, particularly when combined with GPR data concerning the elevation of the peat substrate.

Combining the two datasets reveals the lowest lying areas of the site to be underlain by Limestone till (below c. 72.5mOD) and lacustrine clay (below c. 74mOD), while there are a number of ridges of more elevated material (rising to >77mOD). This has been interpreted as glacial till based on coring identifying gritty clayey material in these locations and based on comparable features present in the surrounding area. The lacustrine deposits encountered would be expected to limit vertical losses to depth in areas where this occurs.

Mixed gravel till is exposed in some places at the ends of fields that are developing as cutaway and within the deep drainage ditches under peat across the bog. The majority of the central and northern parts of the site contain residual peat of 0-1m in depth, much of which is associated with gravel ridges that runs east-west through the site.

3.2.2 Peat type and depths

Peat depths are varied across the site. A large portion of the east of the site contains peat depths in excess of 2.6 metres. Much of the central portion of the site contains shallow peat, largely between 0-1 metre, with deeper peat at the bog boundary/near headlands. See Figures BNM-DR-23-09-04: *Lodge Bog Peat Depths* in the accompanying map book.

The main peat type exposed at this site is black fen peat. There is some *Sphagnum* peat exposed towards the south-eastern section, where the bog is higher. Peat depths here have been recorded in excess of 2.6 metres.

3.3 Key Biodiversity Features of Interest

The majority of the site can be rated as local importance (lower value) (NRA, 2009) as the majority of the site comprises bare peat and was managed primarily for industrial peat production until 2019. Some of the marginal lands within the site boundary, containing remnant bog, cutover bog, woodland or dry heath have been assessed as of local importance (higher value) in a local context (NRA, 2009). Some small areas of the Lodge cutaway bog are beginning to develop pioneer cutaway wetland habitats (poor fen, reed swamp, birch scrub).

The majority of the production bog within the east of the site, which came out of production most recently, is dominated by bare peat cover, see Plate 3.1. Some of the vegetation along existing drainage network has developed into linear strips of birch woodland. The production bog is divided into two main sections to the north and south and these are separated by a headland with a railway orientated east-west. Much of the central and western parcels of Lodge bog have developed pioneering cutaway vegetation (production-related cutaway), see Plate 3.2. In some areas within the central and western part of the site, the ends of several production fields have revegetated where peat has been exhausted and the mixed till sub-soil is now exposed. These fields are colonising with a range of pioneer communities, dominated by poor fen. Some of the more-established vegetation is dominated by soft rush and bog cotton on lower fields where it is wetter, see Plate 3.2.

Some higher fields have colonised with a mosaic of pioneer dry grassland communities where it is higher and better drained. These include vegetation dominated by purple moor-grass, some pioneer dry calcareous grassland with species such as knapweed, ox-eye daisy and glaucous sedge, dry grassland dominated by sweet vernal-grass and yorkshire fog and some more established vegetation dominated by cocksfoot and false oatgrass. The pioneer nature of these communities is obvious with horsetail, cocksfoot and willowherb all present. These grassy areas generally cover a small area. Marsh helleborine was found in this vegetation on sub-soil associated with both purple moorgrass and the more calcareous grassland community.

Some dry grassland has developed along the railway on the central headland. This was dominated by the sweet vernal-grass-dominated community. The railway has been un-used for some time and parts are being overgrown with scrub. Some sections along the railway were also developing rank grassland dominated by cocksfoot and false oat-grass.

A relatively large part of the bog containing remnant high bog (PB1), birch woodland (WN7) and some scrub along the western margin was gifted to the IPCC by BnM in 2005. The other margins of the production bog contain

typical marginal peatland habitats. There is a mosaic of birch woodland (WN7), active cutover bog (used by private sod peat cutters) and some remnant bog along the southern margin.

The large trench drains that run north-south through the site are important wildlife corridors for a variety of flora and fauna in the area, see Plate 3.3. The drainage network discharges to the Slate River that occurs outside the southeast of the site. These habitats are ecologically important in a local context and support a wide variety of specie. Saw sedge (*Cladium mariscus*) was identified within one of the silt ponds within the east of the site. This species is indicative of alkaline water chemistry, likely associated with the exposed shell marl within the centre of the site and the depth of some of the trench drains that form the drainage network.

There are small high bog remnants and cutover bog around the margins, see Plate 3.4. In addition, two parcels of high remnants have also been used for sod-peat production, see Plate 3.5. These areas consist of dry heath type vegetation. Some areas of the scrub and birch woodland also occur within the marginal lands.

Basil thyme was noted at a number of locations along the railway track that divides the site and at the southern end of the site, see Plate 3.6. This species is listed on the Flora Protection Order. Basil thyme would not be a typical species of cutaway bog. The exposed gravel along the railway embankments is a perfect habitat for this species.

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

A habitat map of Lodge Bog is shown in Drawing reference no. BnM DR23_21_17 '*Current habitat map' in the Map book*, Appendix XIII of this report. Plate 6.7 provides an example of developing pioneering cutaway vegetation on former cutaway production bog.



Plate 3.1 Example of cutaway bare peat occurring within the east of the site. This section contains large areas of deep peat.



Plate 3.2 Example of developing pioneering cutaway vegetation on former cutaway production bog.



Plate 3.3 Example of large trench drains that run north-south through the site.



Plate 3.4 Example of remnant sections of raised bog occurring within the south and east of the site. Not old drainage network (right of photo).



Plate 3.5 Example of cutover bog associated with sod peat production. The vegetation comprises of a dry heath type vegetation community, with Sphagnum papillosum and Sphagnum magellanicum occurring in places.



Plat3 3.6 Example of Basil thyme occurring along the old railway track on site.



Plate 3.7 *Example of developing pioneering cutaway vegetation on former cutaway production bog (Drone photography September 2021).*

3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Lodge Bog. The following is a summary of the records of these species available within BnM records.

Multiple mammal species have been recorded at Lodge Bog. Evidence of badger (*Meles meles*), fox (*Vulpes Vulpes*), pine marten (*Martes martes*), hare (*Lepus timidus hibernicus*) and common frog (*Rana temporaria*) were observed on site during BnM walkover surveys.

Curlew (*Numenius arquata*) are known to breed to the northwest of Lodge bog. In addition, lapwing (*Vanellus vanellus)* has also been recorded within the northwest of the site. Both of these species are red listed under the Birds of Conservation Concern in Britain and Ireland (BoCCI), with Curlew facing significant declines in recent decades. The previous rehabilitation undertaken within the west of Lodge bog has provided additional supporting habitat for these species in the area and the species has been recorded using these new wetlands.

The site is used by small numbers of golden plover (*Pluvialis apricaria*) in the winter (Biosphere Environmental Services 2014). Snipe (*Gallinago gallinago*) have been recorded during the breeding season on site. Kestrel (*Falco tinnunculus*) and buzzard (*Buteo buteo*) have also been recorded during recent walkover surveys of the site and suitable habitat exists at the margins. Other more common species recorded within the site include; willow warbler (*Phylloscopus trochilus*), mallard (*Anas platyrhynchos*), wood pigeon (*Columba palumbus*), swallow (*Hirundo rustica*), long-tailed tit (*Aegithalus caudatus*), green finch (*Carduelis chloris*), hooded crow (*Corvus cornix*), chiffchaff (*Phylloscopus collybita*), skylark (*Alauda arvensis*), jay (*Garrulus glandarius*), blue tit (*Cyanistes caeruleus*) and grey heron (*Ardea cinerea*).

Lepidopteran (butterfly) and Odonata (dragonflies and damselflies) species recorded on site included; marsh fritillary butterfly, ringlet (*Aphantopus hyperantus*), green-veined white (*Pieris napi*), meadow brown butterfly (*Maniola jurtina*), large white butterfly (*Pieris brassicae*), small heath (*Coenonympha pamphilus*), small tortoiseshell (*Aglais urticae*), blue tailed damselfly (*Ischnura elegans*), common darter (*Sympetrum striolatum*) and four-spotted chaser (*Libellula quadrimaculata*). Six-spotted burnet moth (*Zygaena filipendulae*) noted on bog along the central access. Buff-tailed bumblebee (*Bombus terrestris*) has also been recorded. During a BnM walkover surveys in August 2021, a marsh fritillary butterfly larval web was recorded in suitable habitat to the west of the site, indicating the presence of a population within the site. Additional areas of suitable habitat occur at other locations at the site margins and along site access tracks.

3.3.3 Invasive Alien Species

No non-native invasive species, listed on the Third Schedule of the EC Birds and Natural Habitats Regulations, have been recorded within the site during Bord na Mona site.

3.4 Statutory Nature Conservation Designations

Lodge bog is not located within or adjacent to any EU Designated sites i.e. Special Areas of Conservation (SAC) or Special Protection Area (SPA). The nearest EU Designated sites in the wider area include the Long Derries - Edenderry SAC (over 5.5km to the northwest), Ballynafeagh Lake SAC (over 6km to the east of the site), Ballynafeagh Bog SAC (over 7.6km to the east of the site), Mouds Bog SAC (over 5.8km to the southeast of the site), Pollardstown bog SAC (over 7.6km to the southeast of the site) and the River Barrow and River Nore SAC (over 15.3km to the southwest of the site). The nearest SPAs to the site are located a significant distance from Lodge Bog (over 19km from the site); these include the River Boyne and River Blackwater SPA, the Slieve Bloom Mountains SPA, Poulapouca Reservoir SPA and the Wicklow Mountains SPA.

This rehabilitation plan will be subject to the Appropriate Assessment process, as per Article 6 of the EU Habitats Directive 92/43/EEC.

There are no Natural Heritage Areas (NHAs) in close proximity to Lodge bog. The nearest NHA is Hodgerstown Bog NHA, located in excess of 7.5km to the east of the site. The nearest non-statutory designated sites i.e. proposed Natural Heritage Areas (pNHAs) in the wider area around Lodge bog is the Grand Canal, located over 500 metres to the south and north of the site.

3.5 Hydrology and Hydrogeology

Lodge forms part of the Barrow Catchment (Catchment ID : 14) as defined by the EPA under the Water Framework Directive (WFD) and is primarily situated within the Figile_SC_010 sub-catchment, with a small portion of the bog falling within the Slate_SC_010 sub-catchment. The bog is located west of Allenwood and to the east of Lullymore. The bog contains several drainage pathways and discharge locations, with the majority of the bog discharging to the Slate River to the South-east and east of the bog.

Regional hydrological data suggest that Lodge receives average precipitation of 826mm/yr (1981-2010), with an estimated evapotranspiration rate of c. 524mm/yr. A , leaving an average effective precipitation of 302mm/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 302mm/yr, which equates to an annual runoff rate of c. 3,020m3/ha.

Lodge Bog is partially pumped, with the pump located along the eastern boundary. It is proposed to turn off the pump and implement an altered gravity drainage design (see the accompanying Lodge Engineering Report and Drawing no. BnM_DR23_21_02 '*Structures and sampling*'). There are a series of deep trench drains through the bog at regular intervals that form part of the main drainage system. The bog has field drains running in a general north to south orientation. Pipes collect water and direct discharge towards silt ponds and discharge points. There are two main drainage catchments located within the bog, separated by the central east-west railway line and travel path. A number of silt ponds occur in close proximity to the eastern boundary of the site. Lodge bog is drained by the Slate River, located adjacent to the south of the site boundary. The Slate River is a tributary of the Figile River, which is in turn a tributary of the River Barrow.

GSI data indicates that Lodge Bog is underlain by the Boston Hill Formation and Waulsortian Limestones, both of which are classified as a locally important aquifers as they are moderately productive only in local zones. There are no mapped karst features in the surrounding landscape according to Geological Survey of Ireland (GSI) mapping. No data exists concerning depth to bedrock, and there are no mapped areas of exposed bedrock in the immediate vicinity of the bog.

The main subsoil types in the surrounding area includes till derived from limestone which occurs to the north, north-west and south of the bog, while alluvium is mapped along the south-eastern and eastern boundary along the Slate River. Groundwater vulnerability for Lodge Bog is typically low level whilst the surrounding areas generally ranges between low to moderate and moderate to high in sections. 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 a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes.

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

data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

3.6 Emissions to surface-water and water-courses

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

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As required under licence, BNM have a number of procedures for how it manages and maintains its silt pond network. The silt that builds up in silt ponds is excavated on a regular basis by Bord na Móna to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during the rehabilitation and decommissioning period. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed. There are silt ponds at several locations within Lodge Bog. The silt ponds discharges into the Slate stream, a tributary of the River Figile, which in turn discharges to the River Barrow. Lodge bog is therefore located in the within the Barrow Catchment.

Lodge bog has two treated surface water outlets to the Slate River IE_SE_14S010100 SLATE_050. The Slate river is at Risk regarding its water quality classification, was indicated as being under pressure from peat and peat extraction and is indicated as remaining so 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-23-21-02 titled “Structures and Sampling”, along with Drawing number BNM-DR-23-21-WQ01 titled “Water Quality Map” included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Lodge.

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 3.0mg/l and COD 100mg/l.

Initial monthly results are included in Appendix XIII. These results are for 13 months from November 2020 to Dec 2021 and indicate the baseline water quality from a minimum of 70% of the bogs catchment. This was the first full summer season without any peat extraction and as expected, some of the key water quality parameters that can impact water quality from peat extraction activities (such as suspended solids) remained relatively static. These also show a downward trajectory in the latter half of the year. During this period, ammonia also indicating a consistent profile, with various trends evident from the two silt ponds, which service similar peat topography from either half of Lodge bog catchment. Lodge bog was a source of both milled fuel and horticultural peat prior

to peat extraction ceasing, and as such, ammonia levels will be indicative of the mixed peat types present. All other parameters fluctuated slightly, most likely influenced by normal weather patterns, especially rainfall.

Monthly ammonia concentrations from November 2020 to December 2021 had a range of 0.027 to 0.664 mg/l with an average of 0.342 mg/l.

Results for suspended solids for the same period indicate a range of 2 to 13mg/l with an average of 4.25 mg/l.

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

Table 3.1 Surface water monitoring results for Lodge.

Bog	SW	Monitoring	Sample Date	pH	SS	TS	Ammonia	TP	COD	Colour
Lodge	SW-60	Q3 20	11/08/2020	7.6	11	270	0.208	0.19	95	360
Lodge	SW-61	Q3 20	11/08/2020	7.7	3	276	0.356	0.05	76	294
Lodge	SW-60	Q1 19	20/02/2019	8	5	264	0.02	0.05	43	91
Lodge	SW-61	Q1 19	20/02/2019	7.8	5	314	0.94	0.05	52	195
Lodge	SW-60	Q3 17	31/08/2017	8.1	8	270	0.19	0.05	58	168
Lodge	SW-61	Q3 17	31/08/2017	8.1	6	238	0.2	0.05	63	202
Lodge	SW-60	Q3 16	12/08/2016	8.1	8	364	0.66	0.05	71	49
Lodge	SW-61	Q3 16	12/08/2016	8.2	5	368	0.65	0.05	64	18

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 September 2021 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. Re-wetted peat also aid the primary objective of stabilizing peat, as when peat is re-wetted it minimises risk to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

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

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

3.7 Fugitive Emissions to air

None

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

3.8 Carbon emissions

The bog is likely to be a carbon source as it is a drained (degraded) peatland with currently active drainage, which facilitates the oxidation of peat. Peat extraction generally transforms a natural raised bog which acts as a modest

carbon sink into a cutaway ecosystem which is a large source of carbon dioxide (2–5 t C/ha/year) (Waddington & McNeil, 2002; Alm *et al*., 2007; Wilson *et al*., 2007, Wilson *et al*., 2015). Furthermore, they are also a significant source of methane (Huttunen *et al*., 2003; Laine *et al*., 2007a) as a consequence of the conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Degraded peatlands also release carbon/GHG emissions via the fluvial/aquatic pathway (Dissolved Organic Carbon – DOC, Suspended Solids/Particulate Matter, degassing of GHGs from water).

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

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

4. CONSULTATION

4.1 Consultation to date

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

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

- IPCC Lodge Bog Nature Reserve and management plan (IPCC).
- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Lodge Bog re-wetting trial (2016-2021) (IPCC and Birdwatch Ireland Kildare). Annual walks of the site with IPCC.
- Lodge Bog *Sphagnum* inoculation trial (2018-2021) (Site visit with NPWS, Community Wetlands Forum, UCD in 2021).
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Lodge 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 were sought and informed of the opportunity to engage with this rehabilitation plan, and when identified were invited to submit their comments or observations in relation to the proposed rehabilitation at Lodge Bog (see Appendix XI).

Phone correspondence was undertaken as either follow up to submissions received, or to instigate consultation. All correspondence received has been acknowledged and evaluated against the rehabilitation work proposed here; these are also summarised in Appendix XI.

Further to the above, as a means of further notification for those based near to any proposed PCAS activities, a leaflet detailing PCAS plans for Lodge Bog, contact details and the PCAS website address was delivered to each house within a 1 Km radius of the bog.

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 Lodge Bog – these are summarised below.

4.2.1 Assessments of rehabilitation

To date a number of consultees including: the IFA, the Irish Creamery Milk Suppliers Association (ICMSA), Irish Peatlands Conservation Council (IPCC) 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.

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.

4.2.2 Restoration/rehabilitation 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.

The IPCC suggested that the PCAS project should be focused on the entire Ballydermot Bog Group, not just Lodge Bog.

4.2.3 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. Councillor Brendan Wyse also highlighted downstream water quality issues.

4.2.4 Flooding and drainage

The IFA, The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehab plans in 2021 and the finalisation for this Lodge Rehabilitation Plan arising from the proposed re-wetting associated with the rehabilitation in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. The IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

4.2.5 Future management

The IFA 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.

Councillor Brendan Wyse suggested that BnM work closely with Birdwatch Ireland Kildare Branch, the Irish Peatland Conservation Council and the National Parks and Wildlife Service to further assist with efforts for nature conservation in Lodge Bog.

4.2.6. Inland Fisheries Ireland

Inland Fisheries Ireland welcomed measures that would improve water quality of downstream rivers. They also requested that Bord na Móna consider restoration of parts of the Slate River channel (outside the site) to support recovery of fisheries habitat and fish populations as part of the rehabilitation plan.

4.2.7. 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.

The Irish Peatland Conservation Council also raised one particular issue during a site visit in November 2021 around previous rehabilitation measures carried out adjacent to IPCC Lodge Bog Nature Reserve. Previous measures had been carried out by BnM to restrict access to the BnM Lodge Bog wetland, and a blind drain (not linked to drainage network) had been created to restrict access and trespass. However, the IPCC asked if some remedial work could be done due to the view that this blind drain could be impacting on the adjacent IPCC Lodge Bog remnant.

Loraine Benson requested that consideration be given to reducing impact to a number of additional breeding species of birds (Curlew, Lapwing, Ringed Plover, Skylark and Snipe) during the breeding season.

Councillor Brendan Wyse requested that sod moss stock and any remaining sod moss be placed back into the extracted trenches.

The IPCC queries the potential impact of the proposed renewable energy development on the proposed rehabilitation at Lodge.

The IPCC queries about potential climate resilience of the proposed rehabilitation at Lodge Bog.

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

4.3 Bord na Móna response to issues raised during consultation

4.3.1. Consultation

BnM are carrying out ongoing consultation has part of the process of developing the rehabilitation plan for Lodge Bog. This is ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties. A website[3] 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

Appropriate Assessment screening will be undertaken on all the bogs as part of PCAS and this is currently being undertaken by external consultants for Lodge Bog. Where required, Natura Impact Statements shall be completed

[3] https://www.bnmpcas.ie/

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 Bord na Móna are taking steps to identify and avoid all known archaeology. 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.

Bord na Móna select bogs as part of the PCAS programme on a year by year basis. Other bogs in the Ballydermot Group will be considered for PCAS in 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 is proposed as part of the monitoring and verification at Lodge 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 Lodge 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 Lodge 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 Amenity

Creating amenity such as walking tracks is not part of the direct scope of PCAS. There is no current amenity planned for Lodge by BnM. However, PCAS will enable and support any future amenity development. There may be further opportunities to develop amenity at this site in association with further planned development. Any future amenity can be positively aligned and integrated to after-use plans following the completion of the proposed rehabilitation at Lodge Bog. Rehabilitation measures proposed for Lodge Bog do not need to be amended to integrate any future amenity projects positioned along the margin of the former production bog or along the former bog railways.

4.3.7 Water quality

It is the expectation of BnM that rehabilitation measures should positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The robust water monitoring programme implemented as part of PCAS will be used to assess water quality leaving rehabilitated sites at designated points.

4.3.8 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. Bord na Móna are happy to continue to work with local stakeholders in relation to nature conservation of IPCC Lodge Bog.

4.3.9. Inland Fisheries Ireland

There is a significantly increase monitoring and verification programmes supporting the measurement and verification of the expected success criteria of the rehabilitation plan, including water quality. This increased the water quality monitoring from quarterly on a selected number of silt ponds, to monthly at significant number of additional silt ponds that aim to establish the water quality impact from a minimum of 70% of the peatland catchment. Bord na Mona got approval to implement this monthly monitoring programme over the life of the scheme and this includes some additional parameters to enable assessment of the aquatic carbon fluxes, as well as the range of parameters such as pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour & COD. Biological monitoring of associated water courses is outside the scope of the PCAS scheme. Bord na Mona have also obtained datasets of all EPA monitoring as required to support the RBMP

objectives under LAWPRO and expect that both chemical and biological monitoring at these sites, will assisting in verifying any improvements in water quality, including any biological benefits.

The scope of the PCAS scheme (https://www.gov.ie/en/publication/136a7-bord-na-mona-bog-rehabilitation-scheme/) has restricted qualifying rehabilitation to the peatlands in question and as such any restoration of rivers/steams is outside the scope of the scheme. The PCAS scheme scope only includes the preparation of the necessary assessments, plans, reports and consent applications, the decommissioning and enhanced rehabilitation of the associated peatlands and any necessary measurement and verification.

4.3.9 Other issues

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

Curlew (*Numenius arquata*) and Lapwing (*Vanellus vanellus)* are both known to breed to the northwest of Lodge bog. Both of these species are red listed under the Birds of Conservation Concern in Britain and Ireland (BoCCI[4]). Ecological restriction zones will be implemented where required during the implementation phase of the plan for the protection of such sensitive ecological receptors. Such restriction zones will be informed by ecological surveys and monitoring.

The environmental impact of the proposed Ballydermot Windfarm will be assessed separately as part of that project. The proposed renewable energy project does not come into the scope of PCAS and a footprint identified for this project has been constrained out of the rehabilitation plans.

Bord na Móna have considered future potential climate change as part of deigning peatlands rehabilitation measures. Currently it is modelled that the eastern part of the country will become drier with more intermittent rain-fall. These conditions are likely to challenge the resilience of further peatland condition. One of the key ways of mitigating these potential impacts is via hydrological management. Priority should be given in the short-term to rehabilitating these peatlands and developing naturally functioning ecosystems with wet conditions that will help provide resilience. This is he key objective of PCAS.

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.

- Some parts of Lodge bog include large areas of bare peat following the cessation of peat production, while some areas that were out of peat production earlier have begun to develop a mosaic of pioneering habitats already. This will not be radically changed.
- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.
- Issues raised by several consultees in relation to potential impacts on adjacent land had already been accounted for during the hydrological analysis and assessment, and corresponding adaptations to incorporate Drainage Management Plan mitigation measures.

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

- 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 potential amenity.

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving water-bodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**. Optimising hydrology for the development of embryonic *Sphagnum*-rich vegetation communities on deep peat, and eventually naturally functioning and peatland habitats.
- Optimising hydrological conditions for the development of reed swamp and fen on shallow more alkaline peat and other subsoils.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, where possible.
- Integrating peatland rehabilitation with planned renewable energy infrastructure on site.
- 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 Lodge Bog. This will happen over a longer time-frame than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (see Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- Some rehabilitation has already been carried out in recent years within the west of Lodge bog. However, some additional works are proposed to further optimise the hydrological conditions within this area.
- 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). However, extensive areas of deep *Sphagnum* peat do remain within the southern and most northern parcels of the bog and do have potential to develop *Sphagnum*-rich habitats in this timeframe. Areas within the centre of the site have been largely cutaway with shallow peat. In addition, areas of shell marl and fen peat remain in this area and as such, will develop fen and reedbed type habitats in the future. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog, making the overall bog wetter. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and Bord na Móna).
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.
- Bord na Móna have also carried out peatland rehabilitation on other bogs in the catchment including Ummeras bog, located close to Monesterevin, in 2021. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the associated tributaries and downstream to the River Barrow, from rehabilitation more than one bog in the same catchment.

6. SCOPE OF REHABILITATION

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

- The area of Lodge Bog (Drawing reference no. DR23_21_01 '*Bog site location', Appendix XIII of this report*).
- EPA IPC Licence - Ref. PO-503-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the cutaway boglands within the licensed area. Lodge bog is part of the Allen-Lullymore 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 Lodge Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilisation is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Lodge Bog identify cutaway re-wetting as the most suitable rehabilitation approach for the shallow peat areas within the site. In some central parts of the site, where shallow peat depths remain, there is an alkaline influence on the water chemistry. This means that re-wetting will lead to the development of fen, reed swamp and other associated wetland/peatland habitats.
- Some of the western part of Lodge bog has already largely vegetated and stabilised as a result of previous rehabilitation works. A mosaic of wetlands, fen habitats and establishing Birch woodland now support local wildfowl and waders occurring. The wetland areas within the west of the site is now considered rehabilitated. The aerial photo demonstrates the contrast between the rewetted area within the west and those areas that remain drier. Additional measures are needed to optimise the hydrological regime across the site in order to maximise the areas extent of areas that can be rewet.
- Proposed land-use. Bord na Móna are currently developing a renewable energy project called Ballydermot Windfarm. This proposed project is in the pre-planning stage. The proposed renewable energy project is expected to have a small footprint on Lodge Bog. It is planned to integrate rehabilitation with future proposed development.
- Rehabilitation of Lodge Bog will support multiple National strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- Some rehabilitation measures are proposed on the marginal cutover bog zone at the peripheries of the bog. It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones.

6.1 Key constraints

Bog conditions. Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some bogs where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other bogs, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status), and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and birch woodland).

- At Lodge Bog, much of the bog has been cutaway, particularly the central and northern sections. There are local factors that will influence the future trajectory of this site (the site has been partially pumped to manage water levels within the east of the site) which need to be considered as part of the wider rehabilitation work.
- **Current/future land-use.** Planned renewable energy development. It is expected that parts of the site will be part of the proposed Ballydermot Windfarm. This project is currently in pre-planning and layout design is advanced. No turbines are planned for Lodge Bog. Infrastructure will include supporting access, cables and an electrical sub-station and works to the existing overhead transmission line. Any proposed rehabilitation measures (i.e. targeted drain-blocking) will be integrated to enable the planned renewable energy development. The potential impact of this infrastructure on the rehabilitated area is expected to be relatively minor and it does not change the overall goals and outcomes of the proposed rehabilitation (re-wetting residual peat) for the overall site. See Lodge Bog: Mapbook, which outlines the proposed cutaway footprint to be rehabilitated with PCAS enhanced rehabilitation measures (drawing number BNM-DR-23-21-05):
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care must be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land. For example, agricultural grassland occurs outside of, but adjacent to, the eastern corner of Lodge bog.
- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted. An archaeological impact assessment of the proposed rehabilitation at Lodge Bog has been carried out (see Appendix XII). There is some known archaeology at this site.
- **Public Rights of Way**. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land-uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term raised bog restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation during the Scheme and to respond to any needs (failure of environmental stabilisation for

example). It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards environmental stabilisation and wetland creation. The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site in the long-term. This is beyond the scope of this rehabilitation plan.

- This plan is not intended to be an after-use or future land-use plan for Lodge Bog.
- The longer-term management of this site for other uses in the future. This will require further engagement with stakeholders.
- Bord na Móna are currently planning to build a windfarm on cutaway bog in the Ballydermot area. This project is known as Ballydermot Windfarm. Lodge Bog is expected to be part of this project. Rehabilitation will be integrated with this proposed renewable energy project. Where the proposed infrastructure is situated within Lodge bog, this area has been constrained from this rehabilitation plan.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as

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

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 run off of suspended solids and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. Table 7.1 provides a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- 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. This will be measured by the EPA Water Framework Directive monitoring programme.

With regard to predicting and estimating likely trends that might materialise or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 yrs., post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations, see Plate 7.1.

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over 3 yrs. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends, see Plate 7.2.

As the monthly monitoring program at Lodge continues in 2022 during the rehabilitation works, and data from the 2021 monitoring program is compiled, further trending will be produced to verify any ongoing trends.

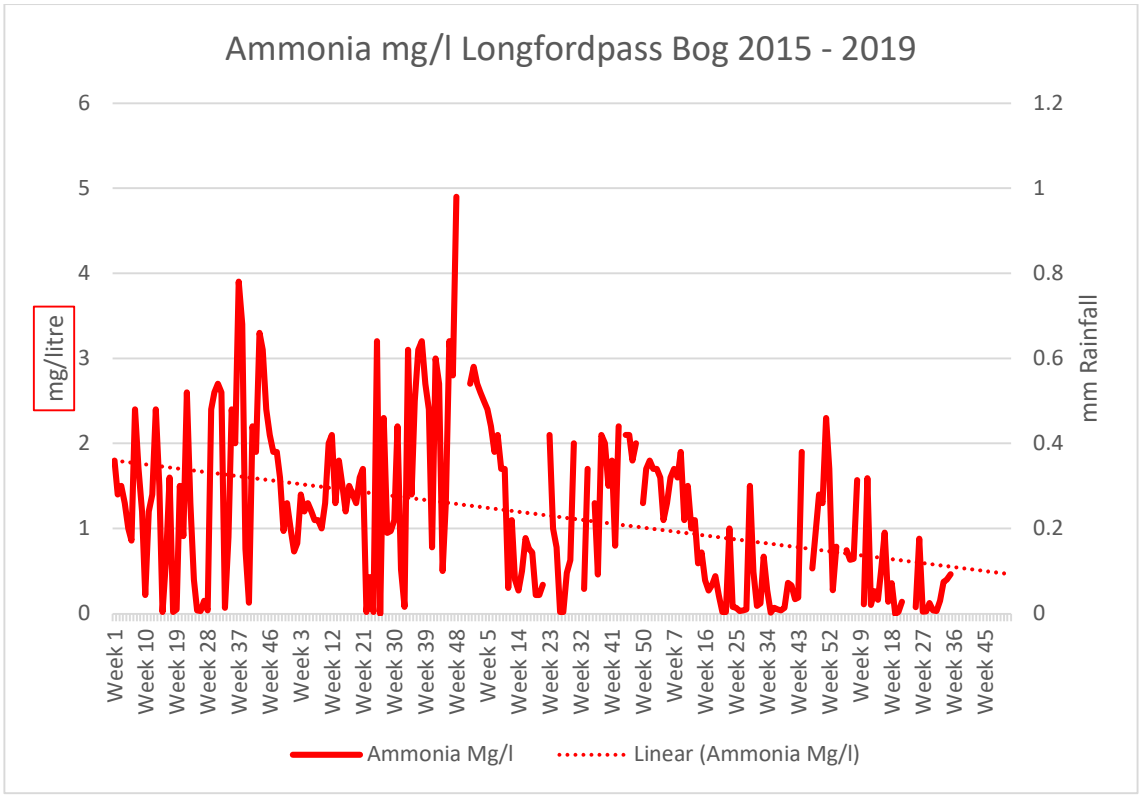


Plate 7.1 Example of decreasing ammonia emissions at Longfordpass bog following cessation of peat extraction and commencement of rehabilitation.

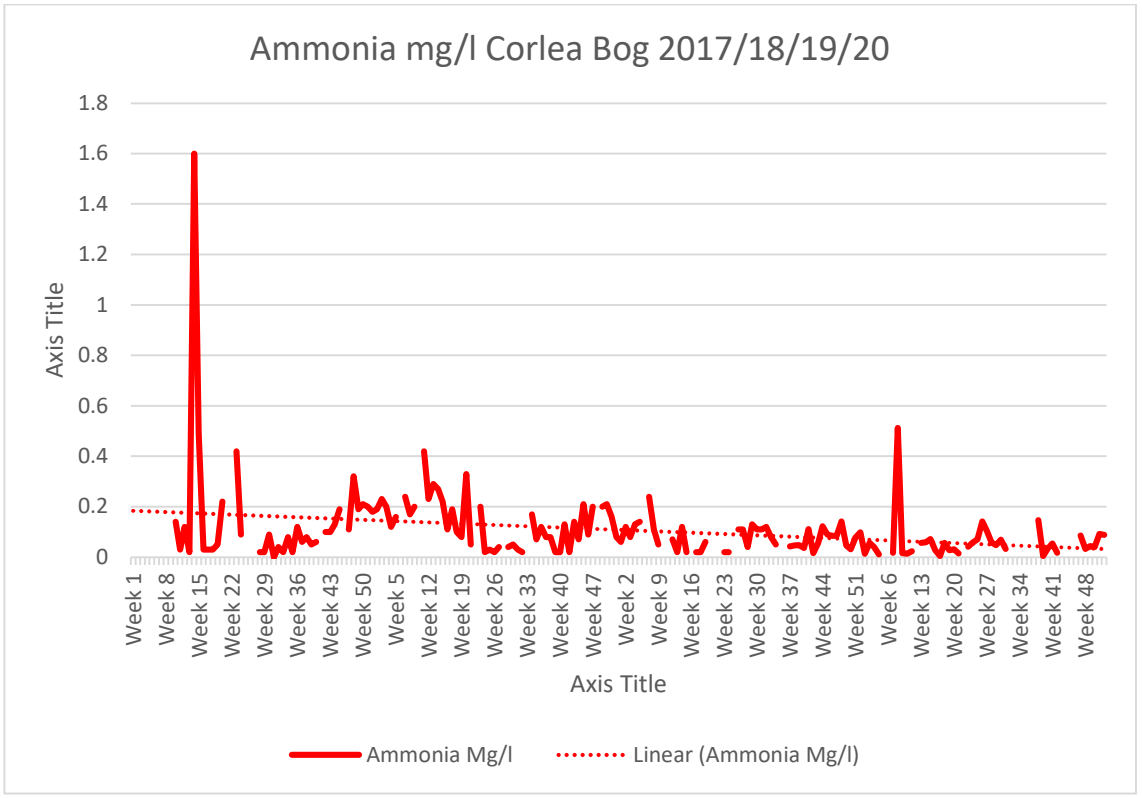


Plate 7.2 Example of decreasing ammonia emissions at Corlea bog following cessation of peat extraction and commencement of rehabilitation.

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

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

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

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

Criteria type	Criteria	Target	Measured by	Expected Time-frame
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2022-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment Presence of key species – Sphagnum	Improvement in biodiversity and ecosystem services.	Metrics that relate to selected biodiversity and ecosystem services (to be defined). Presence of key species – Sphagnum – Walkover survey Baseline monitoring to be carried out during the Scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2022-2025

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

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

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

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

8. Rehabilitation Actions and Time Frame

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with remaining peat depths, topographical and hydrological modelling (depression analysis) will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Depression analysis 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-23-21-22 titled **Lodge Bog: Aerial Imagery2020**

BNM-DR-23-21-04 titled **Lodge Bog: Peat Depths**

BNM-DR-23-21_03 titled **Lodge Bog: LiDAR Map**

BNM-DR-23-21_09 titled **Lodge Bog: Depression Analysis**

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled **BNM-DR-23-21-05 "Rehabilitation Measures"** in the accompanying Map book. (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 measures for Lodge Bog will include**:**

- Assessment of the pumping regime and removal of the pump on site, if this has no significant external impact. Initial hydrological modelling indicates that parts of the centre and west of the site will develop a mosaic of open water and wetland habitats with permanent deeper water. A gravity drainage solution is being proposed. 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 at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels in the adjacent watercourses and associated groundwater conditions.
- Initial hydrological modelling (depression analysis) indicates that a significant part of the centre of Lodge bog has the potential to retain wet conditions. It is anticipated that this will develop a mosaic of wetland and peatland habitats. Hydrological management will look to optimise summer water levels to maximise the extent and development of wetland vegetation.
- Re-wetting the extensive areas of peat remaining on site within the former production area using berms and drain blocking.
- Undertaking intensive drain blocking, modifying outfalls and managing overflows in areas where depression analysis predicts wet conditions will occur. Drain blocking will also occur across other areas in order to retain surface water locally.

- Modifying water levels at outfalls, as it may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated. This will further slow the movement of water through and out of Lodge bog.
- The creation of berms across some sections of the bog to control/retain water levels. This measure seeks to retain shallow (< 10 cm) water conditions across multiple fields.
- Re-wetting some deep peat areas of the bog through regular more intensive drain blocking using an excavator to create peat dams/blockages along each field drain, along with field re-profiling and drain infilling if required;
- Re-wetting the deep peat areas of the bog using berms, drain blocking and field re-profiling. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (< 10 cm) water conditions on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water;
- Seeding of vegetation and inoculation of *Sphagnum* will be undertaken where required. In some areas where vegetation has already established, seeding of vegetation is not required.
- Some targeted drain blocking in marginal (degraded) remnant raised high bog areas is proposed as part of this plan, although they are small in size and degraded nature.
- Targeted drain blocking in an area within the south of the site formerly used for sod moss production.
- 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 run-off of suspended solids, 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).
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields as required, see Drawing no. DR_23_21_28 '*Targeted fertiliser map*'.
- Peat field re-profiling to reduce the camber of the fields and cell-bunding between high fields to manage/optimise water levels for revegetation.

Table 8.1: Types of and areas for enhanced rehabilitation measures at Lodge 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)
Additional Land	AW2	Minimal/targeted works required	26.24
Archaeological constraint		Known archaeology	0.11
Constraints		Ballydermot windfarm constraint	41.57
Dry Cutaway	DCT2	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows	55.66
Deep Peat	DPT2	More intensive drain blocking (7/100 m) + blocking outfalls and managing overflows with a controlled weir outfall	6.68
Deep Peat	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + Sphagnum inoculation	90.24
Marginal land	MLT1	No work required	29.29
Marginal land	MLT2	More intensive drain blocking (max 7/100 m)	6.11
Silt Ponds	Silt Ponds	No work required	1.59
Wetland	WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site	60.63
Wetland	WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	90.2
Grand Total			**408.3**

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

- Seek formal approval of the enhanced plan, noting the alternative adapted standard plan should funding from the Scheme not materialise, from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.
- A detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Lodge Bog has been developed. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies).
- A hydrology and drainage management assessment of the proposed enhanced rehabilitation measures has been carried out;
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation has been completed. The results of this appraisal has been incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible;

- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements has been carried out. There are no known rights of way at Lodge bog.
- A review of remaining peat stocks has been carried out. Some sod moss peat stock is still present at Lodge Bog. It is expected that all peat stocks will eventually be removed or decommissioned.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, such as the presence of sensitive ground-nesting bird breeding species (e.g. curlew, or lapwing) or marsh fritillary butterfly larval webs, etc. The scheduling of rehabilitation operations will be adapted, if needed. Surveys will be scoped and carried out based on the baseline ecological survey and previous knowledge of sites.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- An Appropriate Assessment of the Rehabilitation Plan has been carried out. (Note that the rehabilitation plan for Lodge screened out at the Stage I.)
- See Lodge Decommissioning and Rehabilitation Plan – Addendum 1 for more details.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) (where required), and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of hydrological management, drain blocking, peat field re-profiling and cell-bunding. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in Section 9 of this report and accompanying documents.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions will include fertiliser application on high fields and headlands (where there is bare peat).
- Silt-ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent run-off of suspended solids from the site during the rehabilitation phase.
- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the Scheme

8.3 Long-term (>3 years)

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

8.4 Timeframe

- 2021-2022. Short-term planning actions.
- 2022. Short-term practical actions.
- 2022-2025. 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, via the Climate Action Fund and Ireland's National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*

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

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna 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 deep peat habitats, wetland habitats, shallow cutaway areas, drier areas, and regenerating bog communities across the bog (See Appendix I).

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually (two per year). This will further reduce to a single visit each year after 5 years.
- These monitoring visits will consider any further requirements for practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated.
- **Water quality monitoring** at the bog will be established. This will start in advance of the proposed rehabilitation. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years. post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- Water quality monitoring will aim to include up to 70% of a bog's 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, DOC and COD.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a three-year cycle. The original (licence) requirement was for a quarterly sampling regime but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key targets for successful rehabilitation are being achieved, then the water quality monitoring programme will be reviewed, with consideration of potential ongoing scientific research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key targets for successful rehabilitation have **not** been achieved, then the rehabilitation measures and status of the site will be evaluated and enhanced, where needed. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures, but may demonstrate that more time is required before key targets for successful rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

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

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

- Vegetation and habitat monitoring after rehabilitation is completed using a cutaway bog condition assessment (Similar to ecotope mapping). This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, Sphagnum cover, bare peat cover and water levels. 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.
- It is proposed to monitor the improvement of some biodiversity ecosystem services. A breeding bird and Pollinator monitoring programme will be established. Specific pollinator indicators will be monitored (i.e. bees and butterflies). To be defined in relation to monitoring of the overall Scheme and after consultation with stakeholders.

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

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

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

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

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

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

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

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

Scope of rehabilitation

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

- EPA IPC Licence - Ref. P0503. 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. Lodge bog is part of the Allen-Lullymore bog group (Ref. 503).
- A key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- The area of former industrial peat production at Lodge Bog as defined by Drawing no. BnM_DR23_21_01 '*Bog Site Location*', in the accompanying map book. Industrial peat production has now permanently ceased at Lodge Bog.
- Minimising potential impacts on neighbouring land. Some boundary drains around Lodge Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use: Bord na Móna are currently planning to build a windfarm on cutaway bog in the Ballydermot area. This project is known as Ballydermot Windfarm. Lodge Bog is expected to be part of this project. Rehabilitation will be integrated with this proposed renewable energy project. Where the proposed infrastructure is situated within Lodge bog, this area has been constrained from this rehabilitation plan.

Rehabilitation goals and outcomes

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

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

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

Criteria for successful rehabilitation:

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.
- That there is a 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).
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

Rehabilitation targets

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

Rehabilitation measures: (see Figure Ap-1)

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

Timeframe:

- 2022. 1st phase of rehabilitation. Field drain blocking with dozer/excavator.
- 2023. 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.

- 2024-2025. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2024-2025. Decommission silt-ponds, if necessary.

Budget and Costing

- Bord na Móna maintains a Provision on its balance sheet to pay for the future costs of rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna, 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 has been allocated to the site based on the area of different cutaway types across the bog.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Additional Land	AW1	Minimal/targeted works required	26.24
Dry Cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	55.66
Deep Peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	96.92
Marginal land	MLT1	No work required	35.4
Other	Silt ponds	Silt ponds	1.59
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	150.83
Constraint			41.68
Grand Total			408.3

Monitoring, after-care and maintenance

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

- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

Validation and IPC Licence surrender

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

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

APPENDIX II: BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen -Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow Catchment and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by Bord na Móna for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied at old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly) via the Bord na Móna industrial railway. Many bogs have now been in industrial peat production for a number of decades.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by Bord na Móna. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Bord na Móna also maintains transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The Long Derries SAC is located south of Ticknevin Bog. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by Bord na Móna. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

Much of the Allen -Lullymore Bog complex became cutaway as long term peat extraction activity reduced the peat reserves on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen -Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production, and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across Bord na Móna cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Killinagh in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Killinagh by Bord na Móna.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 & 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow piped outfall. Some cutaway at Lullymore used as a spread-ground for sod peat up until recently was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Bord na Móna have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and Bord na Móna assisted with its rehabilitation. Bord na Móna are also working with Butterfly conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries SAC is located south of Ticknevin Bog. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by Bord na Móna. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation is expected to start in 2021. There is still some historical energy peat stock remaining on some bogs and these peat stock will be transferred via the BnM rail network to Edenderry Power Station up to 2024 when the power station is expected to have ceased using peat

Bord na Móna is currently developing a wind energy project called Ballydermot Windfarm. This proposed project is in the pre-planning stage. It is expected to be submitted to planning in 2021. This proposed project is expected to have a footprint on the majority of bogs in Allen – Lullymore. Bord na Móna is currently developing a project with ESB to develop solar energy at Timahoe North bog. Part of Timahoe South Bog has been re-developed as a waste disposal and composting facility (Drehid).

A breakdown of the component bog areas for the Allen - Lullymore Bog Group IPC License Ref. P0503-01, and current, indicative Peat Production Status, is outlined in Table Ap-2.

Table Ap-2a: Allen - Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1940s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2017
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Parts used for turf production in recent years. Some areas of cutaway are developing pioneer cutaway vegetation communities.	2020	Draft 2017

			Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.		
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Parts used for turf production in recent years. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2017
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Majority of the site is bare peat. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning. .	2020	Draft 2017
Derrybrennan	224	Peat extraction since 1940s Peat extraction ceased in 2020 Majority completely cutaway	Derrybrennan formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2017
Glashabaun North	493	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning. .	2020	Draft 2017
Glashabaun South	569	Peat extraction since 1940s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Parts used for turf production in recent years. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning. .	2020	Draft 2017
Killinagh	245	Peat extraction since 1940s Part cutaway since 1990s. Ceased milled peat extraction in 2000s Peat extraction complexly ceased in 2020 Majority completely cutaway Parts still have deep peat	Killinagh formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Parts used for turf production in recent years. Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial.	2020	Draft 2017
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss Sphagnum inoculation trial. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning. .	2020	To be updated 2021
Lullybeg	271	Peat extraction since before 1975	Lullybeg formerly supplied turf for fuel and energy and latterly milled peat for electricity	2020	Draft 2017

		Part cutaway since 1990s. Ceased milled peat extraction in 2015 Mosaic of peat depths, part cutaway	production. Parts used for turf production in recent years. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning. .		
Lullymore	184	Peat extraction since 1940s Part cutaway since 1980s. Ceased milled peat extraction in 2000s. Peat extraction completely ceased in 2015 (turf) Majority completely cutaway	Lullymore formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Parts used for turf production in recent years. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group - amenity	2020	Draft 2017
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Ticknevin formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cloncannon bog remnent – zoned for biodiversity Mostly bare peat. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning. .	2020	Draft 2017
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection		
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. BnM-ESB Solar energy project consented 2020 for part of the site.	2020	Draft 2019
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project.	2020	Draft 2017

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. The report outlines potential options for biodiversity management after industrial peat production has ceased, (if this is the proposed main land-use for the site).

Bog Name:	**Lodge**	**Area (ha):**	432ha
Works Name:	Ballydermot	**County:**	Kildare
Recorder(s):	MMC	**Survey Date(s):**	08/08/2012

Ecological rating

This site can be rated as having a **low-high local ecological value (E-C)** in general. As the majority of the site is in active production, its ecological value is **E**. Some sections of cutaway have higher cutaway value **(D-C)** as do some of the remnant habitats such as the area of intact raised bog **(C)**.

Small parts of the site with species of conservation value (RDB species) have a higher value **(B).**

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (BP)
- Poor fen mosaics (pJeff) (Codes refer BnM classification of pioneer habitats of production bog).
- Minor development of other poor fen communities dominated by Horsetail (pEq).
- Dry Heath and Birch scrub mosaics (dHeath and e/oBir)
- Minor development of other pioneer dry grassland communities including Sweet Vernal-grass dominated vegetation (gAn-Ho-Eq), dry calcareous grassland (gCal), rank grassland (gDa-Arr) and Purple Moorgrass-dominated vegetation (gMol).
- Silt-ponds and associated embankments of spoil.

Other habitats found around the margins of this site (not on production bog/cutaway) include:

- Raised bog remnants (PB1)
- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000))
- Scrub (WS1) (Birch scrub)
- Cutover bog (PB4)
- Dense Bracken (HD1)
- Wet grassland (GS4)

Description of site

Lodge BnM Production Bog is located adjacent to Lullymore and is 3 km west of Allenwood in Co. Kildare. It was part of the former Ballydermot bog group and now supplies milled fuel peat as part of the Derrygreenagh group to Edenderry Power. Other BnM bogs in the area include Killinagh to the north and Ballydermot (Barnaran) to the west. There is a BnM rail network connecting Lodge Bog to Barnaran and the wider Ballydermot network. The railway also travels north-east to connect Lodge with the Timahoe bogs, although this branch is now quite overgrown. Lodge bog is bounded by the R414 along part of the northern boundary, and this road separates Lodge Bog from the adjacent Killinagh bog. It also divides Lodge Bog from the adjacent Barnaran bog to the west.

A relatively large part of the bog containing remnant high bog (PB1), Birch woodland (WN7) and some scrub along the western margin was gifted to the IPCC by BnM in 2005. The IPCC are located nearby in Lullymore at the Bog of Allen Nature Centre. This section of bog had been used by the IPCC for amenity and education. It is now managed by the IPCC as a nature reserve and is intensively monitored. There has been some raised bog restoration works including drain blocking and scrub removal since 2005. The IPCC produced a conservation management plan for Lodge Bog in 2011. This area was not surveyed during this survey.

The other margins of the production bog contain typical marginal peatland habitats. There is a mosaic of Birch woodland (WN7), active cutover bog (used by private sod peat cutters) and some remnant bog along the southern margin. A small annex to the milled peat production bog is used to produce sod peat by BnM. A small part of the southern marginal zone (within the BnM GIS boundary) is grazed by cattle and is fenced off. A small area towards the south-east corner of the site seems to have been reclaimed and developed into grassland in the past. The eastern margin has similar habitat development, although there is more intensive private sod peat production on adjacent bog along the north-east margin of the site. A narrow strip of Birch woodland and scrub along the northern margin and adjacent to the road completes the marginal habitats.

The majority of the production bog is still in production and has bare peat cover. There are a series of deep trench drains through the bog at regular intervals that form part of the main drainage system. These drains are open and are flanked by high fields on both sides. One side of some of the drains are open to traffic to allow the drains to be cleaned. These verges contain a range of typical habitats including Birch-dominated scrub, dry heath mosaics, and Purple Moorgrass-dominated vegetation. Some of the vegetation has developed into Birch woodland in places. The production bog is divided into two main sections to the north and south and these are separated by a headland with a railway orientated east-west. This headland also divides the bog into two main catchments, north and south, with both draining towards the east.

There is a small amount of pioneer cutaway vegetation developing at Lodge Bog (production-related cutaway). The ends of several fields have come out of production long the south-west margin of the bog where peat has been exhausted and the mixed till sub-soil is now exposed. These fields are colonising with a range of pioneer communities, dominated by poor fen. Some of the more-established vegetation is dominated by Soft Rush and Bog Cotton on lower fields where it is wetter. Some higher fields have colonised with a mosaic of pioneer dry grassland communities where it is higher and better drained. These include vegetation dominated by Purple Moor-grass, some pioneer dry calcareous grassland with species such as Knapweed, Ox-eye Daisy and Glaucous Sedge (gCal), dry grassland dominated by Sweet Vernal-grass and Yorkshire Fog (gAn-Ho-Eq) and some more established vegetation dominated by Cocksfoot and False Oatgrass (gDa-Arr). The pioneer nature of these communities is obvious with Horsetail, Cocksfoot and Willowherb all present. These grassy areas generally cover a small area. Marsh Helleborine was found in this vegetation on sub-soil associated with both Purple Moorgrass and the more calcareous grassland community.

There is also some younger pioneer vegetation dominated by Horsetails (pEq) that is more extensive and seems to have colonised some fields only recently. These are likely to be production fields where there has been no activity in the past year or two years and some fields that have recently com out of production. This type of colonisation is seen around the site. There were also some production fields that have been inactive this summer due to wet conditions and already there is colonisation with extensive Jointed Rush seedlings appearing. Within the production areas there are also several small mounds appearing where there is more extensive vegetation along the edges of the fields on the mounds. This usually

includes dry grassland communities (gAn-Ho-Eq) and poor fen with Soft Rush. Further west towards the Shell marl-influenced area, some Marsh Arrowgrass appeared along the edges of several fields that have been in production. This vegetation was not extensive and the area was therefore mapped as bare peat. However, it does give an indication of how this area will develop if it comes out of production.

Some dry grassland has developed along the railway on the central headland. This was dominated by the Sweet Vernalgrass-dominated community. The railway has been un-used for some time and parts are being overgrown with scrub. Some sections along the railway were also developing rank grassland dominated by Cocksfoot and False Oatgrass.

There is a small annex to the production bog along the southern margin of the site. This area is being used for the production of sod fuel peat by Bord na Móna. This section has somewhat deeper peat and the margins were developing with a typical dry heath and Birch scrub mosaic that is typical of deeper peat. A small area at the western entrance to the bog is also being actively used for the production of sod peat.

The western margin of the production bog is adjacent to the Lodge Bog nature reserve, now managed by the IPCC. The edge of the high bog shows some subsidence and is bordered by a higher field that was drained but probably not put into production. This has now developed into a mosaic of dry heath-dominated vegetation and Birch scrub, with a section towards the centre developing Birch woodland where there is a mound underlying the bog. The first production field adjacent to this high field has been out of production for several years and is being colonised by pioneer Soft Rush-dominated poor fen. This field is adjacent to a stockpile, so the stockpile forms a buffer between the production bog and the nature reserve.

Basil Thyme

Basil Thyme was noted at one location along the railway at the southern end of the site and other small populations further along the railway would not be unexpected. Basil Thyme has not been recorded at this site before and would not be a typical species of cutaway bog. This species was probably unlikely to have been present on the site prior to the development of the cutaway. The exposed gravel along the railway embankments is a perfect habitat for this species. One of its main known populations in Co. Offaly is located close by at the Long Derries cSAC, Edenderry. This site was a BnM gravel pit and material from this site was used to make railway embankments. The spread of Basil Thyme from the Long Derries along the BNM railway network has been recorded in the past (Feehan pers. comm. 2011).

In the long-term, it could be expected that these railway embankments will re-vegetate with grassland and scrub as they go out of use, which will not favour this species. This can already be seen at Lodge as the railway has been unused for several years (particularly the northern branch) and has developed rank grassland communities and is being colonised with scrub. Occasional track maintenance is likely to be beneficial for this species as it will keep the gravel embankments exposed and prevent development of dense vegetation, which would be unsuitable for this species. Other BnM operations are not likely to have a significant impact on the status of this species. One possible solution is to develop some of the main railway line as an amenity walkway when production ceases. A suitable management regime to maintain the habitat of these rare plant species could easily be developed in association with the development and maintenance of these walkways. This will be considered within the wider context of the Derrygreenagh and Ballydermot Bogs, which are viewed as strongholds for the species in east Offaly. Consultation and licensing will be required with NPWS.

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

None

The Grand Canal pNHA (NPWS site code 2104) is located about 0.5 km from the south-east corner of the site.

The remnant high bog is managed as a Nature Reserve by the IPCC.

Adjacent habitats and land-use

Wet grassland (GS4), improved agricultural grassland (GA1), scrub (WS1), Birch woodland (WN7), active and inactive cutover bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

Watercourses (major water features on/off site)

- Lodge Bog is located within the River Barrow catchment.
- There are two main catchments located within the bog, separated by the central east-west railway line and travel path. Both drain to the east towards silt-ponds located along the eastern margin of the bog. Water exits from these ponds and enters the Slate River via a small stream/drain.

Peat type and sub-soils

The main peat type exposed at this site is black fen peat. There is some lighter peat exposed towards the east, where the bog is higher.

Mixed gravel till is exposed in some places at the ends of fields that are developing as cutaway and within the deep drainage ditches under peat across the bog. Shell marl is exposed along some edges of fields and in field drains towards the eastern half of the bog.

Fauna biodiversity

Birds

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

- Buzzard (hunting along eastern margin of site).
- Kestrel (hunting over south-east part of the site)
- Other more common birds noted on the site include Reed Bunting, Meadow Pipit, Wood Pigeon, Wren, Swallow, Blackbird, Blue Tit, Chaffinch, Redpoll, Grey Crow (100+ flock moving across site) and Heron.

Mammals

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

- Badger tracks were noted around the bog at several locations.
- Hare droppings were noted at several locations.

Other species

- Small Copper, Green-veined White, Large White, Meadow Brown, Ringlet, Small Heath and Small Tortoiseshell butterflies were recorded on the bog.
- 6-spotted Burnet Moth noted on bog along the central access zone.

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

APPENDIX V: BIOSECURITY

No invasive species listed under Regulations 49 and 50 of the EC Birds and Natural Habitats Regulations were recorded within the site.

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.

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

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

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

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague[5] and Zebra Mussel will be adhered with throughout all rehabilitation measures and activities.

[5] 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 Allen-Lullymore bog group (Ref. 503). 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 Allen-Lullymore bog group (Ref. 503). This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

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

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production). 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 be the Scheme regulator and funded by the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

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

3 National Climate Policy

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

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

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

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

4 National Peatlands Strategy

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

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as Bord na Móna.

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

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

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

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

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

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

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

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

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

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

The cessation of industrial peat extraction by Bord na Móna in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular 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 Practise

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

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

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

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

The EUs headline target for progress by 2020 is to:

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

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

13 Bord na Móna commitments

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

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

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

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

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

14 Bord na Móna Strategic Framework for the future use of cutaway peatlands 2021 (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	Lodge 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	Stockpiles to be removed
4	Decommissioning or Removal of Buildings and Compounds	Decommission and Removal of Porto-cabin tea centre and materials store
5	Decommissioning Fuel Tanks and associated facilities	Decommissioning and De-Gassing Mobile Fuel Tanks
6	Decommissioning and Removal of Bog Pump Sites	Where Applicable
7	Decommissioning or Removal of Septic Tanks	De-sludge Septic Tank

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

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

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

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

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

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

waste.

7.3.3 The ultimate destination of the waste.

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

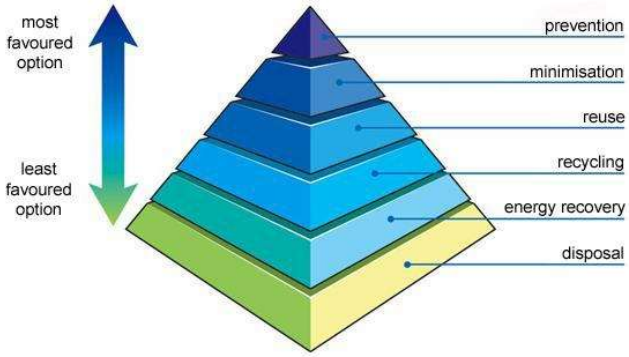
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

2. Enhanced Decommissioning.

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

Item	Enhanced Decommissioning Type	Lodge Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Not Applicable
3	Decommissioning Railway Level Crossing	Decommissioning Railway Level Crossing where required
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog.
5	Removal of High Voltage Power Lines	Not Applicable

APPENDIX VIII. GLOSSARY

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

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

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

Enhanced decommissioning: This is defined as decommissioning carried out under Scheme, which is proposed to 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 stabilisiation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Lisence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisiation.

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

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

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

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

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

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

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

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

Scope:
This plan covers IPPC Licence's Ref. P0503, Allen-Lullymore bog group.

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

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

2.0 P0503-01 IPPC Licence Extractive Waste Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.0 Extractive Waste Management Plan

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

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

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

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

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

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

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

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

Classification in accordance Annex II.

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

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

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

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the 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 National 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 IPPC Licence Ref. PO503 -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*

An map of the areas identified for targeted fertiliser application is provided in Figure APX 1 below.

APPENDIX XI. CONSULTATION SUMMARIES

Table APXI -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Lodge	Department of Housing, Local Government and Heritage NPWS	Multiple Staff Members	02.03.2022	Email		
Lodge	National Museum of Ireland	Multiple Staff Members	02.03.2022	Email		
Lodge	Department of Housing, Local Government and Heritage	General Email Contact	02.03.2022	Email		
Lodge	Dept of Agriculture Food & the Marine	General Email Contact	02.03.2022	Email		
Lodge	Department of Environment, Climate and Communications	Multiple Staff Members	02.03.2022	Email		
Lodge	Dept of Rural and Community Development	General Email Contact	02.03.2022	Email		
Lodge	Department of the Housing Local Government and Heritage	General Email Contact	02.03.2022	Email		
Lodge	Minister for Environment, Climate and Communications	Minister - Eamon Ryan	02.03.2022	Email		
Lodge	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Pippa Hackett Minister of State for Land Use and Biodiversity)	02.03.2022	Email		
Lodge	Oireachtas	Danielle McDonnell (Minister Malcolm Noonan Secretary)	02.03.2022	Email	02.03.2022	Email

Lodge	An Taisce	General Email Contact	02.03.2022	Email		
Lodge	Environmental Protection Agency	Multiple Staff Members	02.03.2022	Email		
Lodge	Inland Fisheries Ireland	General Email Contact	02.03.2022	Email	21/03/2022	Email
Lodge	Local Authority Waters Programme	Multiple Staff Members	02.03.2022	Email		
Lodge	NWRA	General Email Contact	02.03.2022	Email		
Lodge	Teagasc	General Email Contact	02.03.2022	Email		
Lodge	The Heritage Council	General Email Contact	02.03.2022	Email		
Lodge	Waterways Ireland	General Email Contact	02.03.2022	Email		
Lodge	An Forum Uisce (The Water Forum)	General Email Contact	02.03.2022	Email		
Lodge	Coillte	Multiple Staff Members	02.03.2022	Email		
Lodge	Irish Water	General Email Contact	02.03.2022	Email	19.04.2022	Email
Lodge	Irish Water- Water Supply Project Eastern and Midlands Region	General Email Contact	02.03.2022	Email		
Lodge	Office of Public Works (OPW)	Multiple Staff Members	02.03.2022	Email		
Lodge	CARO (Climate Action Regional Office) Eastern and Midlands	General Email Contact	02.03.2022	Email		
Lodge	Bat Conservation Ireland	General Email Contact	02.03.2022	Email		
Lodge	Birdwatch Ireland	General Email Contact	02.03.2022	Email		
Lodge	Butterfly Conservation Ireland	General Email Contact	02.03.2022	Email		

Lodge	Eastern and Midland Regional Assembly	General Email Contact	02.03.2022	Email		
Lodge	Fisheries Ireland	General Email Contact	02.03.2022	Email		
Lodge	Friends of the Earth	General Email Contact	02.03.2022	Email		
Lodge	Friends of the Irish Environment	General Email Contact	02.03.2022	Email		
Lodge	ICMSA (Irish Creamery Milk Suppliers Association)	General Email Contact	02.03.2022	Email		
Lodge	ICSA (Irish Cattle and Sheep Farmers Association	General Email Contact	02.03.2022	Email		
Lodge	Irish Farmers Association	General Email Contact	02.03.2022	Email	03.03.2022	Email
Lodge	Irish Peatlands Conservation Council		30.11.2021	Site visit	30.11.2021	Discussion on site
Lodge	Irish Peatlands Conservation Council	General Email Contact	02.03.2022	Email	22.04.2022	Email
Lodge	Irish Raptor Study Group	General Email Contact	02.03.2022	Email		
Lodge	Irish Rural Link (Community Wetlands Forum)	General Email Contact	02.03.2022	Email		
Lodge	Irish Rural Link	General Email Contact	02.03.2022	Email		
Lodge	Irish Wildlife Trust	General Email Contact	02.03.2022	Email		
Lodge	Inland Waterways Association of Ireland (IWAI)	Dara O Cionnaith	02.03.2022	Email		
Lodge	National Association of Regional Game Councils	General Email Contact	02.03.2022	Email		
Lodge	NPWS Rangers North East	General Email Contact	02.03.2022	Email		

Lodge	NUIG Galway	General Email Contact	02.03.2022	Email		
Lodge	PPN Kildare Public Participation Network	General Email Contact	02.03.2022	Email		
Lodge	Ranger Association Committee	General Email Contact	02.03.2022	Email		
Lodge	Shannon Flood Risk State Agency Co-ordination Working Group	General Email Contact	02.03.2022	Email		
Lodge	Sustainable Water Action Network (SWAN)	General Email Contact	02.03.2022	Email		
Lodge	Trinity College Dublin	General Email Contact	02.03.2022	Email		
Lodge	Turf Cutters and Contractors Association	General Email Contact	02.03.2022	Email		
Lodge	UCD / Irish Rural Link	General Email Contact	02.03.2022	Email		
Lodge	University College Dublin	General Email Contact	02.03.2022	Email		
Lodge	Waterways Ireland	General Email Contact	02.03.2022	Email		
Lodge	Woodlands of Ireland	General Email Contact	02.03.2022	Email		
Lodge	Chief Executive Kildare County Council	Sonya Kavanagh	02.03.2022	Email		
Lodge	Director of Services	Joe Boland	02.03.2022	Email		
Lodge	Kildare County Council - general email		02.03.2022	Email		
Lodge	Kildare County Council - Environment section	Brendan Fitzsimons	02.03.2022	Email		

Lodge	Kildare County Council - General email address	Kildare County Council - General email address	02.03.2022	Email		
Lodge	TD's - Kildare North	Reada Cronin	02.03.2022	Email		
Lodge	TD's - Kildare North	Bernard Durkan	02.03.2022	Email		
Lodge	TD's - Kildare North	James Lawless	02.03.2022	Email		
Lodge	TD's - Kildare North	Catherine Murphy	02.03.2022	Email		
Lodge	TD's - Kildare South	Cathal Berry TD	02.03.2022	Email		
Lodge	TD's - Kildare South	Martin Heydon	02.03.2022	Email		
Lodge	TD's - Kildare South	Patricia Ryan	02.03.2022	Email		
Lodge	TD's - Kildare South	Sean O'Fearghail	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Anne Connolly	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Noel Connolly	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Suzanne Doyle	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Kevin Duffy	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Noel Heavey	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Fiona McLoughlin Healy	02.03.2022	Email		

Lodge	Kildare County Councillors - Kildare - Newbridge	Peggy O'Dwyer	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Tracey O'Dwyer	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Chris Pender	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Robbie Power	02.03.2022	Email		
Lodge	Kildare County Councillors - Kildare - Newbridge	Mark Stafford	02.03.2022	Email		
Lodge	Kildare Country Councillors - Clane - Maynooth	Tim Durkin	02.03.2022	Email		
Lodge	Kildare Country Councillors - Clane - Maynooth	Aidan Farrelly	02.03.2022	Email		
Lodge	Kildare Country Councillors - Clane - Maynooth	Angela Feeney	02.03.2022	Email		
Lodge	Kildare Country Councillors - Clane - Maynooth	Daragh Fitzpatrick	02.03.2022	Email		
Lodge	Kildare Country Councillors - Clane - Maynooth	Peter Hamilton	02.03.2022	Email		
Lodge	Kildare Country Councillors - Clane - Maynooth	Padraig McEvoy	02.03.2022	Email		
Lodge	Kildare Country Councillors - Clane - Maynooth	Naoise Ó Cearúil	02.03.2022	Email		

Lodge	Kildare Country Councillors - Clane - Maynooth	Paul Ward	02.03.2022	Email		
Lodge	Kildare Country Councillors - Clane - Maynooth	Brendan Wyse	02.03.2022	Email	28.03.2022	Email
Lodge	Kildare Country Councillors - Clane - Maynooth	Brendan Wyse	02.03.2022	Email	1/04/2022	Email
Lodge	Eastern and Midland Regional Assembly	General Email Contact	02.03.2022	Email		
Lodge	All Land- owners in vicinity of bog	Leaflet Drop	15/03/2022	Leaflet		
Lodge	All those with turbary rights	Leaflet Drop	15/03/2022	Leaflet		
Lodge	Ecologist - Lorraine Benson	Lorraine Benson	02.03.2022	Email	11.02.2022	Email

Table APXI -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Irish Peatland Conservation Council	Site walk on 30/11/2022 to review condition of BnM Lodge Bog wetland. The IPCC highlighted measures at the northern end of the wetland that were originally carried out to restrict access. The IPCC suspect that this may be causing some unintended drainage from the adjacent IPCC Lodge Bog remnant.	BnM happy to review condition of the barrier constructed to restrict access and trespass. Some drain-blocking will be carried out by BnM to prevent any unintended impacts on IPCC Lodge Bog remnant.
	Submission received from IPCC on 09/04/2022. Generally supportive of the measures being undertaken and the benefits arising. A number of observations were made, including: <u>Planned Development</u> IPCC are concerned that the planned development highlighted on the rehabilitation maps which includes a sub-station and a connectivity route is hindering the maximisation of rehabilitation. How will the continued management of a sub-station going into the future also affect the integrity of the hydrology of Lodge Bog and the	BnM responded acknowledging the submission by IPCC and responded to the queries raised within the same.

	species which are utilising and being encouraged to return to the Lodge Bog continuum? <u>Lullymore Bog - Ballydermot Bog Complex</u> The PCAS project should be focused on the entire Lullymore Bog - Ballydermot Bog Complex and not just Lodge Bog. <u>IPCC Lodge Bog Nature Reserve Drain C</u> IPCC manage a drain on Lodge Bog that runs parallel with the R414 on the northern end of the bog. IPPC requested Bord na Móna workers to dig a deep drain and built a berm to stop this illegal access. Where IPCC land meets Bord na Móna's land there is a sandwich dam which was holding water back onto Lodge Bog North. Since the drainage was undertaken, the amount of water that was usually present in the IPCC drain has nearly disappeared. Can Bord na Móna please investigate as to what has occurred and if there is a way to fix the water issues and also keep access to the minimum? <u>Climate Change Resilience</u> Can Bord na Móna guarantee resilience in terms of carbon and rewetting effectiveness. Will the rehabilitated sites withstand the impacts of climate change as described by the EPA published reports NERO, VAPOR and BOGLAND? The PCAS is designed to increase the benefits in terms of carbon storage, biodiversity and freshwater management but not all areas will be targeted with the enhanced rehabilitation. What will be the outcome and cost of leaving some areas to naturally colonise as within the standard rehabilitation? Will Bord na Móna be able to increase the effectiveness in the future if monitoring shows that the areas with the minimal rehabilitation works are not sufficient? <u>Amenity</u> While access should be kept at a minimum to maximise benefits for conservation there could be interpretation on site explaining the industrial and ecological story. There could also be an online presence highlighting all the rehabilitated sites, encouraging public engagement and reporting on all the activities including continued monitoring and wildlife gains.	

	<u>Ground Nesting Birds</u> Lodge Bog has been home to long-term resident native Curlew since at least 2005 (T O'C, 2012, IPCC). IPCC are concerned that works could affect the behaviour and/or displace curlew during the crucial breeding season and we ask Bord na Móna to be conscious of this when planning and enacting rehabilitation works. Furthermore, we question what impact the planned substation may have on these nationally important resident birds? We have recorded Curlew utilising Lodge Bog Wetlands (as recent as 2pm 4/4/2022, Tristram Whyte, IPCC) more and more since peat extraction ceased highlighting an improvement in land being available for them to use and carry out their natural behaviour. Lapwing are also nesting at the Bord na Móna Lodge Bog Wetlands but breeding does not seem successful with a number of predated nests being found. These Lapwing are also utilising IPCC Lodge Bog North and the adjoining agricultural land on the east-side of the bog. <u>Additional Works 2</u> Please elaborate as to what works are planned in the areas marked as "Additional Works 2" on the Enhanced Rehabilitation Map. The Bord na Móna area marked for this that neighbours the east-side of Lodge Bog North has seen the development of scrub which is providing vantage points for predators. Grey Crow have been seen utilising this area and they pose a problem for the successful nesting of Curlew.	These measures include some additional bunding in an area that has been rehabilitated already to make this ground wetter.
Office of Public Works	Submission received from OPW on 07/03/2022. Lodge Bog does not overlap with any OPW Arterial Drainage Scheme. In general the OPW supports the BnM bog rehabilitation and rewetting as a Nature Based Catchment Management measure in managing flood flows in the River Barrow Catchment, in particular at any AFA downstream (Rathangan, Monasterevin, etc.), identified in the CFRAM Study, and the many other environmental co-benefits from developing this project.	BnM responded acknowledging the submission by OPW and responded to the queries raised within the same.

Inland Fisheries Ireland (IFI)	Submission received from IFI on the 21/03/2022. In general, the IFI supports the BnM bog rehabilitation and rewetting that will result in improvements in water quality. A number of points were made, including: • The site of the proposed plan is located within the Slate River catchment, an important salmon spawning/nursery tributary of the Barrow SAC. • Salmon spawning/recruitment occurs on the Slate, a short distance downstream of the Lodge bog site in the Rathangan area, salmon spawning also occurs on the Pluckerstown Stream which flows into the Slate close to the Lodge bog site. The extent of salmon spawning on the Slate is limited by hydro-morphological/habitat damage to habitat largely undertaken to facilitate commercial peat harvesting. Until relatively recently however salmon spawning/recruitment in these and other Barrow tributaries draining the Bog of Allen area occurred over a far wider range, with important salmon spawning in the Esker River (Daingean tributary) and throughout much of the Slate Rivers. • IFI inspections throughout the Slate River catchment have highlighted excellent salmon habitat potential In the Slate River upstream of the Lodge Bog site, while there is good salmon spawning habitat in the Slate in Rathangan downstream. • IFI welcome any measures which will go some way towards addressing water quality issues linked to the discharge of dissolved nutrients (principally ammonia) and peat solids to surface waters from cut-over peatlands. • The plan as proposed however, does not address the hydro-morphological issues in the Slate River adjacent to and downstream of the Lodge Bog site. The deepening and widening of this watercourse, primarily to facilitate peat extraction resulted in the removal of gravels over long stretches of fisheries waters. In some cases, the excavation depth extended down to the subsoils beneath the watercourse. In this case the potential for natural restoration is limited, given the relatively low gradient and other hydro-morphological issues.	Bord na Mona responded acknowledging the submission by IFI on the 06/04/22 and responded to the queries raised within the same. In summary, Bord na Mona stated that; There is a significantly increase monitoring and verification programmes supporting the measurement and verification of the expected success criteria of the rehabilitation plan, including water quality. This increased the water quality monitoring from quarterly on a selected number of silt ponds, to monthly at significant number of additional silt ponds that aim to establish the water quality impact from a minimum of 70% of the peatland catchment. Bord na Mona got approval to implement this monthly monitoring programme over the life of the scheme and this includes some additional parameters to enable assessment of the aquatic carbon fluxes, as well as the range of parameters such as pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour & COD. Biological monitoring of associated water courses is outside the scope of the PCAS scheme. Bord na Mona have also obtained datasets of all EPA monitoring as required to support the RBMP objectives under LAWPRO and expect that both chemical and biological monitoring at these sites, will assisting in verifying any improvements in water quality, including any biological benefits.

	• Because of this, human intervention is likely to be necessary to facilitate recovery of the fisheries habitat on the long section of the Slate flowing adjacent to the Bord na Mona site. • Similar to the over-deepening of the Slate at the Lodge Bog site, IFI have noted that Rivers adjacent to/adjoining other Bord na Mona peatlands have been subject to much deeper dredging at/adjacent to these sites, compared to the same river upstream or downstream, on a number of Barrow tributaries draining the Bog of Allen. • IFI note that water quality monitoring will be established, with a suite of physico-chemical parameters referred to. IFI believe that biological monitoring of watercourses should be central to any water quality monitoring program. • IFI request that the re-establishment of populations of native fish species such as salmon, brown trout, European eel and lampreys be included as an important component and target of Ecosystem services linked to this bog restorations on the adjacent Slate River.	The scope of the PCAS scheme (https://www.gov.ie/en/publication/136a7-bord-na-mona-bog-rehabilitation-scheme/) has restricted qualifying rehabilitation to the peatlands in question and as such any restoration of rivers/steams is outside the scope of the scheme. The PCAS scheme scope only includes the preparation of the necessary assessments, plans, reports and consent applications, the decommissioning and enhanced rehabilitation of the associated peatlands and any necessary measurement and verification. Dialogue ongoing.
Brendan Wyse: Kildare Country Councillor - Clane - Maynooth	Generally supportive of the measures being undertaken and the benefits arising. A number of observations were made, including: • If the area constrained for the proposed Ballydermot Wind Farm can be reduced. • That lapwing are known to breed within the west of the site and curlew on the adjacent IPCC lands. • Supportive of the proposed rehabilitation in that it will see positive results regarding water quality in the Slate River. • That consideration is given to working closely with Birdwatch Ireland Kildare Branch, the Irish Peatland Conservation Council and the National Parks and Wildlife Service to further assist with efforts for nature conservation in Lodge Bog. • The Slate River just south of Lodge Bog and notwithstanding the distance of 7.6km to Pollardstown Fen, it cannot be disregarded that serious pollution or worsening of water quality in the Slate River would not have an impact further upstream in Pollardstown Fen SAC.	BnM responded acknowledging the submission by Councillor Brendan Wyse and responded to the queries raised within the same. At this stage the proposed Ballydermot Windfarm constraint can not be reduced, but it is expected that the footprint of the proposed infrastructure will be much smaller than the constrained area. BnM are happy to continue to work with local biodiversity stakeholders to assist nature conservation. Water quality is a key KPI of the rehab plan and it is expected that downstream water quality will improve in response to peatland rehabilitation.

	• If the plan could specifically state an action to return the sods currently piled on the area back into the holes from which they were extracted. • In an area formerly used for sod moss production, some peat material remains. Could this material be placed back into the holes from which they were extracted. • Data sharing.	Sod moss stock is likely to be removed from the site. Any remaining sod moss on site will be placed back in trenches as part of the rehabilitation measures.
Irish Water	Generally supportive of the measures being undertaken and the benefits arising. A number of observations were made, including: • Irish water are supportive of the key objective of achieving environmental stabilisation of the bog and stabilising/improving key emissions to water. • Irish Water understand that restored peatlands are generally beneficial for drinking water sources downstream by improving water quality and by creating water retention and slowing the flow from the site. We are therefore in support of the Cutaway Bog Decommissioning and Rehabilitation Plan and believe that it could help to achieve to improvements the quality of drinking water sources downstream in terms of suspended sediment, colour, ammonia and dissolved organic carbon. o The Barrow Supply (Srowland WTP) abstracts from the River Barrow and is located approximately 38 km downstream of the site. • Water quality monitoring: o Good experimental design will be essential when establishing the water quality monitoring programme at the bog. It would be advantageous to monitor the flow from the discharges to quantify any improvements at a water body scale. o Long-term monitoring after the restoration is complete (i.e. greater than 2-3 years) will likely be required to demonstrate the impact of the rehabilitation works on water quality at a water body scale. o We welcome the inclusion of DOC in the monitoring programme because Dissolved Organic Matter (DOM) in drinking water sources poses an increasing challenge and there is potential for future climate change to exacerbate concentrations further, with important implications for water treatment.	BnM responded acknowledging the submission on the 19/04/2022 and responded to the queries raised within the same.

	• Silt ponds: The protection of drinking water sources should be afforded special consideration and status in the interest of the protection of public health. We therefore welcome the proposed maintenance during the rehabilitation and decommissioning phase of the plan. If decommissioning of the silt ponds is necessary, we would request that Irish Water is consulted whilst these plans are being developed. • Cumulative effects: There is potential for this project to have cumulative beneficial impacts with other bog rehabilitation projects on water quality within the same catchment(s). We recommend that the beneficial effects of multiple bog rehabilitation projects are assessed at the catchment scale.	
Ecologist - Lorraine Benson	Submission received from Lorraine Benson (ecologist) on the 11/03/2022. Generally supportive of the measures being undertaken and the benefits arising but also requested that constraint consideration be applied to a number of additional species including Curlew, Lapwing, Ringed Plover, Skylark and Snipe during the breeding season.	BnM responded acknowledging the submission on the 22/03/2022 and responded to the queries raised within the same.

APPENDIX XII. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

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



Code of Practice

22

Code of Practice

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

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

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

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

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

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



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

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is ……

3) Records

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

Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Lodge Bog, Co. Kildare

Draft

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2020) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation of c.408 hectares at Lodge Bog, Co. Kildare on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Lodge Bog will include:

- Re-assessment of the pumping regime; removal of the pump on site is desired if this has no significant external impact. Initial hydrological modelling indicates that parts of the centre and west of the site will develop a mosaic of open water and wetland habitats with permanent 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 sections will naturally have deeper water due to the topography at this site. Water-levels will be adjusted at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels in the adjacent watercourses and associated groundwater conditions.
- Intensive drain blocking around existing wetland or standing water to create/promote the spread of wetland habitats.
- Re-wetting some areas of the bog through regular field drain blocking using a dozer/excavator to create three peat barriers every 100 m along each field drain.
- Peat field re-profiling to reduce the camber of the fields and cell-bunding between high fields to manage/optimise water levels for revegetation.
- Re-alignment of piped drainage.
- Blocking drains in targeted existing pioneering vegetation mosaics, to accelerate re-wetting, and/or manage water levels to the correct height to accelerate the current trajectory towards reed swamp and fen, using a dozer/excavator.
- The creation of berms across some sections of the bog to control/retain water levels. This measure seeks to retain shallow (< 10 cm) water conditions across multiple fields.
- Re-wetting some deep peat areas of the bog through regular more intensive drain blocking using an excavator to create up to a maximum of seven peat dams/blockages every 100 m along each field drain, along with field re-profiling and drain infilling if required;
- Re-wetting the deep peat areas of the bog using berms, drain blocking and field re-profiling. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (< 10 cm) water conditions on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water;
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields as required, see Drawing no. DR-23-21-28 “Fertiliser Application Map”.
- Modifying water levels at outfalls, as it may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated. This will further slow the movement of water through and out of Lodge Bog. There is some blocking of drains in marginal (degraded) remnant raised high bog areas proposed as part of this plan, although they are small in size and degraded nature.
- 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 run-off of suspended solids, 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).

• Seeding of vegetation and inoculation of Sphagnum will be undertaken where required. In some areas where vegetation has already established, seeding of vegetation is not required.

Lodge Bog is just south-east of Allenwood, Co. Kildare, and south of the R414 road. The overall rehabilitation area occupies the townlands of Allenwood South, Drumsru and Lullymore East, on OS 6 inch sheets Kildare Nos. 12 and 17.

Methodology

This is a desk-based archaeological assessment that includes a collation of existing written and graphic information to identify the likely archaeological potential of Lodge Bog. The overall extent of the rehabilitation is indicated in Fig. 1. This area was examined using information from:

- The2004 Peatland Survey
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments

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

Desktop assessment

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Kildare which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1995). This record was published by the Minister in 1996 and includes sites and monuments that were known in Lodge Bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (see Fig. 1).

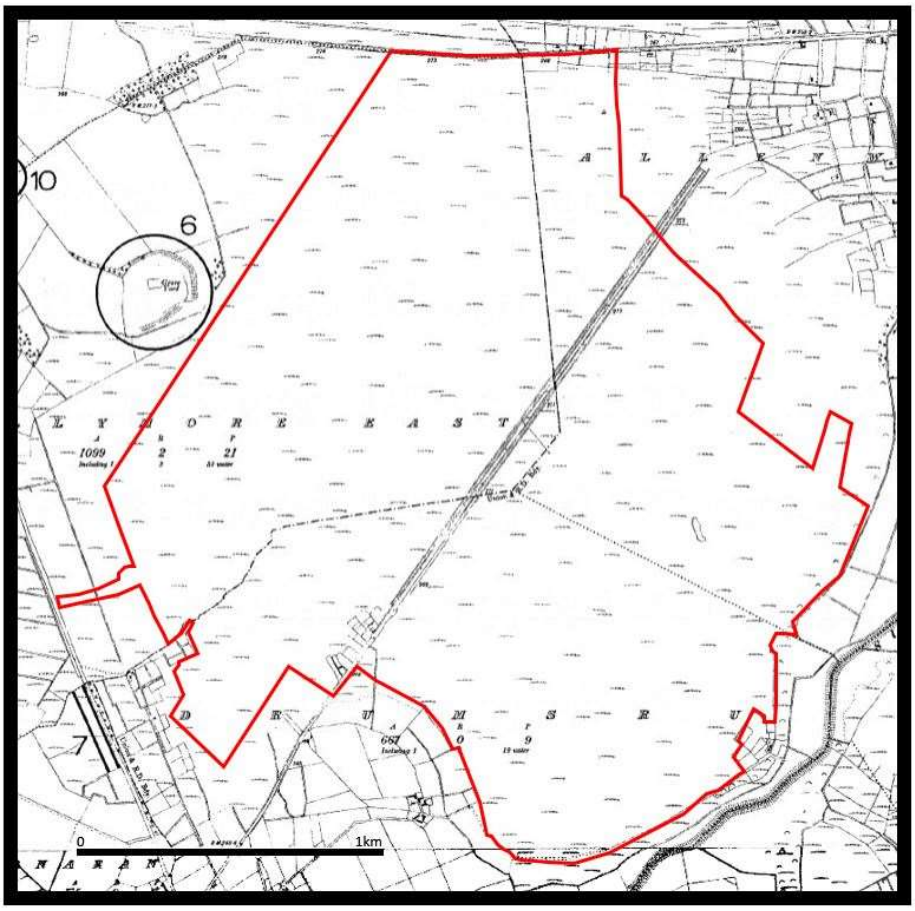


Fig. 1. Lodge Bog, Co. Kildare, detail of the Record of Monuments and Places map sheets Nos. 12 and 17. The proposed rehabilitation area is outlined with the red line. There are no Recorded Monuments in the rehabilitation area.

2004 Peatland survey

Lodge Bog was surveyed by the ADS Ltd. in 2004 as part of the Archaeological Survey of Ireland Peatland Survey (Licence No. 04E1005). Eight sightings of material were made in the bog (see Table 1). These sightings were mostly on the surface with one just below the surface. Sighting KD-LGE002, a single piece of worked brushwood that was sampled and removed from the bog, was dated to the medieval period (Cal AD1430 to 1650). Sighting LGE001 was dated to the modern period (Cal AD 1940 to 1950) and the remaining six sightings were all thought to date to the modern period. The sightings were notified to the Archaeological Survey of Ireland and two were included in the SMR.

Survey No.	Survey Type	Townland	SMR_NO	SMR Class	ITM E	ITM N	Irish Grid E	Irish Grid N	Depth BS m
KD-LGE001	Non-Archaeological Wood	Drumsru	-	-	672164	724268	272229	224239	0
KD-LGE002	Wood Remains	Drumsru	KD012-018----	Structure - peatland	672119	724322	272184	224293	0
KD-LGE003	Wood Remains	Drumsru	-	-	672004	724465	272069	224437	0
KD-LGE004	Wood Remains	Drumsru	-	--	672168	724736	272233	224707	0
KD-LGE005	Wood Remains	Drumsru	-	-	672124	724756	272189	224727	0
KD-LGE006	Platform (poss)	Drumsru	KD012-019----	Platform - peatland	671539	724561	271604	224532	0.15
KD-LGE007	Wood Remains	Allenwood South	-	-	672509	725971	272575	225943	0
KD-LGE008	Wood Remains	Allenwood South	-	-	672405	726077	272470	226049	0

Table 1. List of sites recorded by the 2004 Peatland Survey in Lodge Bog.

Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 14th of January 2022. The SMR consists of records included in the RMP and sites and monuments notified to the Dept. since the publication of the RMP. This review established that there are two entries in the SMR in the proposed rehabilitation area (see Table 2).

SMR_NO	SMR Class	Survey No.	Townland	ITM E	ITM N	Irish Grid E	Irish Grid N	Depth BS m
KD012-018----	Structure - peatland	KD-LGE002	Drumsru	672119	724322	272184	224293	0
KD012-019----	Platform - peatland	KD-LGE006	Drumsru	671539	724561	271604	224532	0.15

Table 2. List of sites recorded by the 2004 Peatland Survey in Lodge Bog.



Fig. 2. Lodge Bog, Co. Kildare, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line. There are two SMRs in the rehabilitation area.

Previous assessments

Lodge Bog has been the subject of an Environmental Impact Assessment Report caried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01 (Whitaker 2018). This assessment included a review of the topographical files and finds registers of the National Museum of Ireland carried out in 2014 and intended to identify all finds from the bog reported to the Museum by that date and these finds are included below (Pers Comm. Jane Whitaker). The assessment noted that there was a high potential for archaeological features to be uncovered during the course of any future development works in Knappoge Bog.

Reported finds

As noted above the Environmental Impact Assessment Report caried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01 contains a complete list of known

finds from Lodge Bog reported to the National Museum of Ireland up to 2014. The finds are included below in Table 3.

Townland	Museum No.	Description
Lullymore East	IA/194/64	Stone battle axe and bronze sword blade
Lullymore East	1989:16	lower part of a rotary quern

Table 3. List of archaeological finds from Lodge Bog reported to the National Museum of Ireland.

Archaeological investigations

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

Impact assessment

A total of eight sightings of archaeological material were identified and recorded in the rehabilitation area by the 2004 Peatland survey and two of these were subsequently entered into the Sites and Monuments Record. All recorded sightings of archaeological material in the rehabilitation area are included in Table 4. These sightings consisted of small quantities of wood consisting of from one to three pieces mostly exposed on the surface of the peat. KD-LGE001 was dated and found to be a modern roundwood dating to AD 1940-50. KD-LGE002 was a single piece of worked brushwood dated to the medieval period (AD 1430 to 1650) that was sampled and removed from the bog. KD-LGE006 was visible as three roundwoods in the drain face and as LIDAR data does not record peat removed from this location it may survive (see Table 5). The LIDAR data which records the quantity of peat removed from each sighting since 2008 indicates that the remaining sightings have all been removed by harvesting. (see Table 4).

Survey No.	Survey Type	Townland	SMR_NO	ITM E	ITM N	Depth BS m	Peat depth 2008	Peat depth 2020	Status
KD-LGE001	Non-Archaeological Wood	Drumsru	-	672164	724268	0	75.05	75.17	Gone
KD-LGE002	Wood Remains	Drumsru	KD012-018---	672119	724322	0	75.71	75.88	Gone
KD-LGE003	Wood Remains	Drumsru	-	672004	724465	0	74.99	74.80	Gone
KD-LGE004	Wood Remains	Drumsru	-	672168	724736	0	73.43	72.79	Gone
KD-LGE005	Wood Remains	Drumsru	-	672124	724756	0	74.13	73.53	Gone
KD-LGE006	Platform (poss)	Drumsru	KD012-019---	671539	724561	0.15	74.47	74.56	May survive
KD-LGE007	Wood Remains	Allenwood South	-	672509	725971	0	76.80	75.99	Gone
KD-LGE008	Wood Remains	Allenwood South	-	672405	726077	0	76.96	76.29	Gone

Table 4. All the known sightings in the rehabilitation area with the Lidar depth data.

Survey No.	Survey Type	Townland	SMR_NO	ITM E	ITM N	Depth BS m	Peat depth 2008	Peat depth 2020	Status
KD-LGE006	Platform (poss)	Drumsru	KD012-019---	671539	724561	0.15	74.47	74.56	May survive

Table 5. The Possibly surviving sighting in the rehabilitation area

Recommendations

There is one possibly surviving sighting in the rehabilitation area KD012-019---**.** The area of this monument should be avoided by the regeneration works with a 20m buffer. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

Conclusion

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

possibly surviving sighting in the rehabilitation area KD012-019---**.** The area of this monument should be avoided by the regeneration works with a 20m buffer. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

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Dr. Charles Mount
17 January2022

APPENDIX XIII. WATER QUALITY MONITORING RESULTS FOR LODGE BOG

Table AP13.1. Water quality data for 12 months from November 2020 to Dec 2021 at Lodge bog.

PCAS SW Sampling Scheme					Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21
Allen Group	P0503-01	Lodge	452	SW60	4	12	8	9	2	2	4	2	2	2	2	2	2	2
Allen Group	P0503-01	Lodge	453	SW61	4	13	7	7	2	4	6	2	5	2	6	2	2	2
				ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35
PCAS SW Sampling Scheme					Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21
Allen Group	P0503-01	Lodge	452	SW60	351	323	409	235	263	194	211	202	138	193	154	226	378	400
Allen Group	P0503-01	Lodge	453	SW61	361	342	409	231	215	185	222	177	124	190	141	229	366	68.2
PCAS SW Sampling					COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21
Allen Group	P0503-01	Lodge	452	SW60	101	99	85	33	75	57	62	65	58	57	60	68	83	55
Allen Group	P0503-01	Lodge	453	SW61	109	103	89	35	88	59	68	64	55	53	54	70	87	56
PCAS SW Sampling Scheme					pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21
Allen Group	P0503-01	Lodge	452	SW60	7.5	7.4	7.7	7.6	7.5	8.2	7.9	8.3	8.1	8.1	8.2	7.8	7.6	7.7
Allen Group	P0503-01	Lodge	453	SW61	7.5	7.4	7.1	7.6	7.8	8	8	8.2	8.2	8	8.2	7.8	7.6	7.6
PCAS SW Sampling					TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21
Allen Group	P0503-01	Lodge	452	SW60	0.09	0.11	0.09	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Allen Group	P0503-01	Lodge	453	SW61	0.12	0.1	0.08	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
PCAS SW Sampling Scheme					TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21
Allen Group	P0503-01	Lodge	452	SW60	285	282	207	213	178	333	246	371	369	294	317	270	242	228
Allen Group	P0503-01	Lodge	453	SW61	324	328	198	79	257	316	262	383	392	324	405	276	268	176
PCAS SW Sampling Scheme					Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/11
Allen Group	P0503-01	Lodge	452	SW60	0.205	0.462	0.332	0.38	0.027	0.664	0.483	0.186	0.343	0.21	0.201	0.295	0.349	0.445
Allen Group	P0503-01	Lodge	453	SW61	0.205	0.464	0.327	0.192	0.027	0.561	0.515	0.467	0.469	0.367	0.291	0.331	0.341	0.45
PCAS SW Sampling					DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21
Allen Group	P0503-01	Lodge	452	SW60	42.2	38.2	30.2	21.8	27.6	17.8	22.2	20.9	20.1	62.5	72.3	26.1	29.7	14
Allen Group	P0503-01	Lodge	453	SW61	42.2	37.9	30.8	21.6	33.1	17.9	22.2	20.1	18.9	65.8	75.7	26	31.2	21.6

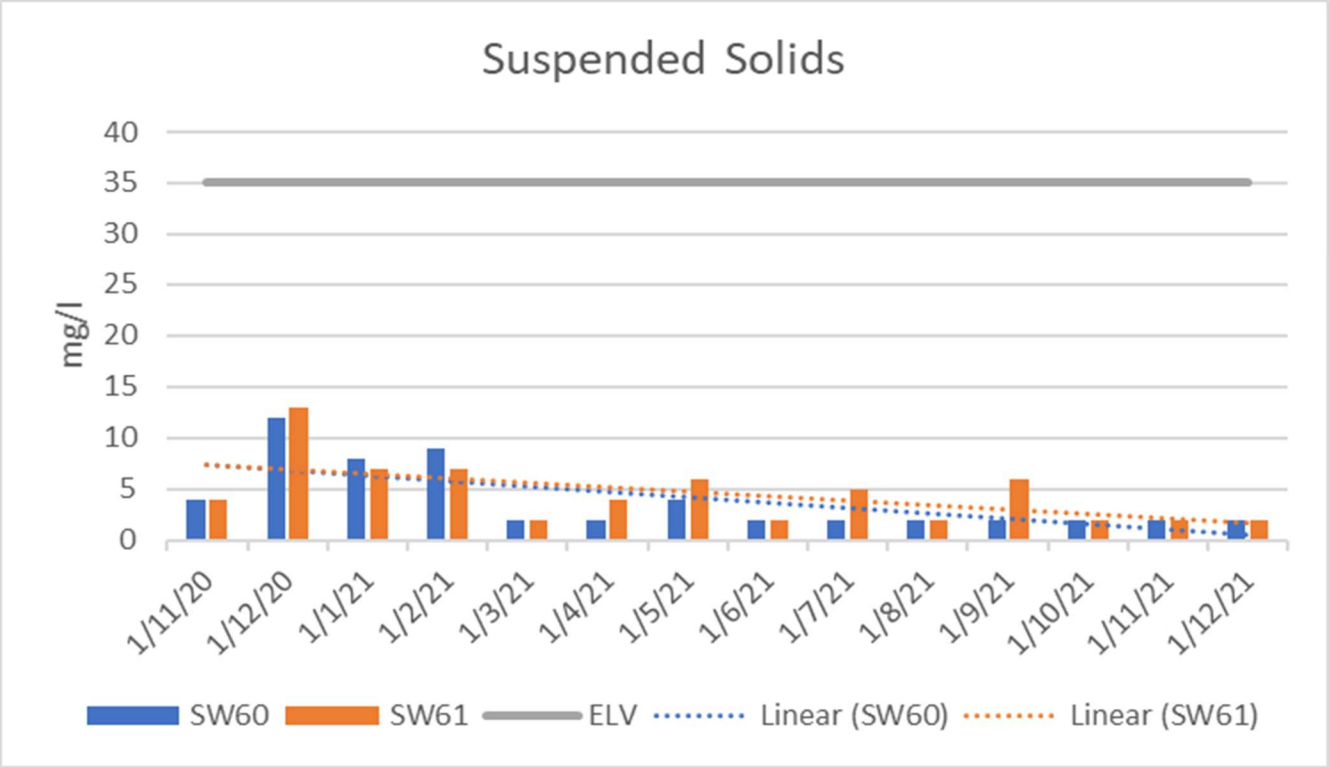


Figure AP13.1. Suspended solids in water sampling at Lodge from different discharge points. 35 mg/l is the emission limit value.

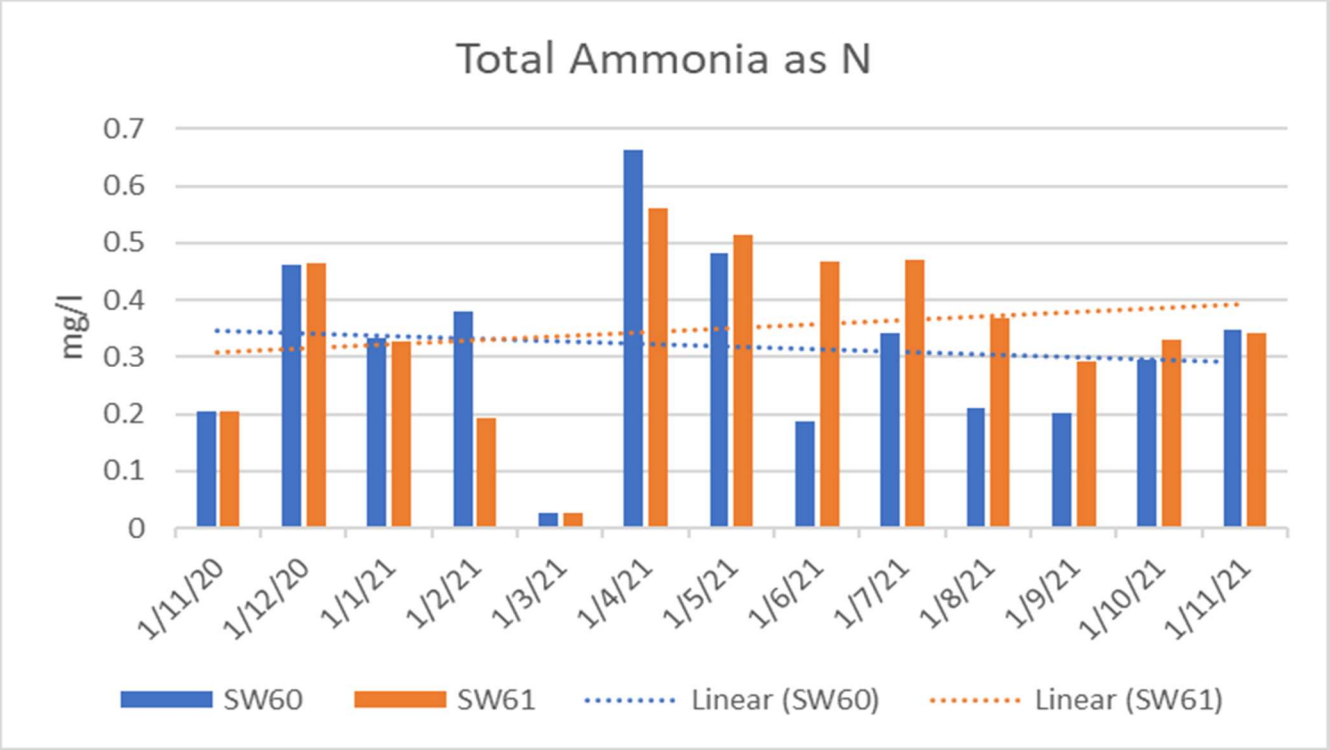


Figure AP13.2. Ammonia concentrations in water sampling from Lodge from different discharge points. The main trigger level for ammonia is 4.53mg/l for reporting to EPA.

Lullybeg Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

Draft

This document seeks to address the requirements of Condition 10.2 of Integrated Pollution Control (IPC) Licence Ref. P0503-01:

> "*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 BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Lullybeg Bog upon cessation of peat production and complements 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 Lullybeg Bog.

BnM have defined the key rehabilitation outcome at Lullybeg Bog as environmental stabilisation.

Any consideration of any other future after-uses for Lullybeg Bog, 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.

BnM are planning to develop a potential renewable energy project at Lullybeg Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

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Non-technical summary

- BnM is planning to rehabilitate Lullybeg Bog, located approximately 5 km west of Allenwood, in Co Kildare.
- Lullybeg Bog was in industrial peat production since the 1930s and supplied turf for fuel and energy and latterly milled peat for electricity production. The site was part cutaway in the 1990's. Peat production at this site ceased in 2004.
- The majority of the site is now vegetated and developing pioneer and maturing habitats. Part of the site was also developed as a conifer forestry by Coillte in the 1980's.
- The Lullybeg Butterfly Reserve is part of this site and is a site of high ecological value, due the presence of Marsh Fritillary and a range of other rare and scarce species.
- BnM are planning to develop a potential renewable energy project at Lullybeg Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The wind farm planning boundary overlaps Lullybeg Bog and is considered as a constraint in the rehabilitation plan. Lullybeg Bog will be rehabilitated as part of the Ballydermot Wind Farm development or at a later date. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing vegetation and promoting re-establishment of more typical cutaway peatland communities such as Birch woodland, Reedbeds, fen habitat and *Sphagnum*-rich embryonic bog communities (putting a "skin" back onto the peat), and minimising effects to downstream waterbodies.
- It will take some time for vegetation and habitats to fully develop at Lullybeg, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures will be planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog 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.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and *Sphagnum* rich embryonic bog communities (on deeper peat); and wetlands with Reedbeds and Birch woodland on shallower peat. In time a naturalised peatland can be developed.
- The development of a range of habitats at Lullybeg Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses, and peatland rehabilitation is an opportunity to create new wetland habitats.
- This peatland rehabilitation plan does not outline future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development

will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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INTRODUCTION

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen-Lullymore bog group (Ref. P0503-01). 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 Allen Bog Group comprises 2 main sub-groups: Clonsast and Lullymore. Lullybeg Bog is part of the Allen-Lullymore bog group (see Appendix I for details of the bog areas within the Allen bog group).

Lullybeg Bog is located in Co. Kildare, adjacent to Lullymore and approximately 5km west of Allenwood. Lullybeg bog is located at the eastern edge of the central section of the bogs within the wider footprint of Ballydermot Bog.

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This **draft** rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Lullybeg Bog and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are NOT proposed as part of this draft Lullybeg rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Lullybeg will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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 document covers the area of **Lullybeg Bog**.

The northern section of Lullybeg was developed as conifer forestry developed by and leased to Coillte in the 1980's. This area has been mapped as a constraint.

The northeastern section (7.3ha) of Lullybeg has an ongoing management agreement with Butterfly Conservation Ireland (BCI) since 2009 - Marsh Fritillary (*Euphydryas aurinia*) butterfly site (Lullybeg Butterfly Reserve).

BnM are planning to develop a potential renewable energy project at Lullybeg Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). This proposed wind farm project is located within Lullybeg Bog as well as the adjacent BnM bogs of Ballydermot, Barnaran, Blackriver, Codd, Derrybrennan, Glashabaun, Killinagh, Lodge, Lullymore and Ticknevin. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm has been taken into account in the preparation of this Rehabilitation Plan. Where proposed wind farm infrastructure overlaps with areas identified for rehabilitation, the timing and sequencing of rehabilitation measures will be coordinated with the proposed development. Accordingly, these areas are treated as a temporal consideration in relation to the implementation of rehabilitation measures.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Lullybeg Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Lullybeg Bog 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 or issues such as rights of way.

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METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan'* (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2012 to 2026 inclusive), monitoring and desktop analysis, form the basis for the development of this 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
  Hydrological modelling.

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.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.

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- 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, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027;
- BnM Annual Report 2025;
- 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 BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Lullybeg Bog was surveyed in 2011. Additional ecological walk-over surveys and visits have taken place at Lullybeg Bog between 2015-2026. 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 (2019), while mosses and liverworts nomenclature follows identification keys published by the Atherton *et al.,* (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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SITE DESCRIPTION

Lullybeg Bog is a sub-section of a larger unit called Ballydermot Bog and is located adjacent to Lullymore and is 5 km west of Allenwood in Co. Kildare. Lullybeg bog is surrounded by the Crabtree River on three sides as it flows west in a semi-circular course. The northern section of Lullybeg was developed as conifer forestry developed by and leased to Coillte in the 1980s. The central section of Lullybeg has been developing as cutaway since the 1990s. Part of this area was also used for sod turf extraction up to 2020, with some areas being used to extract peat and other areas being used as spread-grounds for turf. This activity has now ceased. The southern part of Lullybeg was used for milled peat extraction up to 2015.

The majority of the site has vegetated and contains typical cutaway habitats with Birch scrub/woodland and some wetland vegetation in patches with pioneer grassland, fen and Reedbeds. Areas used to extract sod turf are basins developing as wetlands. Areas used as spread-grounds until recently are generally bare peat. Lullybeg has a gravity drainage system. The Lullybeg Butterfly Conservation Ireland site is located in the north-east corner of this bog.

See Drawing number BNM-ECO-26-14-01 titled *Lullybeg Bog: Site Location Map*, included in the accompanying Mapbook[1] , which illustrates the location of Lullybeg Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Lullybeg Bog was in full industrial peat extraction since 1935 and supplied milled peat for electricity production. Much of Lullybeg Bog is now cutaway and the majority of the original raised bog has now been removed.

3.1.2 Current land-use

Part of Lullybeg has been planted with conifer forestry by Coillte since the 1980's (BnM Lullymore). The primary management objective is timber production, while some undeveloped and broad-leaved forestry has been zoned for biodiversity. Coillte have timber production and biodiversity management plans for the site.

A small area of cutaway at Lullybeg has been managed by Butterfly Conservation Ireland in partnership with BnM and has been identified as containing a very diverse butterfly fauna, including Marsh Fritillary (*Euphydryas aurinia*). Marsh Fritillary is an Annex II EU Habitats Directive species. The site is also used by other species of conservation value, such as Otter (*Lutra lutra*) and Kingfisher (*Alcedo atthis*).

BnM are planning to develop a potential renewable energy project at Lullybeg Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project is located within Lullybeg Bog as well as the adjacent BnM bogs. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm infrastructure **partially** overlaps with the Lullybeg Bog (see drawing number BNM-ECO-26-14-20: Standard Rehab Measures); these (infrastructure) areas have been treated as a constraint in the rehabilitation plan.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Lullybeg Bog Map Book

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

  a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

  b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

xxv. All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3 Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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.

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 Lullybeg Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPL).

As the primary employer in many Midland counties, BnM 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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The bedrock geology[2] of Lullybeg Bog is predominantly thick-bedded limestone, locally peloidal (Allenwood Formation) along with Crinoidal wackestone/packstone limestone (Ballyadams Formation) to the west. The bedrock geology is therefore predominately alkaline (less acidic).

The sub-soils are classed as cutover peat. A sandy, marl sub-soil is found along the Crabtree River, where there are profiles exposed. This is alluvial in development and is likely to underlie the cutover peat.

3.2.2 *Peat type and depths*

Much of Lullybeg Bog is now cutaway and the majority of the original raised bog has now been removed. In general, between 0.5-1.5 of residual peat remains across the majority of the site. There is some deeper peat towards the southern margin with pockets of 2-3 m of peat present.

3.3 Key Biodiversity Features of Interest

The different cutaway habitats developing across the site reflects the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All sites have hydrological gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and ground-water has a stronger influence.

The site is already developing a range of cutaway habitats. Birch woodland is developing towards the north-east, where the bog is relatively dry. The central zone has a range of bare peat, pioneer cutaway habitats including poor fen dominated by Rushes and Sedges, Reed-swamp, wet scrub and immature Birch woodland. Some diverse dry calcareous grassland is developing along the western margin where there are pockets of underlying limestone till.

The northeastern section of Lullybeg contains the Butterfly Conservation Ireland site with Marsh Fritillary (*Euphydryas aurinia*) butterfly and several other butterfly and moth species of conservation value. Marsh Fritillary is an Annex II EU Habitats Directive species. Alder Buckthorn (*Frangula alnus)* is found in the butterfly conservation section of the bog. This species is a nationally rare Red List plant species.

Round-leaved Wintergreen (*Pyrola rotundifolia*) is found in Birch scrub in the centre of the southern third of the site as well as within the northwestern section of Lullybeg. This species is a nationally scare Red List plant species

[2] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0

listed as 'Near Threatened' in the Ireland Red List (Wyse-Jackson *et* al., 2016). The presence of Round-leaved wintergreen is significant and enhances the rare flora resource of Co. Kildare.

Several tussocks of Great Fen-sedge/Saw sedge (*Cladium mariscus*) were recorded within the eastern section of the site, an indicator of rich fen development. This is a scarcer coloniser of cutaway and enhances the potential biodiversity value of the site. Buckthorn (Purging) (*Rhamnus cathartica*) was recorded within the southern margin of Lullybeg.

The Crabtree River is an important ecological corridor and there are several patches of Ash-Hazel woodland (WN2) and Blackthorn-dominated scrub developing.

The site is used occasionally by Hen Harrier and small flocks of Golden Plover and Lapwing in the winter (Biosphere Environmental Services 2014).

A detailed ecological report for Lullybeg is provided in Appendix II.

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present include:

- Birch scrub with emergent (eBir), open (oBir) and closed scrub (cBir) all present (WS1)
- Pioneer poor fen communities, with Soft Rush-dominated vegetation (pJeff) are most common, and Bog Cotton-dominated vegetation (pEang) less prominent. Minor amounts of *Campylopus*-dominated (pCamp), Bottle Sedge-dominated (pRos) and Arrowgrass-dominated vegetation (pTrig) present (PF2)
- Small amounts of pioneer Heather-dominated vegetation (dHeath) around the edges of the site (PB4)
- Minor amounts of Reedbeds dominated by Common Reed (pPhrag) (FS1)
- Relatively small areas of temporary open water (tOW)
- Conifer plantation (WD4)
- Several dry grassland communities including dry calcareous grassland (gCal) and a Cocksfoot-Sweet Vernal grass community (gCo-An) (GS1)

The most common habitats found around the margins of the site include:

- Birch woodland (WN7)
- Scrub (WS1) (Blackthorn and Birch)
- Cutover bog (PB4) (several small fragments)
- Ash-Hazel woodland (WN2)) (along the Lugherra River)
- Dense Bracken (HD1)
- Silt Ponds (Silt) with associated habitats such as scrub

[3] Categories in brackets refer to the current BnM classification system for vegetation communities, along with an equivalent Heritage Council habitat classification or Fossitt Code, where relevant.

See Appendix II for more detail on site, habitats and local features.

See Drawing number *BNM-ECO-26-14-17 Lullybeg Bog: Habitat Map 2018*, included in the accompanying mapbook, which illustrates the habitats at Lullybeg Bog.

3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Lullybeg Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC). Multiple mammal species have been recorded on or within 1 Km of the bog including Irish Hare (*Lepus timidus subsp. Hibernicus)*, Fox (*Vulpes vulpes*), Eurasian Badger (*Meles meles),* Pine Marten (*Martes martes*) and European Otter (*Lutra lutra*).

The butterfly species Common Blue, Speckled Wood, Small Copper and Meadow Brown have all been recorded during BnM surveys. Twenty-two species of butterfly including Marsh Fritillary have been recorded at this site (Reserve – Butterfly Conservation Ireland); NBDC have records for twenty-five species of butterfly within Lullybeg Bog, including the species of conservation concern Dark Green Fritillary (*Speyeria aglaja*), Dingy Skipper (*Erynnis tages*), Grayling (*Hipparchia semele*), Large Heath (*Coenonympha tullia*), Marsh Fritillary (*Euphydryas aurinia*) Small Heath (*Coenonympha pamphilus*) and Wall (*Lasiommata megera*).

Some rare moth species such as the Narrow-bordered Bee Hawkmoth, have been recorded at the site and several new county moth records have also been made in the past few years. NBDC have records for the moths of conservation interest Dark Tussock (*Dicallomera fascelina*), Forester (*Adscita statices*), Narrow-bordered Five-spot Burnet (*Zygaena lonicerae*), Small Chocolate-tip (*Clostera pigra*), Small Purple-barred (*Phytometra viridaria*) and Yellow Shell (*Camptogramma bilineata*).

Otter (*Lutra lutra*), Kingfisher (*Alcedo atthis*) and White-clawed Crayfish (*Austropotamobius pallipes*) (1990's last record) have been recorded in this area along the Crabtree River. Otter and White Clawed Crawfish are Annex II EU Habitats Directive species. Kingfisher is an Annex I Birds Directive species. The site contains Alder Buckthorn (*Frangula alnus*) (along Crabtree River and in Butterfly Conservation Ireland site). This is a scarce plant species. The site also contains Round-leaved Wintergreen (*Pyrola rotundifolia*), which is also a Red list species, whose status is now "near threatened". Saw-Sedge (*Cladium mariscus*) is present. This is an indicator species of potential rich fen (PF1).

Common Frog was also recorded on the bog.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Wood Pigeon (*Columba palumbus*), Meadow Pipit (*Anthus pratensis*), Hooded Crow (*Corvus cornix*), Blue Tit (*Cyanistes caeruleus*), Wren (*Troglodytes troglodytes*), Chiffchaff (*Phylloscopus collybita*), Blue Tit (*Cyanistes caeruleus*), Robin (*Erithacus rubecula*), Hooded Crow (*Corvus cornix*), Blackbird (*Turdus merula*) have all been recorded during BnM ecology surveys.

NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km square (N62) which Lullybeg Bog intersects include Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Partridge (*Perdix perdix*). Grey Wagtail (*Motacilla cinerea),* Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*),

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

Whinchat (Saxicola rubetra), Woodcock (*Scolopax rusticola)* and Yellowhammer (*Emberiza citrinella*). Red-listed[5] listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Red Kite (*Milvus milvus*) and White-tailed Eagle (*Haliaeetus albicilla*).

Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

There are no records for invasive species at Lullybeg recorded during BnM surveys or on the NBDC database.

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Lullybeg Bog. The nearest EU Designated sites are as follows:

- The Long Derries, Edenderry SAC (Site Code: 000925) - 4 km from Lullybeg.
- River Barrow and River Nore SAC (site code: 002162) - 15 km from Lullybeg
- Mouds Bog SAC (site code: 002331) - 12 km from Lullybeg
- Pollardstown Fen SAC (site code: 000396) - 12 km from Lullybeg.
- Ballynafagh Lake SAC (site code: 001387) - 13 km from Lullybeg.
- Ballynafagh Bog SAC (site code: 000391) - 13 km from Lullybeg

A number of non-statutory designated sites also occur in the wider area around Lullybeg Bog. The Long Derries, Edenderry pNHA, also designated under The Long Derries, Edenderry SAC is located 4 km from Lullybeg. The Grand Canal pNHA (NPWS Site Code: 002104), occurs approximately 5 km north of Lullybeg. Carbury Bog NHA (Site Code: 001388) occurs approximately 10 km north and Black Castle Bog NHA (NPWS Site Code: 000570) occurs approximately 13 km northwest. Ballina Bog pNHA (NPWS Site Code: 000390), occurs approximately 15 km north of Lullybeg. Hodgestown Bog NHA (NPWS Site Code: 001393), occurs approximately 12 km east of Lullybeg.

See drawing *BNM-ECO-26-14-23: Proximity to Designated Sites* in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar sites located in proximity to Lullybeg Bog. The nearest Ramsar sites are Pollardstown Fen located approximately 12km southeast and Raheenmore Bog located approximately 25 km west of Lullybeg Bog.

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

3.5 Hydrology and Hydrogeology

Lullybeg bog forms part of the Barrow Catchment (Catchment ID: 14) as defined by the EPA under the Water Framework Directive (WFD). The bog lies completely within the Figile_SC_010 sub-catchment.

Lullybeg Bog discharges to the local water-courses (EPA code Lullymore East-14L11, also known as the Crabtree River) and Lullybeg (EPA code Lullybeg14L13). These water-courses surround the northern western and southern margins of the bog. These water-courses flow east to the Figile River.

GSI data indicates that Lullybeg Bog lies entirely within a regionally important bedrock aquifer. An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential and further subdivided based on the type of openings through which groundwater flows.

Lullybeg Bog is located in an area mapped by GSI as of low and moderate groundwater vulnerability (GSI Map viewer). Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low/moderate risk of any groundwater contamination occurring at this site.

Quaternary sediment maps show that Lullybeg Bog is generally underlain by cutover raised peat. This combination of sediment is common in the wider context surrounding the site.

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 Lullybeg 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 bi-annual basis by BnM 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.

Lullybeg Bog has one surface water outlet to the Barrow catchment. The bog drains north towards a silt pond. The outlet is directed to the Lullymore East River and onto the Figile River. This river is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds, associated surface water emission points and monitoring and sampling locations are detailed in Drawing numbers BNM-ECO-26-14-02 titled *Lullybeg Bog: Structures and Sampling*, along with Drawing

number BNM-ECO-26-14-WQ01 titled *Lullybeg Bog: Water Quality Map* included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Lullybeg 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also 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*., 2017). Bog rehabilitation is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) 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 BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Lullybeg has been completed. This discharge will have improved 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 watercourse receptors and the Slate_SC_010 sub-catchment and will support the future status of the watercourses achieving Good Status. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Water quality monitoring will be established. 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.

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 monitoring for pH, suspended solids, total solids, total phosphorus, total ammonia, colour, and COD.

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3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.,* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/year) based on Tier 1 Emission factors (Evans *et al.,* 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al.* 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the longterm warming effect of continued CO_2 emissions (Gunther *et al.* 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Lullybeg 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. The majority of the bog will develop as Birch woodland on drier areas and peripheral headlands. Fen Reedswamp and wet woodland will develop in the wetter cutaway areas.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Lullybeg Bog can be rated as **Local Importance; lower value** to **Local Importance; higher value.** Bare peat in the former production area of Lullybeg Bog is assessed as **local importance (lower value)**.

Lullybeg Bog is developing as a diverse mosaic of cutaway habitats including fen, calcareous grassland, reedbeds and open water, as well as Birch woodland/scrub and old mixed broadleaved woodland (Blackthorn and Birch), Ash-Hazel woodland (WN2). These habitats may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

The Lullybeg Butterfly Reserve can be rated as **National Ecological Importance,** due to the presence of Marsh Fritillary butterfly and other rare and sensitive species.

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Lullybeg Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity, and other general topics over the years about Ballydermot Bog within Allen bog group, including Lullybeg Bog, with various stakeholders in relation to:

- Forestry management with Coillte.
- Management of Lullybeg Butterfly Reserve with Butterfly Conservation Ireland.
- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Lullybeg Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Lullybeg Bog.

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

4.2 Topics raised by Consultees

N/A Yet as consultation has not commenced.

4.3 BnM response to topics raised during consultation

N/A Yet as consultation has not commenced.

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5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect planned renewable energy infrastructure or areas required for this proposed project.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Integrating rehabilitation measures with existing land-use (e.g. conifer forestry). It is not proposed to change or affect any conifer or commercial forestry.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of a peatland used for industrial peat production, in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is some potential for the creation of wet cutaway habitats at Lullybeg Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Lullybeg Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. The site has already developed pioneer and maturing cutaway habitats and much of the site is stabilised.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). this will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- 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 portion of this site has potential to develop *Sphagnum*-rich habitats in this timeframe.

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Nevertheless, re-wetting across the entire bog, 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 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 BnM). Reducing pressures due to former peat extraction activities at Lullybeg 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 BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g. Timahoe South, and Lodge Bog in 2022-2023) and have previously carried out re-wetting and rehabilitation at Lullymore bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Lullybeg Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Lullybeg bog is part of the Allen-Lullymore bog group.
- The local environmental conditions of Lullybeg Bog mean that targeted drain blocking is the most suitable rehabilitation approach for this site.
- The key goals and outcomes of rehabilitation set by BnM. BnM have defined the key goal and outcome of rehabilitation at Lullybeg Bog as **environmental stabilisation and optimising residual peat re-wetting,** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Windfarm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Lullybeg Bog. In areas associated with proposed wind farm infrastructure, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- The cutaway is already developing a mosaic of Birch scrub/woodland, wetland and cutaway peatland habitats. Much of this cutaway is largely stabilised already. A portion of the site has bare peat. Rehabilitation is proposed to enhance residual peat re-wetting across the site, while taking account of current (forestry and nature conservation) land-use.
- Current land-use includes forestry, where drainage will be maintained, and this will be treated as a constraint.
- Current land-use also includes nature conservation (Lullybeg Butterfly Reserve). This initiative will continue to be supported by BnM.
- Rehabilitation of Lullybeg Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent. At Lullybeg there are ecological indicators of alkaline water chemistry present in the wetlands, such as Saw Sedge. This is an indication that fen habitats will develop at this site in mosaic with other habitats. The western side of the site is somewhat lower and has the

potential to act as a basin. There is some potential to develop some wetland habitats in this area by blocking main outfalls and raising the water-level somewhat. There is some deeper peat towards the southern end of the site that would have the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised.

- **Potential land-use.** It is expected that BnM will update and finalise the draft rehabilitation plan for Lullybeg when a decision is made in relation to the wind farm planning application. BnM remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC license. The targeted rehabilitation measures set out in this Rehabilitation Plan will be implemented following completion of the construction phase of the proposed Ballydermot Wind Farm in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.
- **Land-use**. The northern part of the bog has been developed for forestry. The drainage of this area will have to be maintained. Part of the site is also managed for nature conservation as part of the Lullybeg Butterfly Reserve. There is ongoing activity to enhance the conservation value of this area including scrub removal and some cattle grazing in the past. These positive management activities are supported by BnM.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM 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**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to BnM Archaeological Liaison Officer and the National Museum of Ireland (Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

6.2 Key Assumptions

- It is assumed that BnM 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.

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6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Lullybeg 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 Lullybeg Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial drainage activities.

Rehabilitation is generally defined by BnM 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 a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g. potential suspended solids run-off).

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

- Rewetting of residual peat in the area originally drained for industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat forming habitats. 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 BnM 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 Longford Pass 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 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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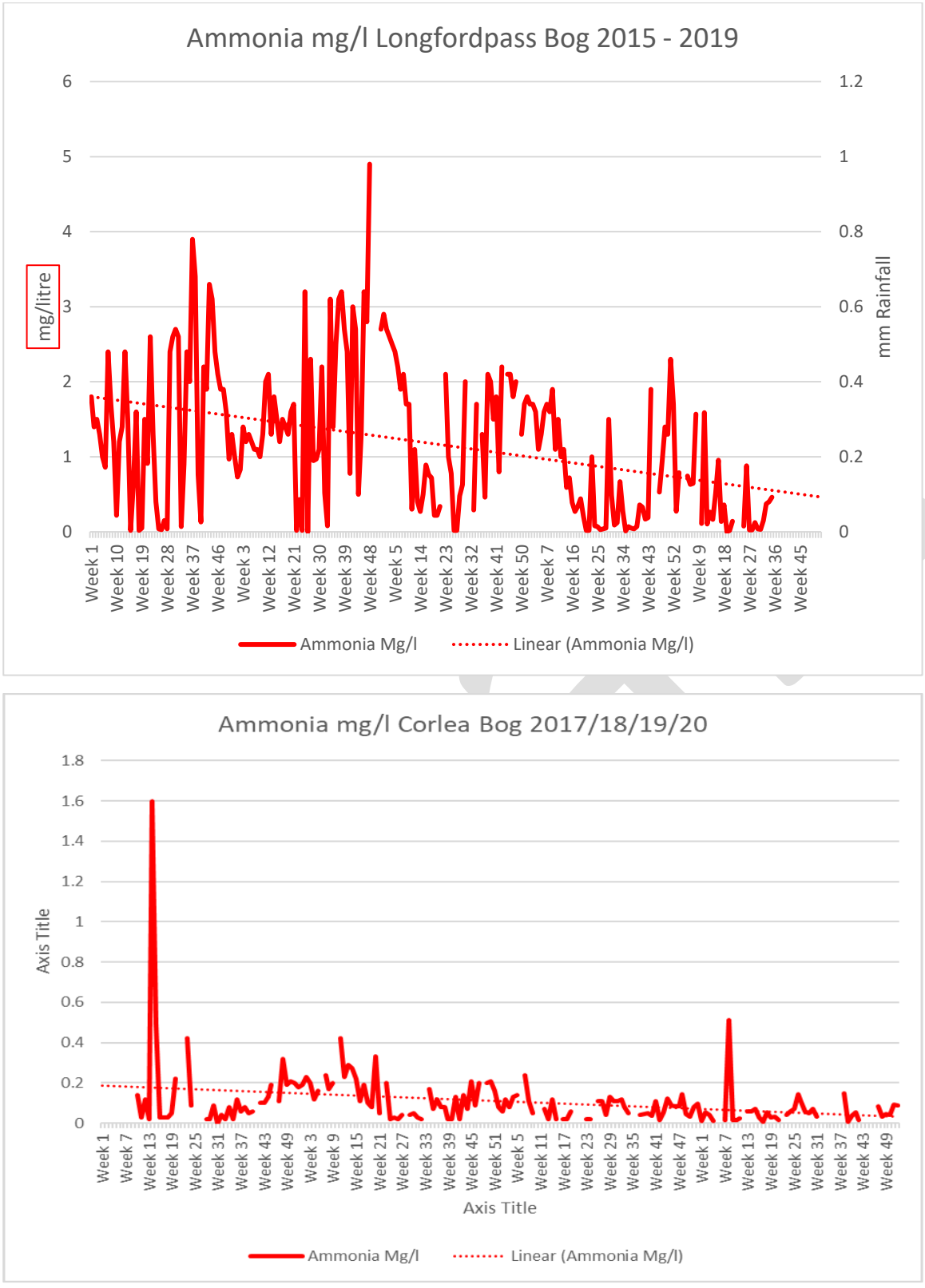


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

Table 0.1 Summary of Success criteria, targets, how various success criteria will be measured and expected time-frames.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and 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 based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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, these are included in the accompanying Mapbook as the drawings referenced below:

BNM-ECO-26-14-21 Lullybeg Bog: Aerial Imagery 2000

BNM-ECO-26-14-22 Lullybeg Bog: Aerial Imagery 2020

BNM-ECO-26-14-04 Lullybeg Bog: Peat Depths

BNM-ECO-26-14-03 Lullybeg Bog: LiDAR Map

BNM-ECO-26-14-09 Lullybeg Bog: Depression Analysis

The restoration and rehabilitation measures are provisionally outlined in drawing titled BNM-ECO-26-14-20 ***Lullybeg Bog: Rehabilitation Measures*** in the accompanying Mapbook.

These rehabilitation measures for Lullybeg Bog will include (see Table 8.1):

- Much of the cutaway has already vegetated and stabilised. A widespread drain-blocking programme will be implemented across the cutaway, where possible to re-wet cutaway and re-wet to the optimum water-level. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat and deeper residual peat towards the southern end of the site.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established. This targeted drain-blocking will have to consider land-use constraints (forestry).
- Measures may include modifying outfalls and managing water levels with overflows.
- Wetland measures including blocking outfalls and managing water levels with overflows.
- 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).

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Table 8.1: Types of and areas for rehabilitation measures at Lullybeg Bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

Type	Code	Description	Area (Ha)
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	83.2
Wetland cutaway	WLT1	Modifying outfalls, targeted drain-blocking and managing water levels with overflows to re-wet cutaway	61.0
Marginal land	MLT1	No work required	24.5
Silt Pond	Silt Pond	Silt Pond	0.1
Ballydermot Wind Farm	Wind Farm Infrastructure + Buffer	Wind Farm infrastructure areas including turbine bases, internal access roads and turning points, crane hard stand and peat and spoil areas.	43.8
	Renewables Footprint	Areas associated with the proposed Ballydermot Wind Farm where rehabilitation measures will be appropriately sequenced including enhancement areas and scrub planting.	1.8
Constraint	Constraint	Access track, Butterfly Conservation Ireland site, retained drainage infrastructure and forestry	52.7
Total Area			**267.1**

8.1 Completed and Ongoing

- Part of Lullybeg bog was developed as conifer forestry by Coillte in the 1980's. This forestry (conifer plantation) has established and is considered to be rehabilitated. Issues of forestry management will be addressed during forestry operations in the forested sections of the site by Coillte, and under the appropriate Felling Licence as granted by the Forest Service.
- A significant portion of the site has already developed vegetation cover and is developing a mosaic of typical cutaway peatland habitats including Birch woodland and small wetlands. Natural re-colonisation of the cutaway so far has been quite effective. Some areas remain bare peat – former headlands, travel paths and areas used for peat extraction until recently. These bare peat areas are with colonisation of pioneer vegetation.

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

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Lullybeg Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements will be carried out

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- 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) will be 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.
- Appropriate Assessment (AA) of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- 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.

8.4 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 9 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.

8.5 Timeframe (to be adjusted when finalised)

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions.
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation**: Decommission silt-ponds, if necessary

8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a ‘standard’ rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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.
- 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.
- Monitoring results will be maintained, trended 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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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 BnM 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.

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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 have 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.

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APPENDIX I. BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow catchment, and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and Timahoe South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied an old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly, via the BnM industrial railway. Many bogs were in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long-term peat extraction activity reduced the peat depth on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen-Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Lullymore in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Lullybeg by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 and 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow piped outfall. Some cutaway bog at Lullymore, used as spread grounds for sod peat, was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly Conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries, Edenderry SAC (site code: 000925) is located in the Lullymore Bog sub-group. Glashabaun Bog (northern sub section) overlaps the SAC and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is an esker and BnM used the site in the past to extract gravel for the construction of railway embankments across BnM bogs. Rare plants including Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations.

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation commenced is ongoing.

A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC Licence Ref. P0503-01, and current, indicative peat production status, is outlined in Table Ap-1.

Table Ap-1 Allen-Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since the 1950s. Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Glashabaun South	569	Peat extraction since 1950s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss *Sphagnum* inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023
Lullybeg	271	Peat extraction since the 1930s. Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2004	Draft 2026
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group – amenity.	1992	Draft 2026
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019 Majority of bog still has relatively deep peat	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production. Cloncannon bog remnant – zoned for biodiversity	2019	Draft 2026

Draft

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Mostly bare peat. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.		
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection	N/A	N/A
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab ongoing

See Drawing number *BNM-ECO-26-14-24 Bog Group Map*, included in the accompanying Mapbook which illustrates the location of Lullybeg Bog and the Allen-Lullymore Bog Group in context to the surrounding area.

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Lullybeg West** **Ballydermot**	**Area (ha):**	267 ha (Lullybeg production bog)
Works Name:	Ballydermot	**County:**	Kildare
Recorder(s):	MMC	**Survey Date(s):**	5-6/09/2011

Habitats present (in order of dominance)

The most common cutaway habitats present at this site include:

- Bare peat (BP) including former sod peat production areas
- Conifer plantation (WD4) planted on cutaway bog. Some failed.
- Birch scrub (oBir, cBir) and woodland (BirWD) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Pioneer poor fen dominated by Soft Rush (pJeff) and/or Bog Cotton (pEang).
- Minor development of other poor fen communities dominated by Marsh Arrowgrass (pTrig) and Horsetail (pEq).
- Minor development of other pioneer cutaway communities such as Common Reed (pPhrag), calcareous grassland (gCal) and rank grassland (gCo-An).
- Pioneer wetland dominated by Bottle Sedge and Bog Cotton (pRos/pEang). Also contains Saw Sedge.

Other habitats found around the margins of this site (not on production bog/cutaway) include:

- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)
- Scrub (WS1) (Blackthorn scrub and Birch scrub)
- Ash-Hazel woodland (WN2) (along Lugherra River)
- Dense Bracken (HD1)

Description of site

Lullybeg West is defined as BnM Lullybeg production area. This is surrounded by the Crabtree River on three sides as it flows west in a semi-circular course. Lullybeg wetland (previously surveyed in 2010) is located adjacent to the east side of this site and the Butterfly Conservation Ireland site is located in the north-east corner of this section. The site can be divided into three main sub-sections; the conifer plantation and sod-peat cutting area to the north, the central cutaway habitat area and the production area to the south. One feature of interest is that there are no small patches of high bog scattered around the site. Any remnant high bog has developed into other habitats such as Birch woodland (WN7).

Conifer plantation/Sod-peat cutting area

This sub-section is located at the northern end of the site. It includes post-thicket un-thinned conifer plantation (WD4). Adjacent to this is bare peat, which was used as a sod peat spread-ground. Peat was being harvested from the edges of this area until recently (2021). The western side along the Lugherra River is relatively diverse with patches of Ash-Hazel

woodland (WN2) and Hazel/Blackthorn scrub (WS1) developing. These habitats are developing on mineral alluvial soils or where the peat is very thin. Some of this ground had been farmed in the past. The former habitats are developing in mosaic with Birch woodland (WN7) and scrub (cBir) where the peat is deeper. Some former access routes are now disused and are closing in with scrub. Dense Birch woodland (BirWd, cBir) has developed along the Figile River. There is sandy glacial/alluvial sub-soil exposed along this river.

The western side of this section is somewhat more diverse than typical Birch woodland and associated habitats due to the influence of the streams, remnant riparian vegetation and thin peats. Ash, Hazel, Guelder Rose, Spindle, Hawthorn and Blackthorn all appear along the banks of the Figile River. A small area of more mature bog woodland with tall Birch is found in association with dense Bracken (HD1) and some rank grassland (gCo-An). This area may have been grazed in the past. There are also two distinctive (Grey?) Popular trees at this location that are much taller than the surrounding Birch woodland.

Cutaway area

This sub-section contains some typical pioneer cutaway habitats, much of which is developing towards Birch woodland. It is a mosaic of different habitats at different stages. Bare peat-dominated fields are scattered all through the area as a result of on-going sod peat production. Between these fields there are typical pioneer cutaway habitats. Birch scrub and poor fen are the most common habitats. The densest Birch woodland (BWD) is located in the north-east corner.

There are some series of fields through this section with dense scrub/woodland adjacent to fields at a much younger stage of development through this section. The western side tends to have much younger cutaway vegetation and fields emerging along the southern boundary are also at a much younger stage. Some Marsh Arrowgrass-dominated vegetation appears in some of the recently abandoned fields along the southern boundary.

Most of this section is quite dry and there are few water-logged areas where wetland vegetation is developing. One such small area is dominated by Bottle Sedge and also contains several clumps of Saw Sedge. There are no significant areas of open water present. Several wet areas towards the western side tend to be dominated by Bog Cotton. Some Common Reed has spread over several fields along the western side.

There is a small area of more diverse calcareous grassland (gCal) located at the north-western corner. This area is not unlike the Butterfly Conservation Ireland area and has potential to be managed in a similar manner. This area contain Knapweed, Cocksfoot, Sow-thistle, Birdsfoot, Angelica, False Oat-grass, Marsh Thistle, Hemp Agrimony, Marsh Pennywort, Strawberry, Brambles, Rose, Dandelion, Carrot, Mint, Soft Rush, Hard Rush and Jointed Rush. There are patches dominated by Devil's Bit with Purple Moorgrass occasional (see photo). One feature of this area is that is transitions into Yellow Sedge-dominated vegetation (pVir), which has potential rich fen features. Greater Tussock-sedge (*Carex paninculata*) is relatively frequent in this area.

Former Peat extraction area

This area is dominated by bare peat and is located at the southern end of the site. The western boundary between Lullybeg and Blackriver is marked by a track along the side of Crabtree River. This stream is found within steep embankments vegetated with rank grassland (GS2) and or Dense Bracken (HD1) with patchy scrub and Birch woodland. Species such as Hawthorn, Guelder Rose, Ash and Spindle are all found on these embankments. Alder Buckthorn was noted in the Birch-dominated scrub along the edge of the track at the south-west corner of Lullybeg. Dense Birch woodland (WN7) is present at the southern end of the site, on former high bog.

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

None

The nearest designated site to this sub-section of Ballydermot is 3.6 km NE to the Grand Canal pNHA (NPWS site code 002104).

Adjacent habitats and land-use

Wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), scrub (WS1), Birch woodland (WN7), cutover bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

Watercourses (major water features on/off site)

- The Crabtree River flows west along the SE, S and W sides of Lullybeg West. The Figile River flows west through the northern end of the site. The Lugherra River flows south along the north-east boundary of the site. All three rivers meet around Shanovoola (old farm) and flow west as the Figile River. All of the rivers have been channelized in deep embankments.
- There are patches of Blackthorn-dominated scrub (WS1) and patches of Ash-Hazel woodland (WN2) along the Lugherra River.
- The upper reaches of the Figile River flows from the Butterfly Conservation Ireland site. There are records of Otter from this site. Otter spraints have been recorded around the silt ponds to the east (adjacent to Lullybeg wetlands). White Clawed Crayfish was recorded from this stream and from the Crabtree River during drainage works in the 1990's.
- This section of Ballydermot drains towards the Figile River and is located in the South-Eastern Barrow catchment.

Peat type and sub-soils

A sandy, marl-like sub-soil is found along the Crabtree and Figile Rivers, where there are profiles exposed. This is likely to be alluvial in development.

Fauna biodiversity

Birds

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

- Several common species such as Wren, Chiffchaff, Blackbird, Blue Tit, Meadow Pipit, Wood Pigeon, Grey Crow were recorded on the site.

Mammals

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

- Hare
- Badger signs

Other species

Several butterflies were noted including Small Copper, Large Blue, Speckled Wood and Meadow Brown.

In addition there are numerous butterfly, moth and other species records from the Butterfly Conservation Ireland site (see annual reports). Kingfisher, Water Rail, Teal, Woodcock, Buzzard, Red Squirrel and Otter found here during 2010. (http://www.butterflyconservation.ie/wordpress/?page_id=259). Twenty-two species of butterfly including Marsh Fritillary have been recorded at this site. Some rare moth species such as the Narrow-bordered Bee Hawkmoth, have been recorded at the site and several new county records have also been made in the past few years.

Fungal biodiversity

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N/A
References European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI. Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

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

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

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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 Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2026-2030

The All-Ireland Pollinator Plan 2026-2030outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2004, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM lands. The Bord na Móna

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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 BnM'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.

14 BnM commitments

BnM 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.

In line with BnM'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. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. 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.

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APPENDIX VI. 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 BnM 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	Lullybeg Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Not relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

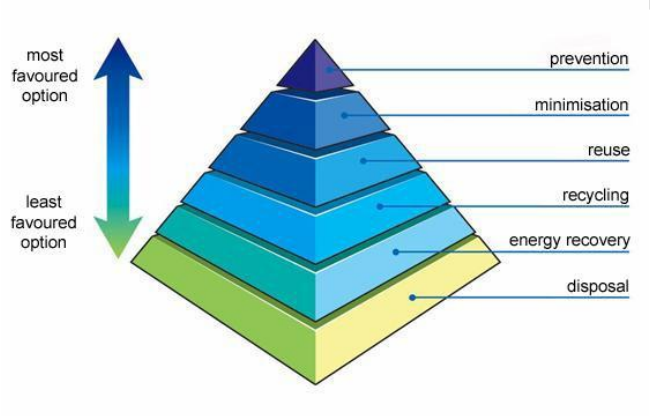
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 cutover 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

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

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide (SER, 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant, 1999) and the **improvement**

of ecological conditions in damaged wildlands through the **reinstatement of ecological processes**. In general, BnM 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 acrotelm – 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.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

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 IPC Licence's Ref. P0503 in the Allen-Lullymore Group of Bogs in Counties Offaly and Kildare.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.
- 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.
- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.

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- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

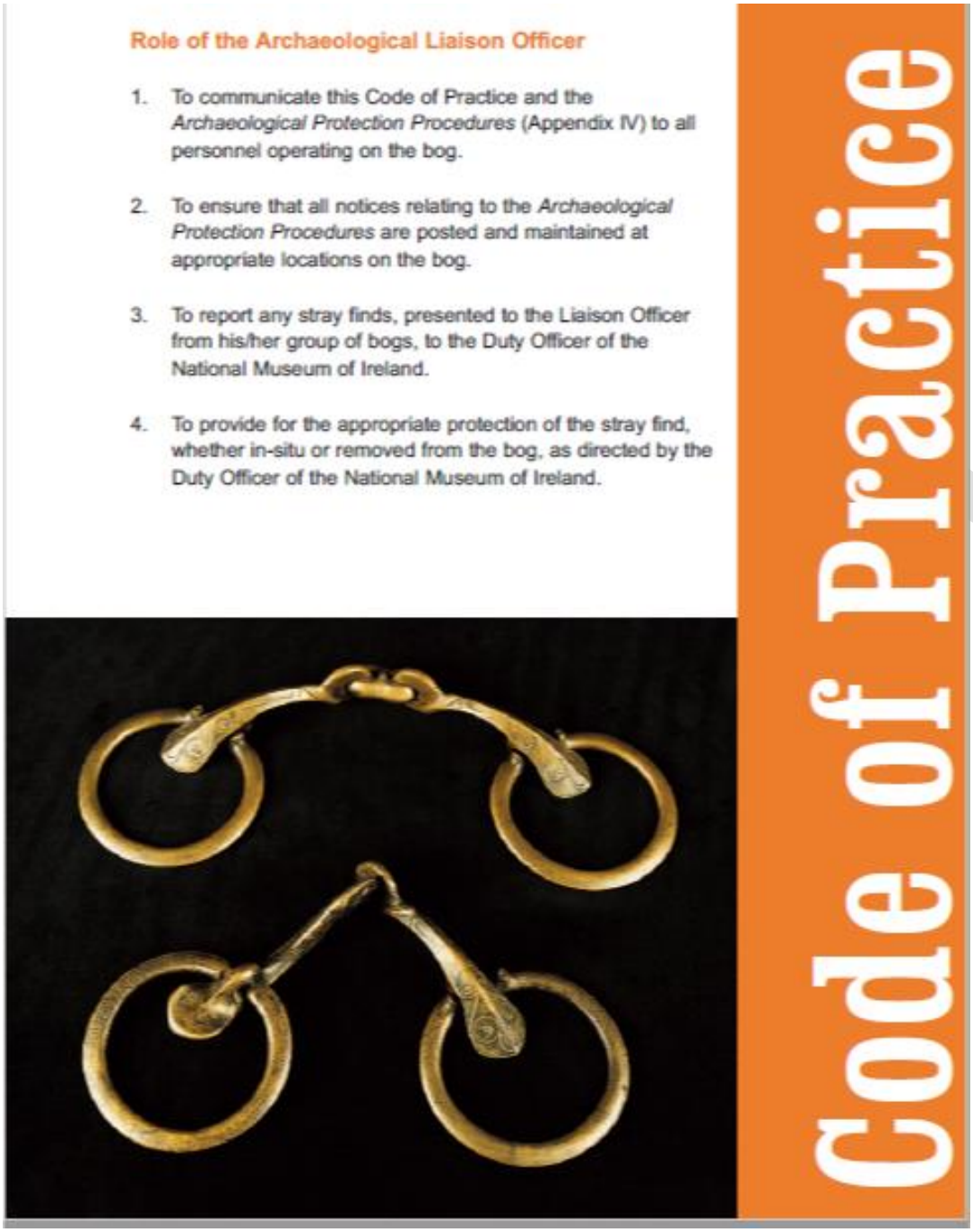
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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- 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/resources/faqs/environment--you/faq-listing/ , 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 X. 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.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Lullybeg Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet	
Document Name:	Lullybeg Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Draft v0.1**

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

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Name(s):	BG	CS	MMcC
Date:	06/08/2026	06/08/2026	06/08/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):		JB	CS
Date:		22/10/2026	23/10/2026

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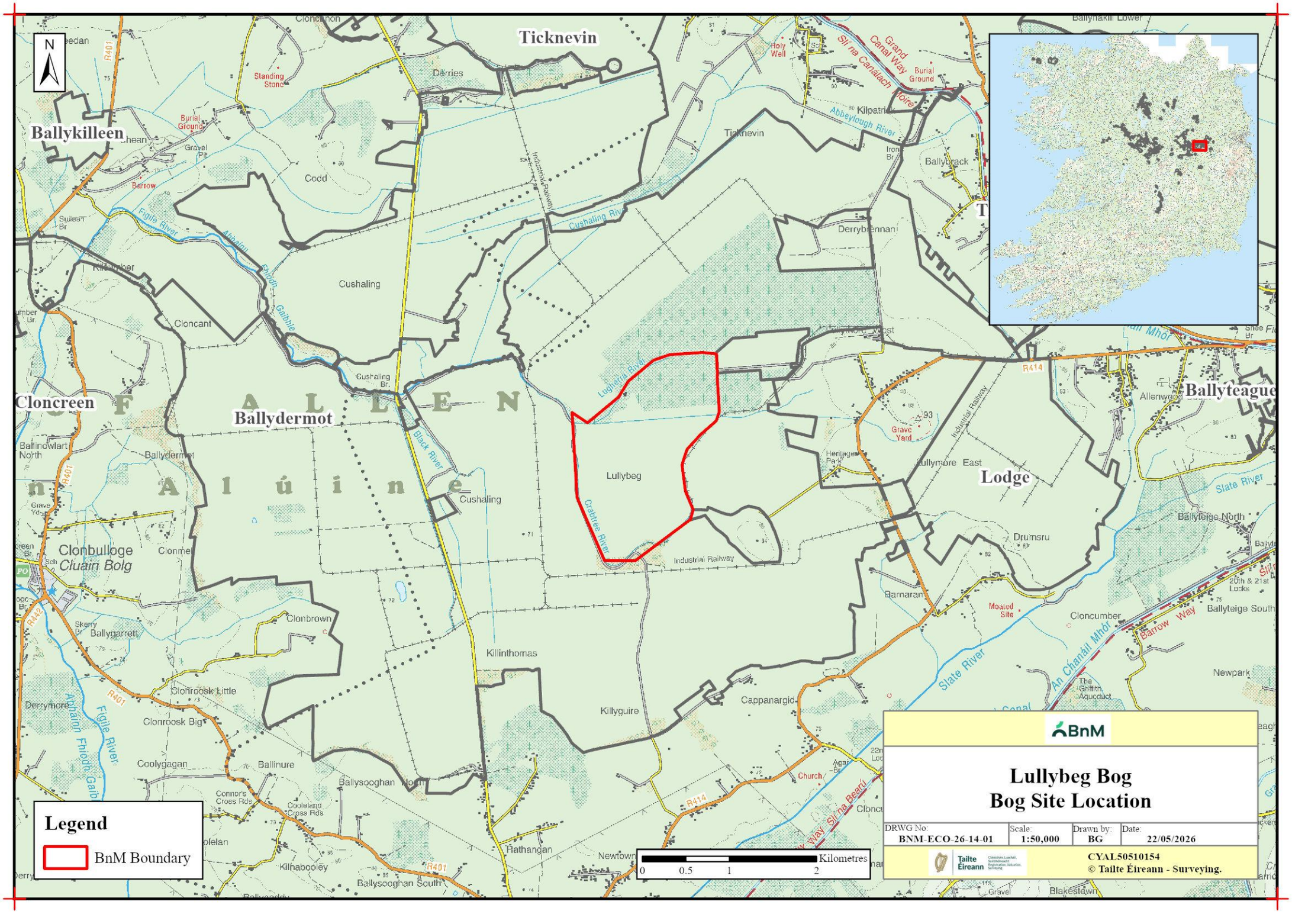
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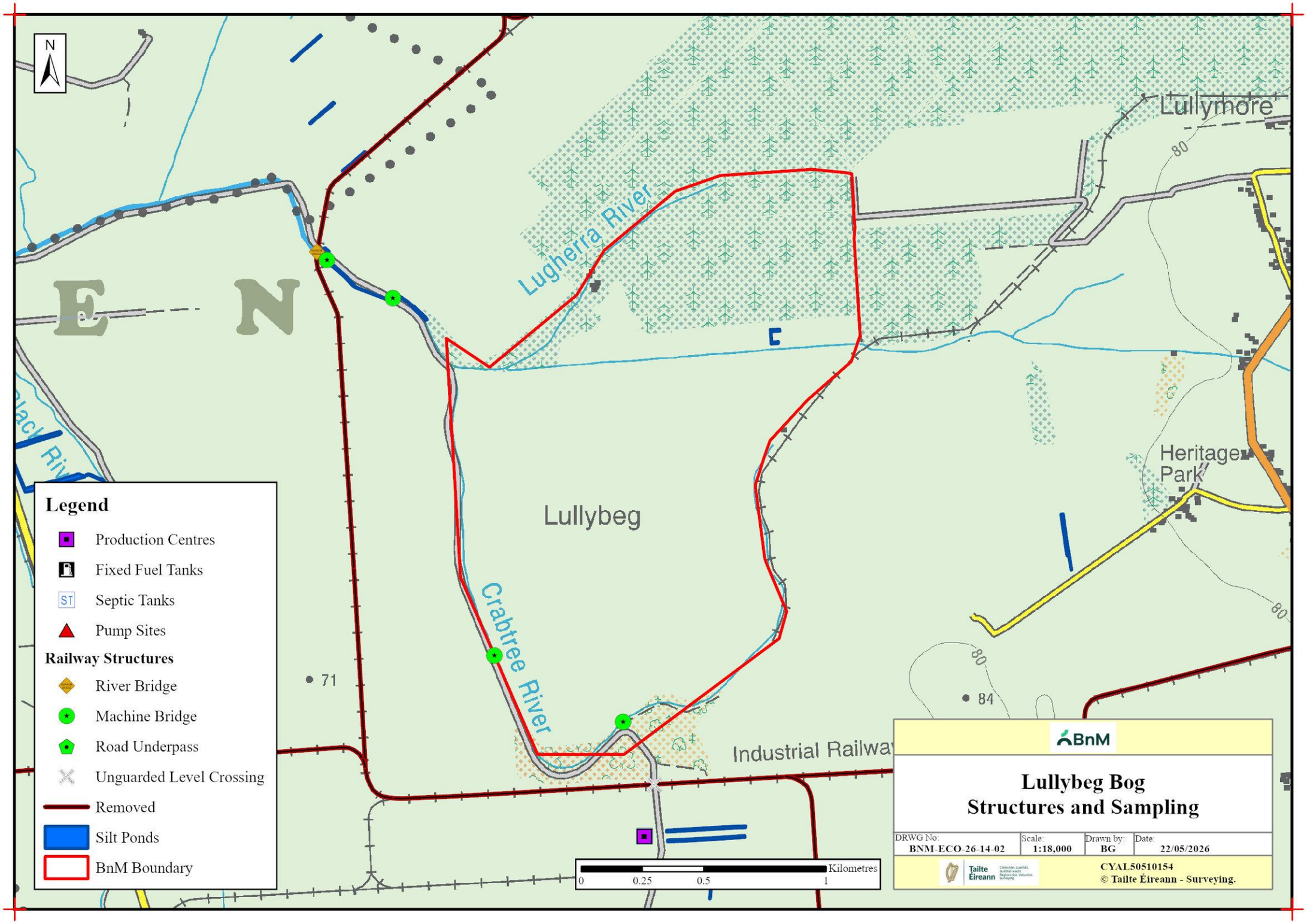
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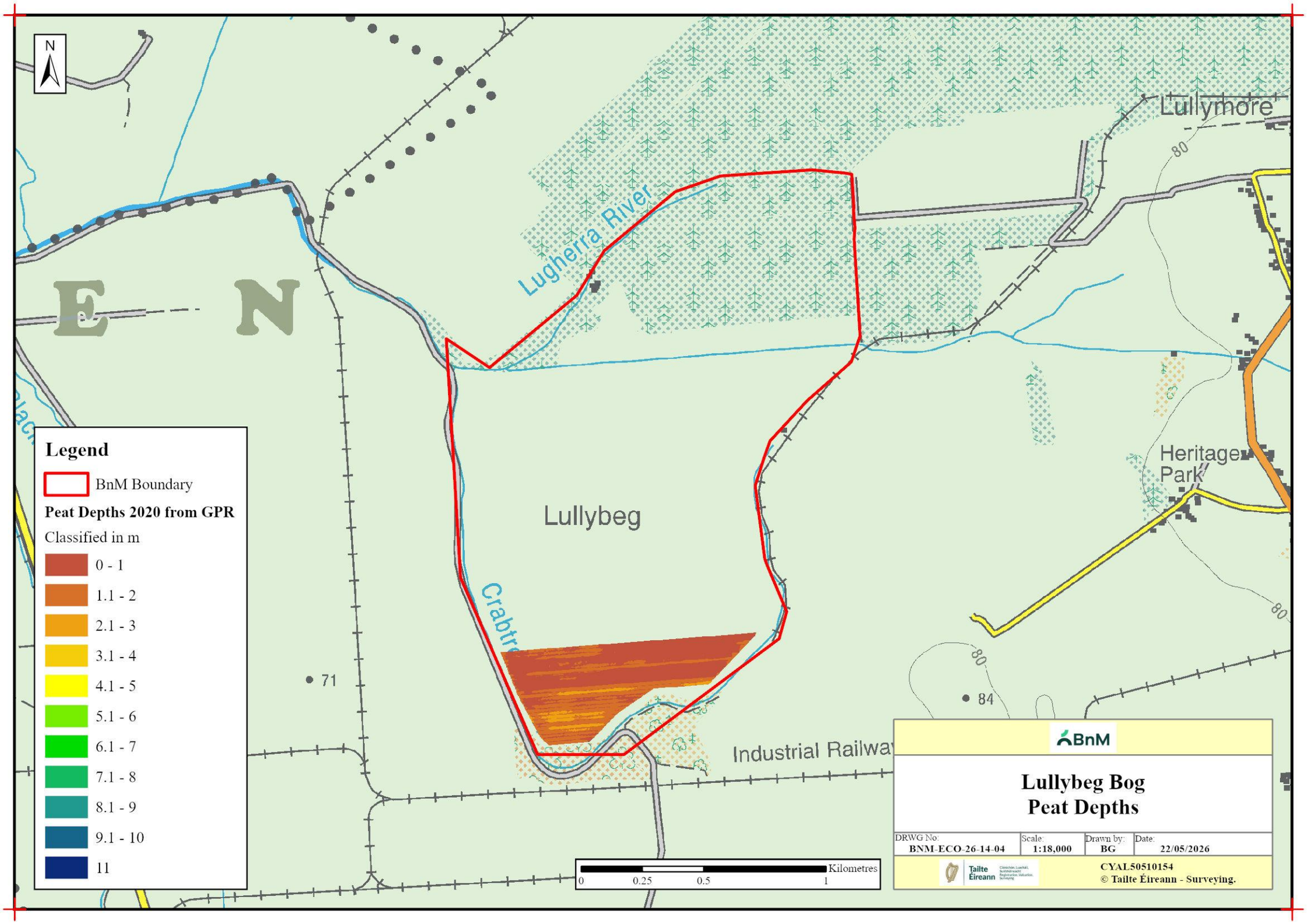
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Removed
Silt Ponds
BnM Boundary
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0.25
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BnM
Lullybeg Bog
Structures and Sampling
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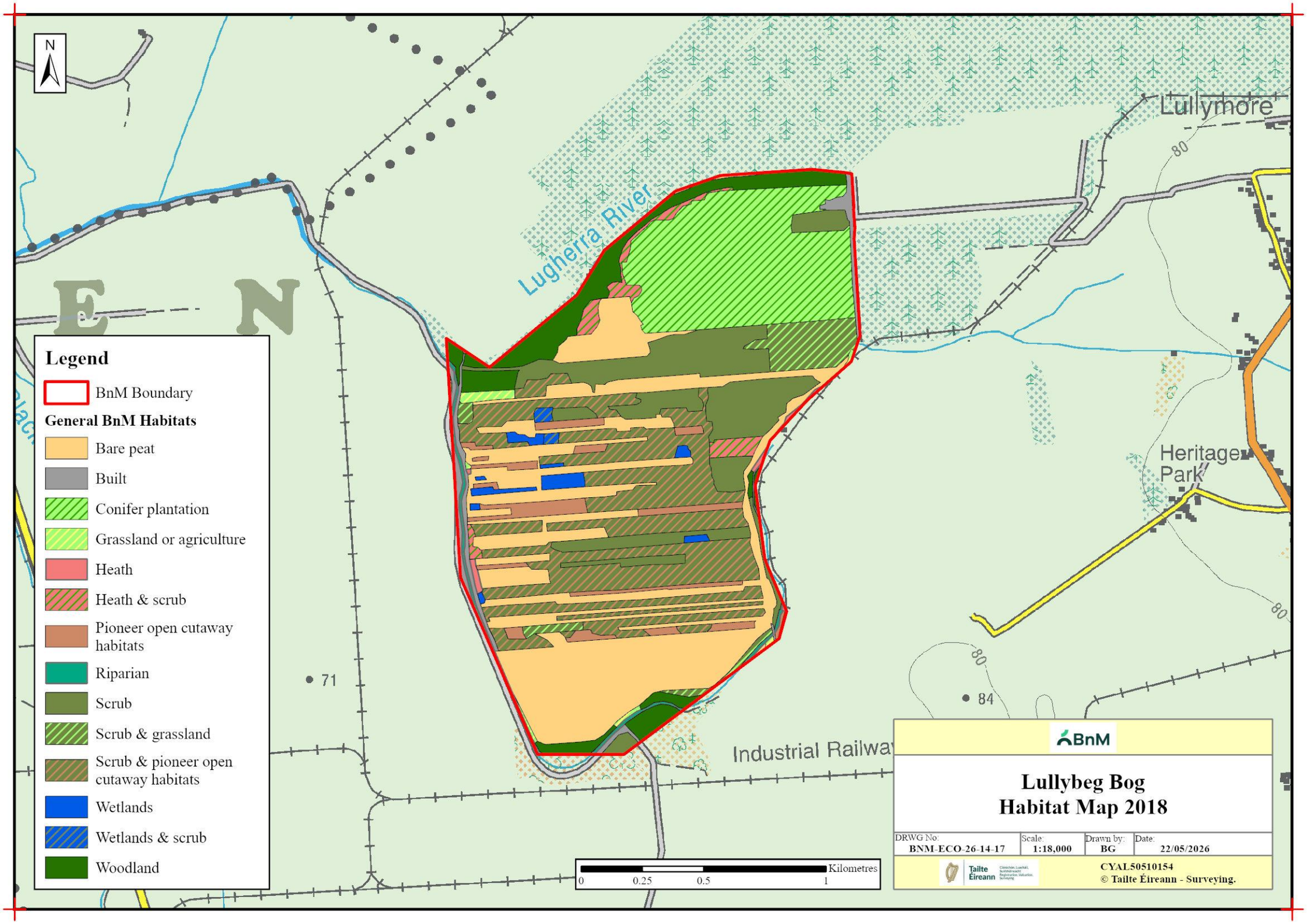
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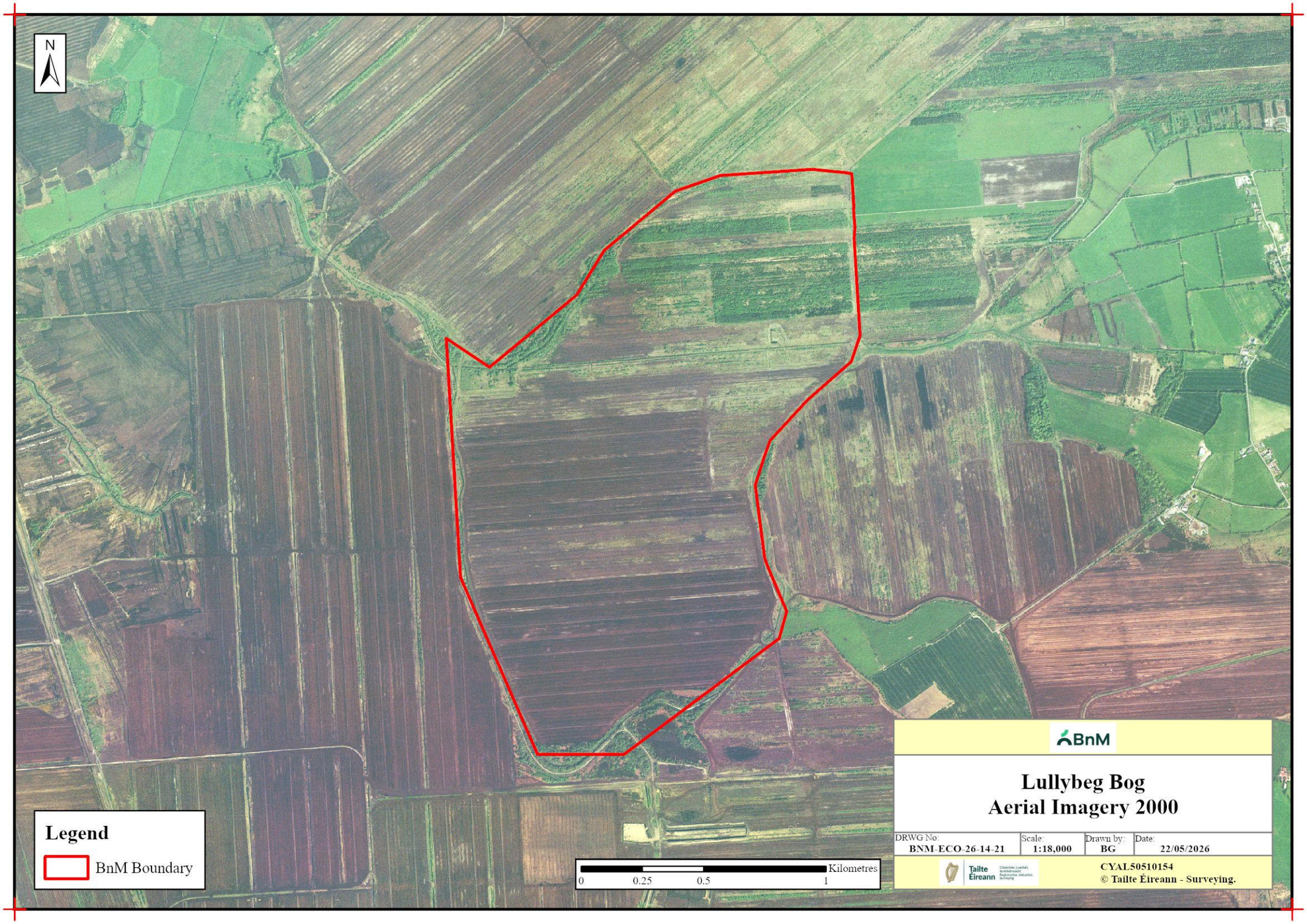
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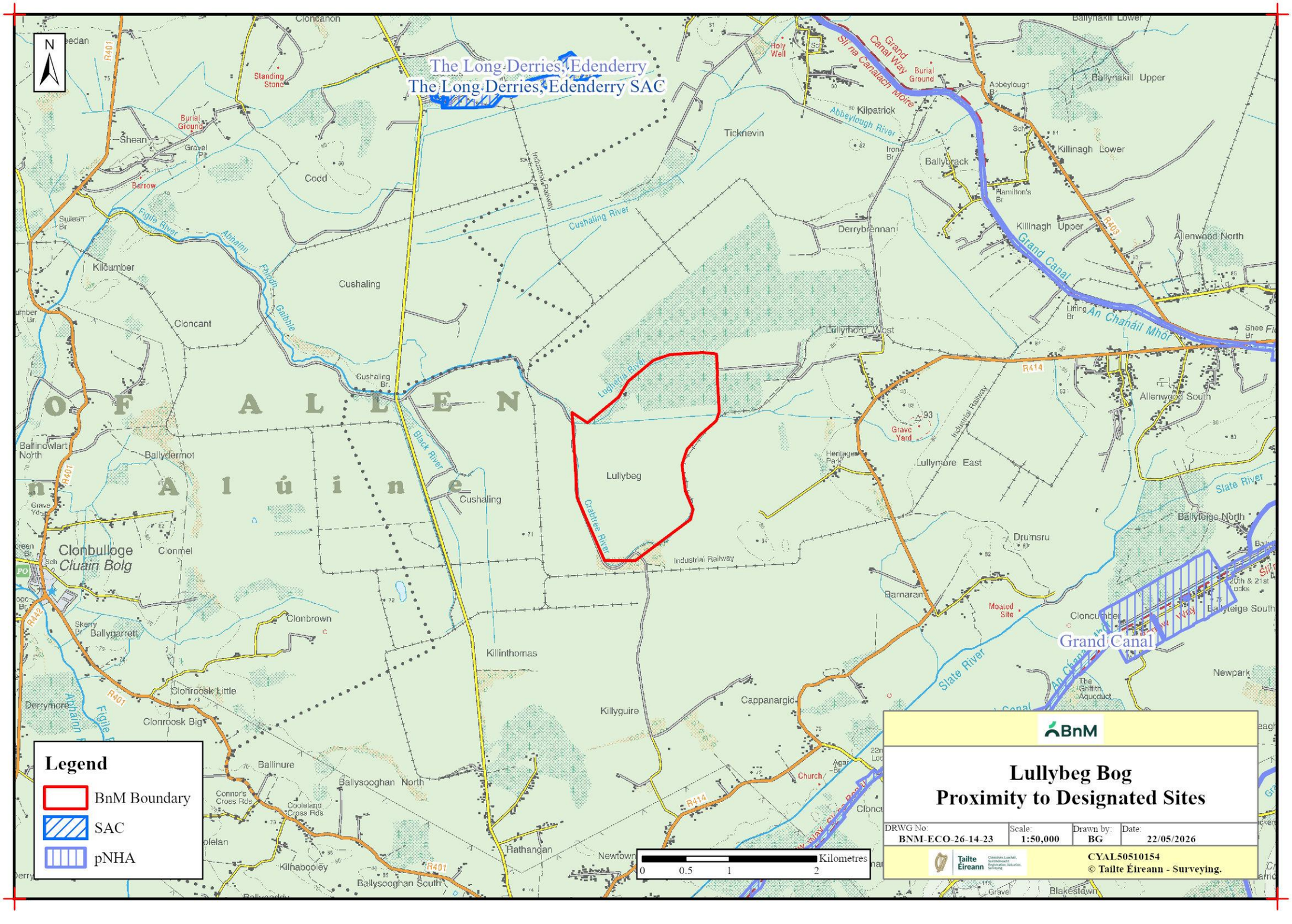
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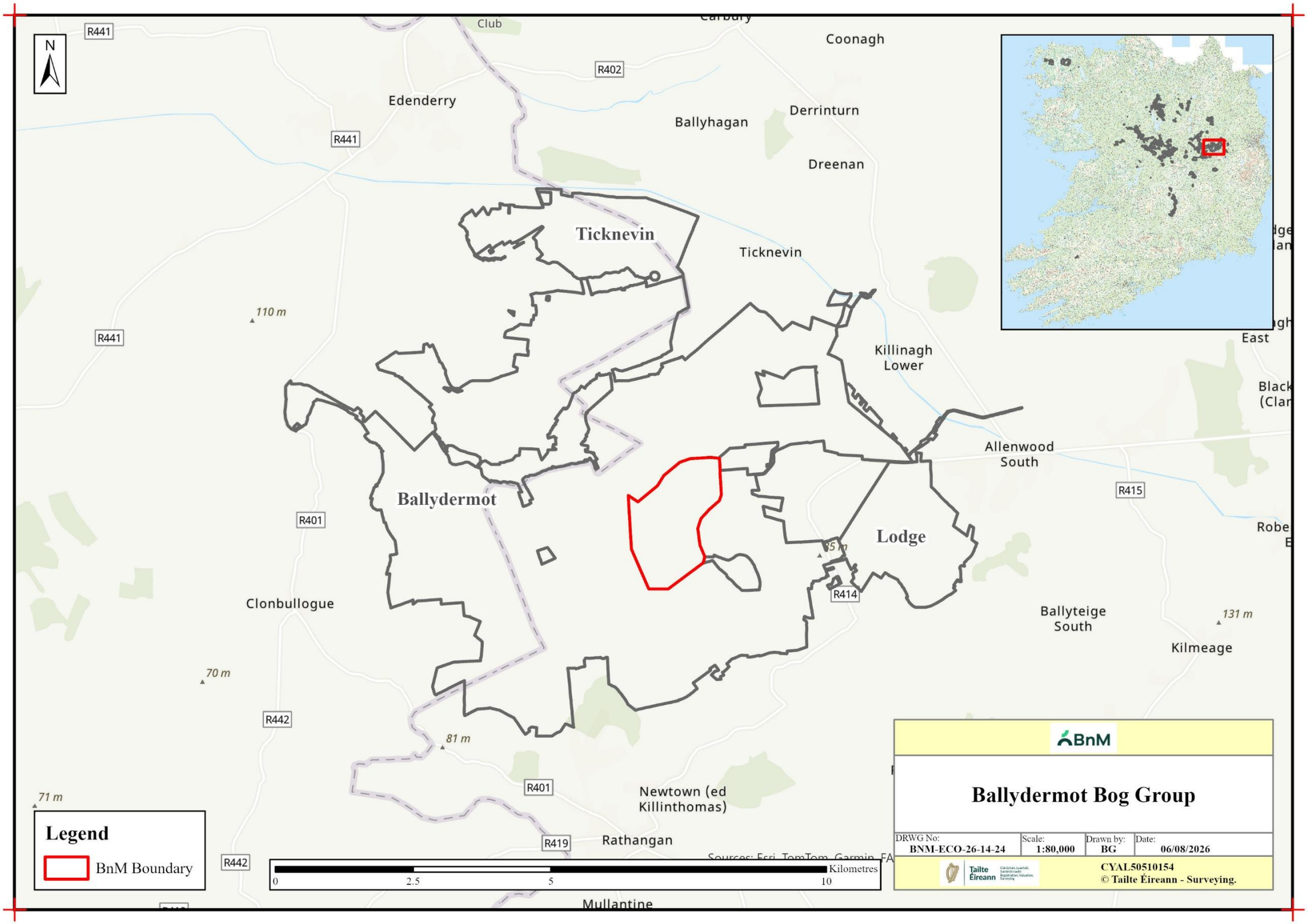
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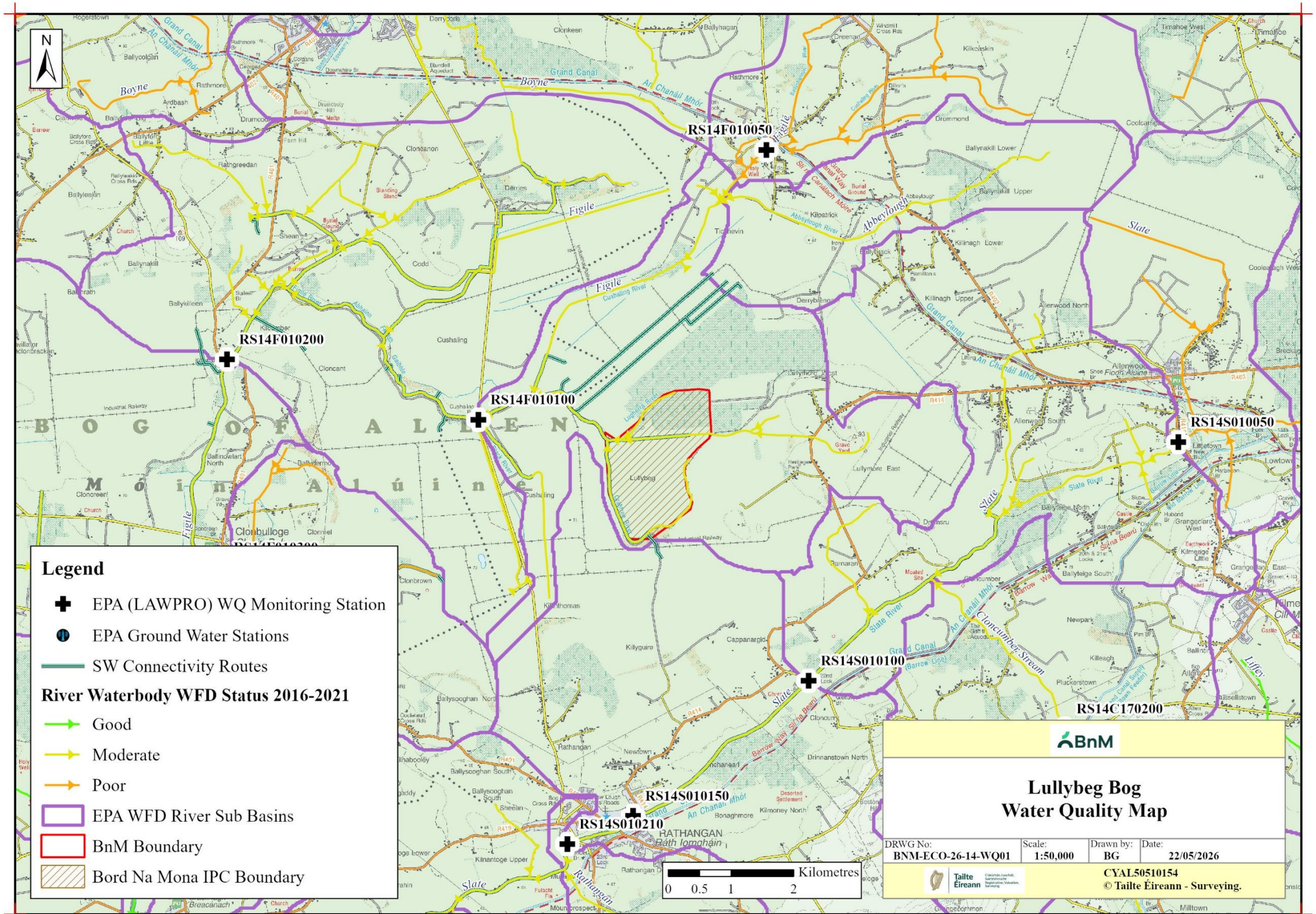
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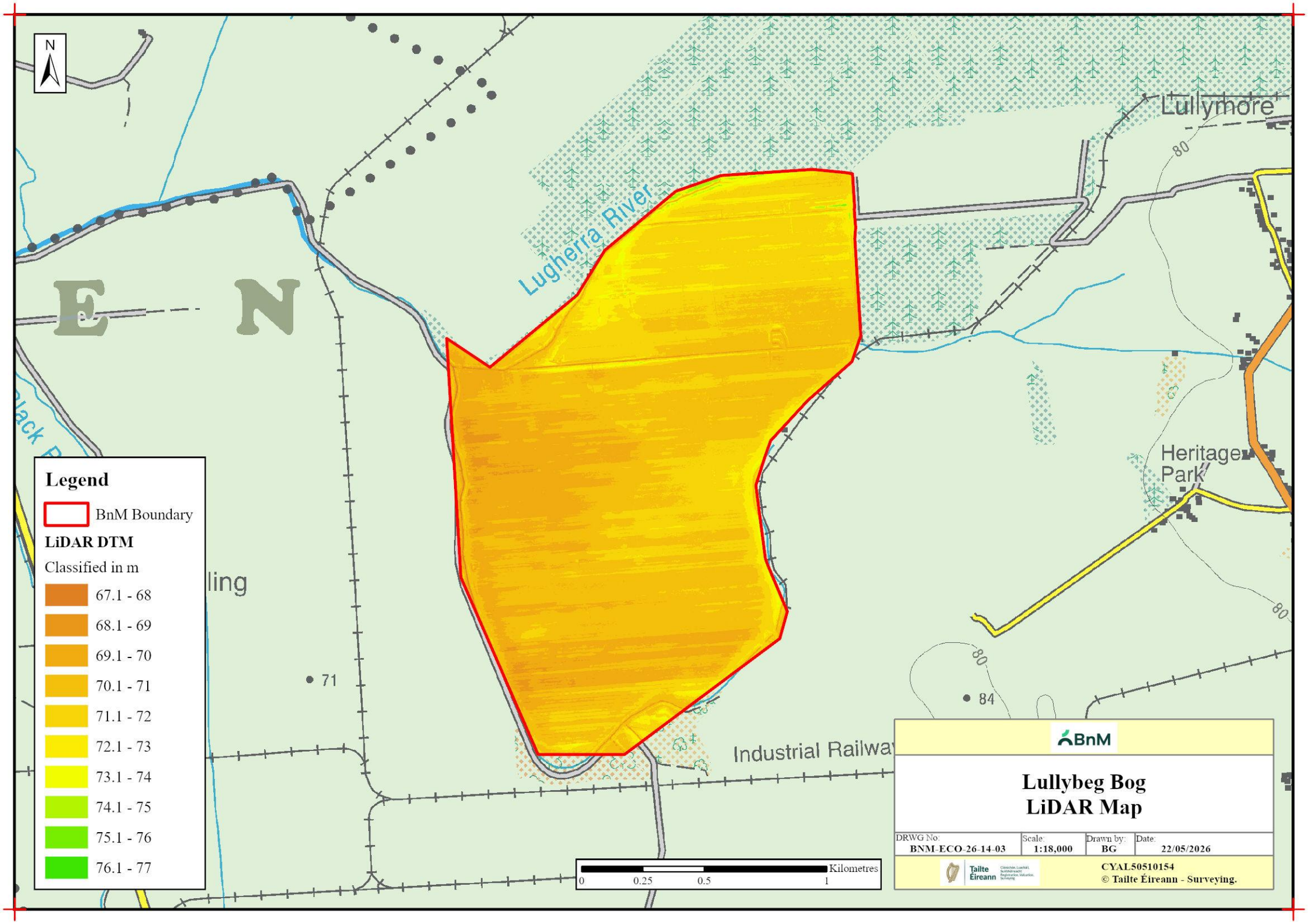
BNM-ECO-26-14-WQ01: Water Quality Map

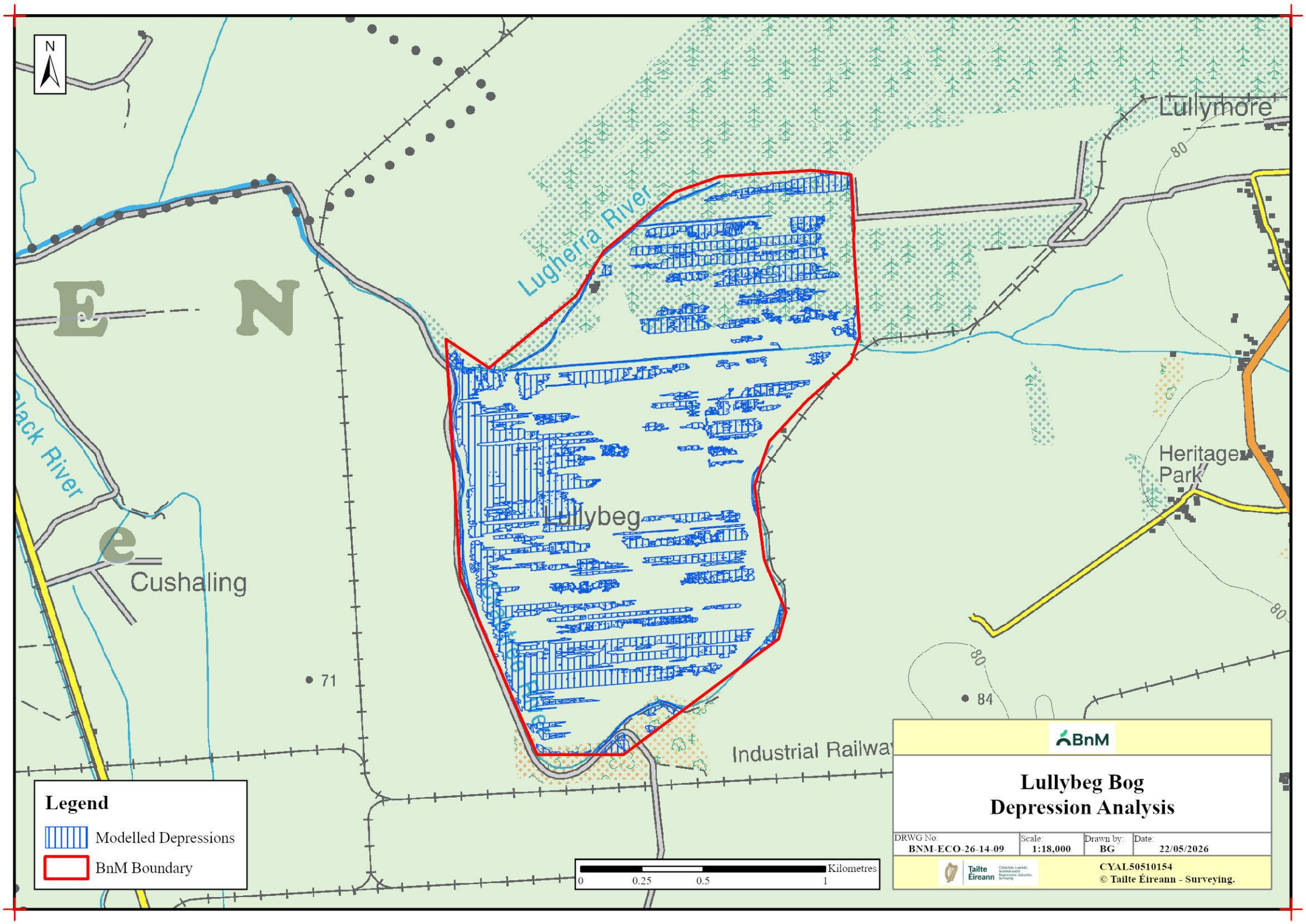
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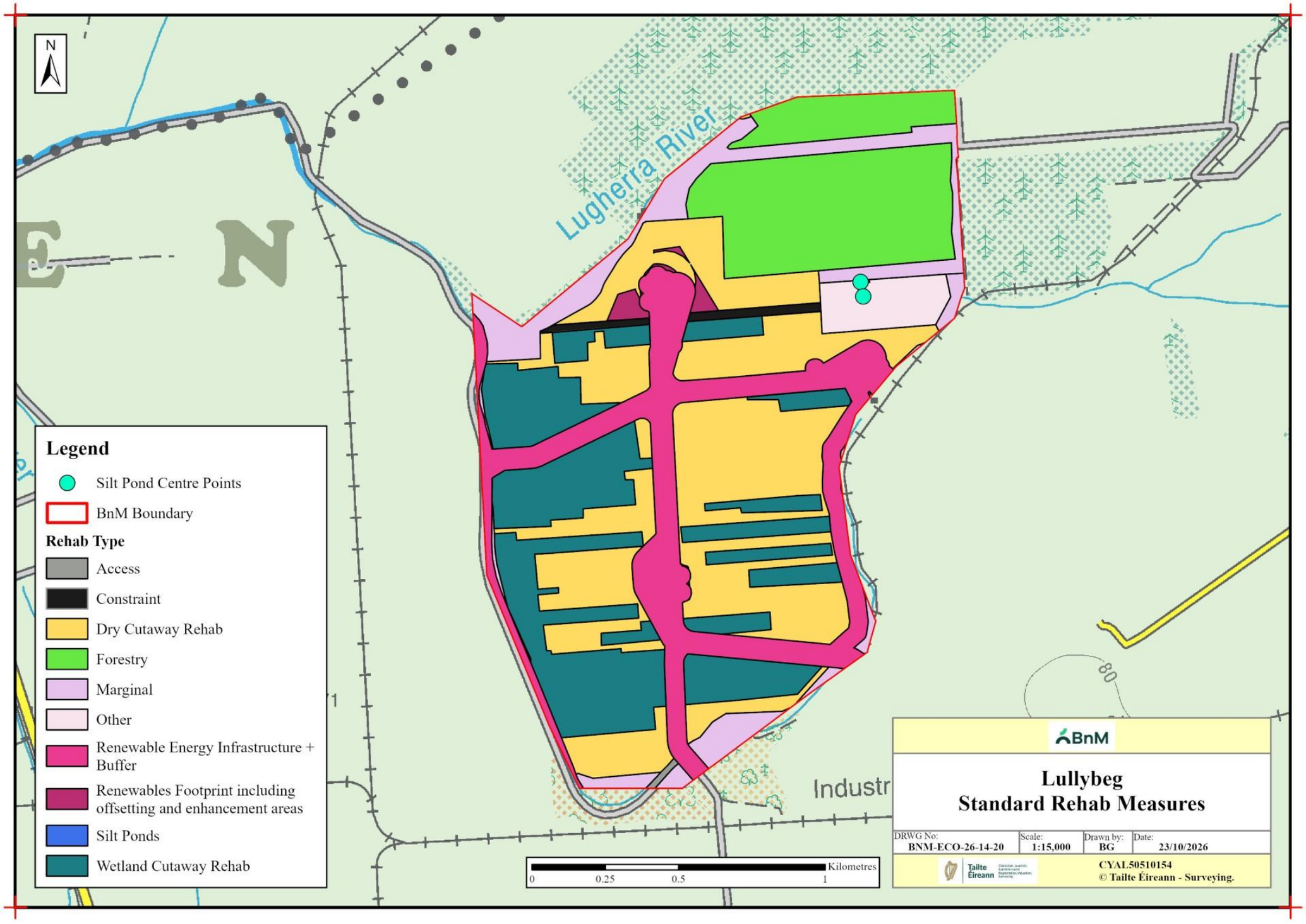



N
Lugherra River
Lullymore
Heritage Park
Lullybeg
Cushaling
71
84
80
Industrial Railway
Legend
Modelled Depressions
BnM Boundary
0
0.25
0.5
1
Kilometres
BnM
Lullybeg Bog
Depression Analysis
DRWG No: BNM-ECO-26-14-09
Scale: 1:18,000
Drawn by: BG
Date: 22/05/2026
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Rehabilitation Maps

BNM-ECO-26-14-20: Standard Rehab Measures

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Lullymore Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

Draft

This document seeks to address the requirements of Condition 10.2 of Integrated Pollution Control (IPC) Licence Ref. P0503-01:

> "*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 BnM *agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Lullymore Bog upon cessation of peat production and complements 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 Lullymore Bog.

BnM have defined the key rehabilitation outcome at Lullymore Bog as environmental stabilisation.

Any consideration of any other future after-uses for Lullymore Bog, 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.

BnM are planning to develop a potential renewable energy project in the bogs around Lullymore Bog within the wider footprint of Ballydermot Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

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	1	2	33	4	0	10

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Non-technical summary

- BnM is planning to rehabilitate Lullymore Bog, a sub-section of a larger unit called Ballydermot Bog and is located approximately 5 km west of Allenwood in Co Kildare.
- Lullymore Bog was in industrial peat production by BnM since the 1930's and supplied milled peat for electricity production. Milled peat production at this site ceased in the 1990s.
- BnM Industrial peat extraction has now completely ceased at Ballydermot Bog.
- Rehabilitation and re-wetting were previously carried out at Lullymore bog on a phased basis from 2005.
- Rehabilitation at Lullymore Bog is largely complete and successful as there has already been substantial re-wetting.
- The majority of the site is now vegetated and developing maturing fen, wetland and Birch woodland habitats.
- A substantial part of the site was also developed as conifer forestry by Coillte in the 1980's.
- Part of the eastern section of the site has also been leased to Lullymore Heritage and Discovery Centre. This area has been developed for amenity and peatland education.
- BnM are planning to develop a potential renewable energy project at Lullymore Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The overall wind farm planning boundary includes Lullymore Bog. No actual infrastructure is planned for Lullymore Bog.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing vegetation and promoting re-establishment of more typical cutaway peatland communities such as Birch woodland and fen habitat.
- Rehab measures may include drain-blocking and other measures to optimise water levels at the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- Any future rehabilitation measures will be planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog has brought 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.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like *Sphagnum* rich embryonic bog communities (on deeper peat); and wetlands with Reedbeds, fen and Birch woodland on shallower peat.
- The development of a range of habitats at Lullymore Bog is supporting biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape.
- Lullymore wetland is notable for the presence of rare plant species such as Round-leaved Wintergreen and Alder Buckthorn. It also has a diverse breeding bird assemblage with wetland and scrub/woodland species.

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- Carbon research has been ongoing at Lullymore for several years. One of the key initial findings is that the Birch woodland developing at the site is a carbon sink.
- This peatland rehabilitation plan does not outline future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen bog group (Ref. P0503-01). 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 Allen Bog Group comprises 2 main sub-groups: Allen - Clonsast and Allen - Lullymore. Lullymore is located within the Allen-Lullymore bog group. Further details on the bogs within the Allen-Lullymore bog group are outlined in Appendix I.

Lullymore Bog is located at the eastern extent of the central portion of bogs within the wider footprint of Ballydermot Bog and is located in Co. Kildare, and is approximately 5km west of Allenwood.

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This **draft** rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Lullymore Bog and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are **NOT** proposed as part of this draft Lullymore rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Lullymore will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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 document covers the area of **Lullymore Bog**. Parts of Lullymore Bog (around the perimeter of the site) are currently being used by domestic turf cutters who have turbary rights. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting and turbary issues on Lullymore Bog that are outside of the control of BnM. Nevertheless, BnM 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.

BnM are planning to develop a potential renewable energy project at Lullymore Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). The development site boundary of proposed wind farm project is located within Lullymore Bog as well as the adjacent BnM bogs of Ballydermot, Barnaran, Blackriver, Codd, Derrybrennan, Glashabaun, Killinagh, Lodge, Lullybeg and Ticknevin. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm has been taken into account in the preparation of this Rehabilitation Plan. Where proposed wind farm infrastructure partially overlaps with areas identified for rehabilitation, the timing and sequencing of rehabilitation measures will be coordinated with the proposed development. Accordingly, these areas are treated as a temporal consideration in relation to the implementation of rehabilitation measures.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Lullymore Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Lullymore Bog 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.

Part of Lullymore Bog has been leased to Lullymore Heritage and Discovery Centre. A section of the bog in the north (~24.2ha) has been developed for forestry and is leased to Coillte. These areas have been mapped as a constraint on the rehabilitation plan.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan'* (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2012 to 2026 inclusive), monitoring and desktop analysis, form the basis for the development of this 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

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.
- Feehan, J. (2004). A long-lived wilderness. The Future of the North Midlands Peatland Network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford & Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.

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- 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, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- 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 2022-2027;
- BnM Annual Report 2025;
- 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 BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Lullymore Bog was surveyed in 2011. Additional ecological walk-over surveys and visits have taken place at Lullymore Bog between 2011-2026. 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 (2019), while mosses and liverworts nomenclature follows identification keys published by the Atherton *et al.* (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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3. SITE DESCRIPTION

Lullymore bog is a sub-section of a larger unit called Ballydermot Bog and is located adjacent to Lullymore and 5 km west of Allenwood in Co. Kildare. The site is located adjacent to Lullymore Heritage and Discovery Park. An access road forms the southern boundary to the sub-site. The Crabtree River flows along the western boundary while the upper reaches of the Figile River flows through the site. The majority of this site has been cutaway for some time and has now been developed for forestry or rehabilitated as a wetland. The area north of the river has been developed for forestry and was planted by Coillte in the 1990's. There was some commercial sod-peat production activity at this site up to 1992, although this has now ceased.

The majority of the site has vegetated and contains typical cutaway habitats with Birch scrub/woodland and wetland vegetation in patches with pioneer grassland, fen and Reedbeds. Lullymore Bog is a typical cutaway bog that has a basin-type topography as the majority of peat was removed. Lullymore has a gravity drainage system. This area has now been re-wetted as drainage was blocked. Re-wetting occurred on a phased basis from 2005. Initially the main outfall was blocked to allow a wetland to develop. Since then, there has been adjacent drain-blocking to block other outfalls through the site. A large bund was constructed at the south-west corner of the site to further raise water-levels. The former sod turf spread grounds were treated with fertiliser to encourage natural colonisation.

One feature of interest is that the wetland is being colonised by Saw Sedge, an indicator of rich fen development. This is a rarer coloniser of cutaway and enhances the potential biodiversity value of the site. Another feature of interest is that there are no small patches of high bog scattered around the site. Any remnant high bog has developed into other habitats such as Birch woodland (WN7). There is a small mineral island along the eastern side of the site that contains mature Beech-dominated woodland (WD1).

Part of the site was leased to Lullymore Heritage and Discovery Park. This area has been landscaped, re-wetted and allowed to naturally colonise, and is used for amenity and education. A board-walk was built through this site.

A research project was set up at Lullymore to examine carbon fluxes from the cutaway. A carbon flux tower has been built in a wooded section in association with several research partners including University College Cork, Trinity College Dublin and University College Dublin. A PhD carried out by Hannah Mealy (UCC) and funded by BnM is concluded in 2023. One key finding of this research is that the Birch woodland is a carbon sink at present. Birch woodland at Lullymore is developing on dry peat and was expected to be a carbon source as the water levels are lower and peat continues to decompose and oxidise. However, the research has found that the growth of the woodland (biomass) has off-set this flux significantly and at present, the overall habitat is a carbon sink. Further research is needed to validate this initial conclusion. In the long-term, as growth of the woodland slows, the carbon fluxes may change, and this site would revert to being a carbon source. This flux tower is also part of the Smartbog research project smartbog (ucd.ie).

See Drawing number *BNM-ECO-26-14-01 Lullymore Bog: Site Location Map,* included in the accompanying Mapbook[1] , which illustrates the location of Lullymore Bog in context to the surrounding area.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Lullymore Bog Map Book

3.1 Status and Situation

3.1.1 Site history

Lullymore Bog was in full industrial peat extraction since the 1930's and supplied milled peat for electricity production. Much of Lullymore Bog is now cutaway and the majority of the original raised bog has now been removed. Rehabilitation and re-wetting has been ongoing since 2005 on a phased basis.

Some cutaway was developed as farmland by BnM in the 1980s and used for grazing cattle and sheep. This land has now been sold and is outside the IPC Licence boundary.

An Foras Taluntais Peatland Research Station was located at Lullymore. This research facility was in operation since the 1950's and closed in 2003. The facility investigated grassland, horticultural and forestry use of peatlands and cutaway peatlands. The buildings are now used by the Irish Peatland Conservation Council.

3.1.2 Current land-use

Part of Lullymore has been planted with conifer forestry by Coillte since the 1980's (BnM Lullymore). The primary management objective is timber production, while some undeveloped and broad-leafed forestry has been zoned for biodiversity. Coillte have timber production and biodiversity management plans for the site.

Lullymore Heritage and Discovery Park (LHDP) is located adjacent to this site. In 2011 the eastern corner of the site was leased to LHDP for the purposes of amenity and education (approx. 20ha leased). In 2012 BnM carried out some wetland creation in this part of the bog and the management has now been completely transferred to the Lullymore Heritage Park group. This area has been landscaped, re-wetted and allowed to naturally colonise. An amenity railway was also constructed by LHDP with material supplied by BnM. An unused carriage from the Blackwater bog train amenity was transferred to this location and has been in use as a bog train until recently.

BnM are planning to develop a potential renewable energy project at Lullymore Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project boundary is located within Lullymore Bog as well as the adjacent BnM bogs. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm planning boundary encompasses the Lullymore Bog rehabilitation footprint (see drawing number *BNM-ECO-26-14-20: Standard Rehab Measures*); while no infrastructure is planned within the Lullymore bog boundary any (infrastructure) areas have been treated as a constraint in the rehabilitation plans for the adjacent BnM bogs.

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

  a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

  b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

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xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

xxv. All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3 Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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.

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In respect of Lullymore Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPL).

As the primary employer in many midland counties, BnM 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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The bedrock geology[2] of Lullymore Bog is predominantly thick-bedded limestone, locally peloidal (Allenwood Formation) to the west and unbedded limestone (Waulsortian limestones) to the east. The bedrock geology is therefore predominately alkaline (less acidic).

The sub-soils are classed as cutover peat. This is underlain by lacustrine marl, which is exposed in places.

There is exposed limestone-based till to the east, which underlies an old plantation woodland that has mixed mature Beech, Sycamore, Oak, Pine and other conifers. This till features as a ridge across the site and influences habitat development.

3.2.2 *Peat type and depths*

Much of Lullymore Bog is now cutaway and the majority of the original raised bog has now been removed. In general, between 0-1 m of residual peat remains across the majority of the site.

3.3 Key Biodiversity Features of Interest

The different cutaway habitats developing across the site reflects the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All sites have hydrological gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and ground-water has a stronger influence.

The site is already developing a range of cutaway habitats (poor fen, Reed swamp, Birch woodland). Much of the site is re-vegetating or re-wetted and the area of bare peat has been reduced significantly. Some rehabilitation measures have previously been carried out on the southern section. The resultant environmental conditions in this section are therefore generally wetter and closer to optimal condition than the same in the north and eastern lobe. Birch woodland is developing towards the eastern portion of the southern section, where the bog is relatively dry due to the ridge of limestone till. This woodland on cutaway bog is maturing and also contains some Beech (*Fagus sylvatica*), Scots Pine (*Pinus sylvestris*) and Hawthorn (*Crataegus monogyna*) in the understorey. A recent survey found some old woodland indicator species are such as Wood Sanicle (*Sanicula europaea*) are colonising this woodland.

The main part of the site is developing as a diverse mosaic of wetland habitats including Reed-swamp, open water, wet scrub, fen, *Cladium* fen and embryonic *Sphagnum*-rich vegetation. One feature of interest is that the wetland is being colonised by Great Fen-sedge/Saw sedge (*Cladium mariscus*), an indicator of rich fen development. This is a rarer coloniser of cutaway and enhances the potential biodiversity value of the site. Lullymore has the most extensive colonisation of this species so far and there are patches dominated by Saw Sedge that are classified as Reed-swamp (FS1).

[2] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0

A small area of old mixed broadleaved woodland (WD2) is part of this site. This habitat was not developed for peat extraction by BnM and is a marginal habitat. This area is now leased to Lullymore Heritage and Discovery Park.

Round-leaved Wintergreen (*Pyrola rotundifolia*) has been recorded at several locations along old drains. This is a Red listed species, whose status is now "near threatened" in the Ireland Red List (Wyse Jackson *et* al., 2016). The presence of Round-leaved wintergreen is significant and enhances the rare flora resource of Co. Kildare.

The wetlands have attracted breeding waders such as Lapwing (*Vanellus vanellus*) and Snipe (*Gallinago gallinago*). Biosphere Environmental Services (2014) also noted the occasional use of the site by Whooper Swan (*Cygnus cygnus*), Peregrine (*Falco peregrinus*), Hen Harrier (*Circus cyaneus*) and small groups of Lapwing and Golden Plover (*Pluvialis apricaria*) in the winter. The use of the wetlands at Lullymore by waterbirds has declined over the past few years as the habitats have matured and there is greater tree cover.

A detailed ecological report for Lullymore is provided in Appendix II.

3.3.1 Current habitats

The most common vegetation communities/habitats[3] present include:

- Birch scrub with emergent (eBir), open (oBir) and closed scrub (cBir) all present (WS1).
- Bare peat (BP)
- Pioneer poor fen communities (pEang, pRos, pJeff) (frequently in mosaic with open Birch scrub) (PF2).
- Potential rich fen and flush (pClad) (mosaic of wetland habitats including clumps of Saw Sedge) (PF1)
- Reedbeds (pPhrag, pTyph) (FS1)
- Open water (OW)
- Birch woodland (WN7)
- Conifer plantation (WD4)
- Mixed broadleaved/conifer woodland (WD2)
- Dry Heather-dominated vegetation (dHeath) (frequently in mosaic with Birch scrub)
- Depositing river (FW2)
- Gorse scrub (WS1) (Found around the margins of the site).
- Dense Bracken (HP1) (Found along the embankment and river marking the boundary)

The most common habitats found around the margins of the site include:

- Birch woodland (WN7)
- Scrub (WS1)
- Cutover bog (PB4) (several small fragments)
- Dense Bracken (HD1)
- Conifer plantation (WD4)
- Silt Ponds (Silt) with associated habitats such as scrub

See Appendix II for more detail on site, habitats and local features.

[3] Categories in brackets refer to the current BnM classification system for vegetation communities, along with an equivalent Heritage Council habitat classification or Fossitt Code, where relevant.

See Drawing number *BNM-ECO-26-14-17 Lullymore Bog: Habitat Map 2018*, included in the accompanying mapbook, which illustrates the habitats at Lullymore Bog.

3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Lullymore Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC). Multiple mammal species have been recorded on or within 1 km of the bog including Irish Hare (*Lepus timidus subsp. Hibernicus)*, Fox (*Vulpes vulpes*), Eurasian Badger (*Meles meles),* Pine Marten (*Martes martes*) and European Otter (*Lutra lutra*). Stoat (*Mustela erminea*), Badger, Otter, Red Squirrel (*Sciurus vulgaris*) and Pine Marten have been recorded recently using the plantation woodland and the cutaway woodland at Lullymore. Otter is an Annex II EU Habitats Directive species.

The butterfly species Common Blue, Speckled Wood, Small Copper and Meadow Brown have all been recorded during BnM surveys. NBDC have records for 25 species of butterfly recorded at Lullymore, including the species of conservation concern Dark Green Fritillary (*Speyeria aglaja*), Dingy Skipper (*Erynnis tages*), Marsh Fritillary (*Euphydryas aurinia*), Small Heath (*Coenonympha pamphilus*) and Wall (*Lasiommata megera*).

Twenty-two species of butterfly including Marsh Fritillary have been recorded at Lullybeg Butterfly Reserve (Reserve – Butterfly Conservation Ireland) to the north of the wetland. Other species of notable conservation value are also present (See Harding 2009). The adjoining site is being actively managed for butterflies with some scrub removal to encourage the development of species-rich grassland. It is likely that these butterfly species use other parts of the overall site.

Lullymore also contains Round-leaved Wintergreen (*Pyrola rotundifolia*). This species is listed as Near Threatened on Irelands Red List (Wyse Jackson *et al*., 2016). The presence of Round-leaved wintergreen is significant and enhances the rare flora resource of Co. Kildare.

The site contains Alder Buckthorn (*Frangula alnus*) and Saw-Sedge (*Cladium mariscus*) is present. Saw sedge is an indicator species of potential rich fen (PF1). Both of these species are listed as "Least Concern" Red Listed plant species (Wyse Jackson *et al*., 2016).

Common Frog (*Rana temporaria*), Smooth Newt (*Lissotriton vulgaris*) and Common Lizard (*Zootoca vivipara*) have also been recorded at this site.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Lapwing (*Vanellus vanellus*), Moorhen (*Gallinula chloropus*), Whitethroat (*Sylvia communis*), Willow Warbler (*Phylloscopus trochilus*), Reed Bunting (*Emberiza schoeniclus*), Kestrel, Blackcap (*Falco tinnunculus*), Stonechat (*Saxicola rubicola*), Sedge Warbler (*Acrocephalus schoenobaenus*), Heron (*Ardea cinerea*), Blackbird (*Turdus merula*), Robin (*Erithacus rubecula*), Blue Tit (*Cyanistes caeruleus*), Wren (*Troglodytes troglodytes*), Pheasant (*Phasianus colchicus*), Dunnock (*Prunella modularis*), Redpoll (*Carduelis flammea cabaret*), Magpie (*Pica pica*), Chaffinch (*Fringilla coelebs*), Great Tit (*Parus major*), Swallow (*Hirundo rustica*) Wood Pigeon (*Columba palumbus*) Buzzard (*Buteo buteo*), Peregrine (*Falco peregrinus*) (both in mid-summer), Merlin (*Falco columbarius*), Long-eared Owl (*Asio otus*), Kestrel (*Falco tinnunculus*), Woodcock (*Scolopax rusticola*) (probable breeders), Jay (*Garrulus glandarius*), Sparrowhawk (*Accipiter nisus*), Water-rail (*Rallus aquaticus*), Whooper Swan, (*Cygnus cynus*), Mute Swan (*Cygnus olor*), Wigeon (*Anas penelope*) and Golden Plover (*Pluvialis aucuparia*) (wintering - both in autumn) have all been recorded during BnM ecology surveys.

NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km squares (N62, N72) which Lullymore intersects include, Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Partridge (*Perdix perdix*). Grey Wagtail (*Motacilla cinerea),* Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Red Grouse *(Lagopus lagopus)*, Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola)* and Yellowhammer (*Emberiza citrinella*). Red-listed listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Nightjar *(Caprimulgus europaeus)*, Red Kite (*Milvus milvus*) and White-tailed Eagle (*Haliaeetus albicilla*).

Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

NBDC has records for the high impact invasive mammal species American Mink (*Neovison vison*), as well as Feral Goat (*Capra hircus*) and Greater White-toothed Shrew (*Crocidura russula*) which are regarded as medium impact invasive species.

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Lullymore Bog. The nearest EU Designated sites are as follows:

- The Long Derries, Edenderry SAC (Site Code: 000925) – 4 km from Lullymore.
- River Barrow and River Nore SAC (site code: 002162) – 15 km from Lullymore
- Mouds Bog SAC (site code: 002331) – 11 km from Lullymore
- Pollardstown Fen SAC (site code: 000396) – 11 km from Lullymore.
- Ballynafagh Lake SAC (site code: 001387) – 12 km from Lullymore.
- Ballynafagh Bog SAC (site code: 000391) – 11 km from Lullymore

A number of non-statutory designated sites also occur in the wider area around Lullymore Bog. The Long Derries, Edenderry pNHA, also designated under The Long Derries, Edenderry SAC is located 4 km from Lullymore. The Grand Canal pNHA (NPWS Site Code: 002104), occurs approximately 5 km north of Lullymore. Carbury Bog NHA (Site Code: 001388) occurs approximately 10 km north and Black Castle Bog NHA (NPWS Site Code: 000570) occurs approximately 13 km northwest. Ballina Bog pNHA (NPWS Site Code: 000390), occurs approximately 15 km north of Lullymore. Hodgestown Bog NHA (NPWS Site Code: 001393), occurs approximately 12 km east of Lullymore.

See drawing *BNM-ECO-26-14-23: Proximity to Designated Sites* in the accompanying map book.

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

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar sites located in proximity to Lullymore Bog. The nearest Ramsar sites are Pollardstown Fen located approximately 12km southeast and Raheenmore Bog located approximately 25 km west of Lullymore Bog.

3.5 Hydrology and Hydrogeology

Lullymore bog forms part of the Barrow Catchment (Catchment ID: 14) as defined by the EPA under the Water Framework Directive (WFD). The bog lies completely within the Figile_SC_010 sub-catchment.

Lullymore Bog discharges to the local water-courses (EPA code Lullymore East-14L11, also known as the Crabtree River) and Lullybeg (EPA code Lullymore14L13). These water-courses surround the northern, western and southern margins of the bog. These water-courses flow east to the Figile River.

GSI data indicates that Lullymore Bog lies entirely within a regionally important bedrock aquifer. An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows.

Lullymore Bog is located in an area mapped by GSI as of low and moderate groundwater vulnerability (GSI Map viewer). Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low/moderate risk of any groundwater contamination occurring at this site.

Quaternary sediment maps show that Lullymore Bog is generally underlain by cutover raised peat. This combination of sediment is common in the wider context surrounding the site. There is some limestone-based till located to the east of the bog.

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 Lullymore 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 bi-annual basis by BnM 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.

Lullymore Bog has one surface water outlet to the Barrow catchment. The bog drains north towards a silt pond. The outlet is directed to the Lullymore East River and onto the Figile River. This river is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds, associated surface water emission points and monitoring and sampling locations are detailed in Drawing numbers *BNM-ECO-26-14-02 Lullymore Bog: Structures and Sampling*, along with Drawing number *BNM-ECO-26-14-WQ01 Lullymore Bog: Water Quality Map* included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Lullymore 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also 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*., 2017). 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) 2022-2027 (DHLGH, 2024) 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 BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Lullymore has been completed. This discharge will have improved 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 watercourse receptors and the Slate_SC_010 sub-catchment and will support the future status of the watercourses achieving Good Status. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Water quality monitoring will be established. 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 for additional rehabilitation.

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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the longterm warming effect of continued CO_2 emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Lullymore 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. The majority of the bog will develop as Birch woodland on drier areas and peripheral headlands. A wetland mosaic with shallow open water, fen, reed swamp and wet woodland are developing in the wetter cutaway areas in the southwest section of the site in response to rehabilitation measures previously carried out since 2005.

Carbon emissions research at Lullymore (Hannah Mealy)

Peatlands in a natural state sequester carbon dioxide when environmental conditions are suitable, such as a high-water table and appropriate vegetation cover. However, when these environmental conditions are altered (i.e. the water table lowered, vegetation cover disturbed, and peat harvested) the result is that the peatland becomes an emitter of carbon or a source of carbon. Peat soil has a high organic matter content and therefore a higher carbon content, which is why a radical change from sink (sequester) to source occurs when peat soil is drained.

Lullymore peatland has a patchwork of ecosystems across what was once a cutaway peatland site after being industrially harvested. Within this patchwork is a birch dominated native woodland where carbon monitoring is taking place. The site offered a unique opportunity to study carbon emissions, for the reason that it is a naturally established woodland on peat soil and most research in Ireland has been conducted on monocultured forestry sites and woodlands on mineral soil. To monitor carbon from this site, the Eddy Covariance method is being applied. This method is a highly effective means of monitoring carbon between the terrestrial ecosystem and the atmosphere. For this research project two gases of interest include carbon dioxide (CO_2) and methane (CH_4), both important greenhouse gases. By measuring changes in gas concentration and wind from the atmosphere concurrently at high frequency, we can estimate the flux of the gas of interest. The flux is essentially the volume of gas passing through a known area over a given time. Looking at fluxes over a period of time (a year or more for an ecosystem) we can estimate the overall carbon that was lost into the atmosphere or carbon that was sequestered, and from this we can determine whether the ecosystem is a sink or a source for CO_2 and CH_4.

Preliminary results from one year's data are showing that the woodland site is a sink for CO_2. Methane fluxes are on a much smaller magnitude compared to the CO_2 fluxes. However, the overall accumulation of CH_4 has not yet been estimated. This is due to large gaps in the data for various reasons (the weather and instrument failure) which will require further data gap filling analysis. Additional data collection will be required to determine inner annual variation from the site, to increase the validity of gas fluxes. On collection of longer-term data sets, further analysis will be carried out to establish a CO_2-eq for both gases. On review of this, the sink/source function of the site will be determined.

The Birch woodland is likely to be at present a carbon sink, due to the accumulation of biomass in the woodland. This is expected to tail off as the woodland matures, and carbon fluxes from this habitat may change in the future. This conclusion needs to be validated by further research.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Lullymore Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare peat in the former production area and confer plantation are assessed as **local importance (lower value)**.

Lullymore Bog is developing as a diverse mosaic of wetland habitats including Reed-swamp, open water, wet scrub, fen, *Cladium* fen and embryonic *Sphagnum*-rich vegetation, as well as birch woodland/scrub and old mixed broadleaved woodland. These habitats may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Lullymore Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity, and other general topics over the years about Ballydermot Bog within Allen-Lullymore Bog group, including Lullymore Bog, with various stakeholders in relation to:

- Forestry management with Coillte.
- Consultation with Kildare Birdwatch Ireland (May 2016 & July 2016) about management of the wetland.
- The 1st review of the 2nd Bord na Móna Biodiversity Action Plan was held in Lullymore Heritage and Discovery Park in February 2017. A field-trip visited the Lullymore cutaway.
- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Lullymore Heritage and Discovery Park.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Lullymore Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Lullymore Bog.

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

4.2 Topics raised by Consultees

N/A Yet as consultation has not commenced.

4.3 BnM response to topics raised during consultation

N/A Yet as consultation has not commenced.

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5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- Integrating rehabilitation measures with existing land-use (e.g. conifer forestry and amenity). It is not proposed to change or affect any conifer or commercial forestry, or amenity use.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect planned renewable energy infrastructure or areas required for this proposed project.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of a peatland used for industrial peat production, in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation has formed the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is the general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. This has largely been completed at Lullymore.
- It will take some time for stable naturally functioning habitats to fully develop at Lullymore Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. The site has already developed pioneer and maturing cutaway habitats and much of the site is stabilised.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- 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 portion of this site has potential to develop *Sphagnum*-rich habitats in this timeframe.

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Nevertheless, re-wetting across the entire bog, 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 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 BnM). Reducing pressures due to former peat extraction activities at Lullymore 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 BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g. Timahoe South, and Lodge Bog in 2022-2023; Timahoe North in 2025) and have previously carried out re-wetting and rehabilitation at Lullymore bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Lullymore Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Lullymore bog is part of the Allen-Lullymore bog group.
- The local environmental conditions of Lullymore Bog mean that hydrological maintenance, including modifying outfalls and managing water levels with overflow pipes, is the most suitable rehabilitation approach for this site.
- The key goals and outcomes of rehabilitation set by BnM. BnM have defined the key goal and outcome of rehabilitation at Lullymore Bog as **environmental stabilisation and optimising residual peat re-wetting,** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Windfarm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Lullymore Bog. In areas associated with proposed wind farm infrastructure where a partial overlap occurs, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- Rehabilitation has already been carried out at this site on a pilot and phased basis and the cutaway is already developing a mosaic of Birch scrub/woodland, wetland and cutaway peatland habitats. The cutaway is stabilised already. A very small portion of the site has bare peat. Rehabilitation is largely complete. There may be some future maintenance and adjustment of water-levels.
- Current land-use includes forestry, where drainage will be maintained, and this will be treated as a constraint.
- Current land-use also includes amenity (Lullymore Heritage and Discovery Centre). This initiative will continue to be supported by BnM.
- Rehabilitation of Lullymore Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.

- Much of the cutaway has already naturally colonised with pioneering vegetation and has re-wetted in part due to previous rehabilitation efforts. Lullymore is a typical cutaway basin. The phased rehabilitation including drain-blocking and hydrological management has been successful in raising water-levels across the site. At Lullymore there are ecological indicators of alkaline water chemistry present in the wetlands, such as Saw Sedge (*Cladium mariscus*). This is an indication that fen habitats will develop at this site in mosaic with other habitats.
- **Potential land-use.** It is expected that BnM will update and finalise the draft rehabilitation plan for Lullymore when a decision is made in relation to the wind farm planning application. BnM remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC license. The targeted rehabilitation measures set out in this Rehabilitation Plan will be implemented following completion of the construction phase of the proposed Ballydermot Wind Farm in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.
- **Land-use**. Part of the bog has been developed for forestry and is leased to Coillte. The drainage of this area will have to be maintained. Part of the site is leased to Lullymore Heritage and Discovery Park and is used for amenity.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM 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**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to BnM Archaeological Liaison Officer and the National Museum of Ireland (Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

6.2 Key Assumptions

- It is assumed that BnM 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 rehabilitation activities.

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6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Lullymore 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 Lullymore Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial drainage activities.

Rehabilitation is generally defined by BnM 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 a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g. potential suspended solids run-off).

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

- Rewetting of residual peat in the area originally drained for industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation and increase in the area of potentially peat forming habitats. 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 BnM 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 Longford Pass 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 Corlea Bog in Mountdillon over the 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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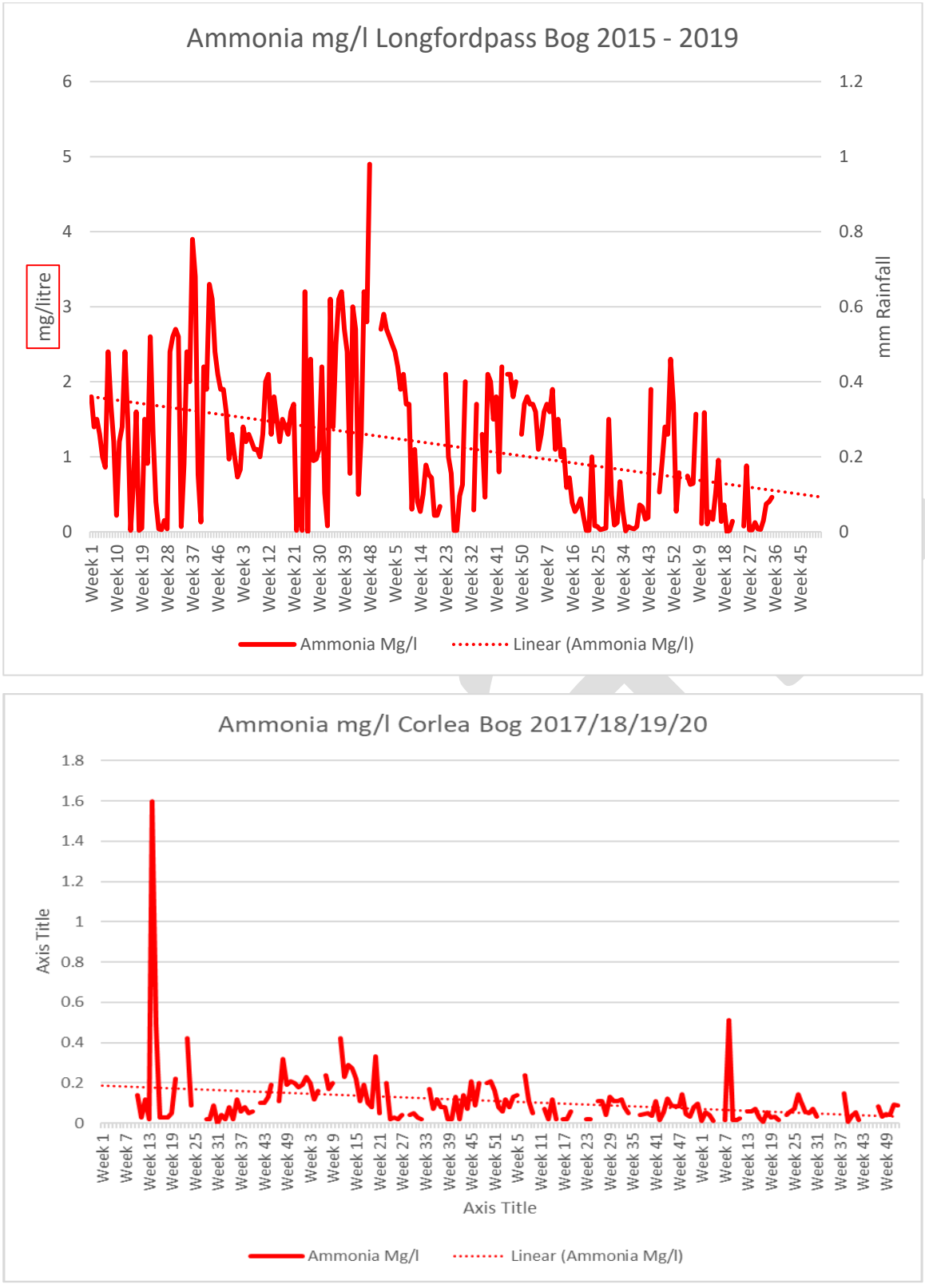


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected time-frames.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and 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 based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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, LiDAR surface maps and Depression analysis, these are included in the accompanying mapbook as the drawings referenced below:

BNM-ECO-26-14-21: Aerial Imagery 2000

BNM-ECO-26-14-22: Aerial Imagery 2020

BNM-ECO-26-14-03: LiDAR Map

BNM-ECO-26-14-09: Depression Analysis

The restoration and rehabilitation measures are provisionally outlined in drawing titled *BNM-ECO-26-14-*20*:* ***Standard Rehab Measures*** in the accompanying Mapbook.

These rehabilitation measures for Lullymore Bog will include (see Table 8.1):

- Much of the cutaway has already vegetated and stabilised. Phased rehabilitation has been carried out across this site and re-wetting has been successful.
- Future hydrological maintenance may include modifying outfalls and managing water levels with overflows.
- 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 rehabilitation measures at Lullymore Bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

Type	Code	Description	Area (Ha)
Deep peat rehab	DPT1	Regular drain blocking, modifying outfalls and managing water levels with overflows	5.1
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	0.01
Marginal land	MLT1	No work required	16.5
Constraint	Constraint	Access, Lease - Lullymore Discovery Centre and forestry)	39.3
Silt Pond	Silt Pond	Silt Pond	0.2

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Type	Code	Description	Area (Ha)
Completed Rehab	Completed Rehab	Completed Rehab	113.3
Ballydermot Wind Farm	Wind Farm Infrastructure + Buffer	Buffered area East of the Wind Farm infrastructure areas including turbine bases, internal access roads, crane hard stand and peat and spoil areas.	0.6
Total Area			**175.0**

8.1 Completed and Ongoing

- Part of Lullymore bog was developed as conifer forestry by Coillte in the 1980's. This forestry (conifer plantation) has established and is considered to be rehabilitated. Issues of forestry management will be addressed during forestry operations in the forested sections of the site by Coillte, and under the appropriate Felling Licence as granted by the Forest Service.
- The majority of the remaining the cutaway has already re-vegetated and has developed wetlands, scrub and Birch-dominated woodland.
- Some active rehabilitation was carried out in 2006/2007 to block a main outfall and enhance wetland cover. Some repair works were carried out in 2011. Additional works were carried out in 2016 to further maintain and raise water-levels in the wetlands.
- BnM carried out some rehabilitation works in the area leased to Lullymore Heritage Park in 2012. This included drain blocking, lake and island creation and re-location of the main outfall through the site. This area of the bog will be managed by Lullymore Heritage Park into the future under terms of a lease signed in November 2011.
- An area formerly used as a spread ground for sod turf by licensed contractors was fertilised in June 2014 to increase vegetation establishment. This area is now re-vegetating quite rapidly.

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

- Seek formal approval of the finalised rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Lullymore bog to enhance the completed measures. This will take account of topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.
- A drainage management assessment of any proposed additional rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out
- 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) is to be 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.

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- Appropriate Assessment (AA) of the rehabilitation plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include Regular drain blocking, modifying outfalls and managing water levels with overflows. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- 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.

8.4 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 9 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.

8.5 Timeframe

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions.
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation**: Decommission silt-ponds, if necessary.

8.5 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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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.
- 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.
- Monitoring results will be maintained, trended 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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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 BnM 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.

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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 have 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.

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APPENDIX I. BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow catchment, and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and Timahoe South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied an old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly, via the BnM industrial railway. Many bogs were in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long-term peat extraction activity reduced the peat depth on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen-Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Lullymore in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Lullybeg by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 and 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow piped outfall. Some cutaway bog at Lullymore, used as spread grounds for sod peat up until recently, was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

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Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly Conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries, Edenderry SAC (site code: 000925) is located in the Lullymore Bog sub-group. Glashabaun Bog (northern sub section) overlaps the SAC and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is an esker and BnM used the site in the past to extract gravel for the construction of railway embankments across BnM bogs. Rare plants including Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations.

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation is ongoing.

A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC Licence Ref. P0503-01, and current, indicative peat production status, is outlined in Table Ap-1.

Table Ap-1 Allen-Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.		
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since the 1950s. Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Glashabaun South	569	Peat extraction since 1950s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry.	2020	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.		
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss Sphagnum inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023
Lullybeg	271	Peat extraction since the 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2004	Draft 2026
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group – amenity.	1992	Draft 2026
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019 Majority of bog still has relatively deep peat	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production. Cloncannon bog remnant – zoned for biodiversity Mostly bare peat.	2019	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.		
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection	N/A	N/A
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab complete

See Drawing of Allen-Lullymore Bog Group number *BNM-ECO-26-14-24 titled: Bog Group Map*, included in the accompanying Mapbook which illustrates the location of Lullymore Bog and the Allen-Lullymore Bog Group in context to the surrounding area.

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Lullymore** **Sub-section of Ballydermot**	**Area (ha):**	162.2 ha (400.8 acres)
Works Name:	Ballydermot	**County:**	Kildare
Recorder(s):	MMC & DF	**Survey Date(s):**	18 June 2010, 2015

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Birch scrub (oBir & cBir) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Bare peat (BP)
- Pioneer poor fen communities (pEang, pRos, pJeff) (frequently in mosaic with open Birch scrub)
- Open water (OW)
- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.) (Found along the embankment and river marking the boundary and around the margins).
- Mixed broadleaved/conifer woodland (WD2)
- (potential) rich fen and flush (pClad) (mosaic of wetland habitats including clumps of Saw Sedge)
- Reedbeds (pPhrag, pTyph)
- Dry Heath (dHeath) (frequently in mosaic with Birch scrub)
- Depositing river (FW2)
- gCal
- Gorse scrub (WS1) (Found around the margins of the site).
- Dense Bracken (HP1) (Found along the embankment and river marking the boundary)
- Dry grassland (gAn-Ho-Eq), gCal, gMol) (found in Marsh Fritillary site)

Description of site

The area surveyed (Lullymore Bog) is a subsection of the larger BnM bog - Ballydermot Bog. The site is located in Co. Kildare adjacent to Lullymore Heritage and Discovery Park. A 'bog tour train' runs from the park and drives along the access road that forms the southern boundary to the site. The site is located approximately 7.2 ha west of Allenwood. The majority of this site is out of production and has now been zoned as a wetland area, with a small proportion zoned for biodiversity. Part of the site is still be used for sod peat production. Some rehabilitation work was carried out in 2006/2007 to block drains and enhance the development of wetland habitats. The site also includes a small area to the north known as Lullybeg that is managed by Butterfly Conservation Ireland (see Harding 2009).

The site is surrounded by other parts of Ballydermot bog (mainly production bog). There is some agricultural grassland to the south that has been developed on a 'mineral island'. The Heritage Park is located to the east of the site. The main boundary (west and north) is a BnM railway embankment (now disused). The access road marks the southern boundary with the edge of the bog along the eastern boundary.

Birch-dominated scrub (oBir and cBir) is main habitat becoming established on the drier areas of the site. Some of this scrub is well-developed and quite thick and dense, although none of the scrub is sufficiently established to be classified as Birch woodland yet. It was also noticeable that other sections are scrubbing up quite quickly and that the area mapped as scrub is greater than the area as indicated by the previous aerial photo. Some of the scrub is sparser and more open and forms mosaic with mainly poor fen communities (but also with potential rich fen). The scrub also contains frequent Grey Willow and some Eared Willow. Scot's Pine and Lodgepole Pine are also occasionally frequent and Sitka Spruce was present. Other tree species included Rowan and Aspen and some young Oak saplings were present. Some of the scrub along the higher margins of the site also contains Heather and Bilberry was also recorded. Bramble, Ivy and Bracken are also present.

Some of the small wetlands around the site were quite diverse with a range of wetland and peatland species. It was noticeable that some of these wetlands contained standing water and also had standing-dead Birch, probably due to higher water tables related to drain-blocking. Some of the re-wetted scrub was now becoming dominated by Willow. Large clumps of Saw Sedge also appeared within these wetlands, sometimes along old drains and within the other mainly poor fen vegetation. Saw Sedge also appeared in drier areas and was distributed relatively frequently around the site. The abundance and

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widespread distribution of Saw sedge around the site is notable as it contains the most Saw Sedge found on BnM cutaway to date. The presence of this species along with other indicators such as Brown mosses and the relative abundance of Greater Tussock Sedge highlight the potential for this site to develop rich fen habitat.

The wetland/poor fen vegetation was mainly a mosaic of several poor fen communities of which the Bog Cotton-dominated community and the Soft Rush-dominated community were most prominent. Small areas were also dominated by Bottle Sedge. The drier areas around some of the clumps of Saw Sedge contained species such as Purple Moorgrass, Soft Rush, Jointed Rush, Grey Willow, Marsh bedstraw, Marsh Pennywort, Lesser Spearwort, *Calliergonella cuspidata*, Common Spotted orchid, Marsh Valerian, Tormentil, Sweet Vernal-grass, Mint, Birch, Common Bog Cotton, Cuckoo Flower, Creeping Bent, Creeping Willow, Round-leaved Sundew, Marsh Arrowgrass, Marsh Thistle, Devil's-Bit, Willowherb sp., Lesser Butterfly Orchid and hummocks of *Aulacomnium palustre*. Small areas (in and around the patches of Saw Sedge) were also dominated by Yellow Sedge (potential rich fen vegetation) and contained other species such as *Campylium stellatum.*

Wetter sections with standing water were dominated by Bog Cotton and Bottle Sedge and contained additional species such as Soft Rush, Stoneworts, Lesser Spearwort, Mint, Floating Sweet-grass, Pondweed, Reed Canarygrass, common Reed, Reedmace, Star Sedge, Common Spotted Orchid, Marsh orchid sp., Greater Tussock Sedge and Gypsywort. The largest wetland towards the north of the site is a mosaic of vegetation communities and also has frequent large clumps of Saw Sedge scattered through the wetland in both wet and drier sections. There is a large area of open water surrounded by emergent vegetation that is a mosaic of mainly poor fen vegetation. Some of this wetland vegetation is at the pioneer stage and is likely to diversify and become more established in the future. There are also several stands of Reedmace and some Common Reed and some Willow scrub scattered through the wetland. Of interest was the relative abundance of Greater Tussock Sedge in some parts of the wetland and in the drains leading to the wetland from the northern boundary. This is another indication of the potential for rich fen communities to develop on the site. The wetland has also attracted breeding wetland bird species such as Lapwing and Moorhen.

A small area of mature woodland that was dominated by Beech and Sycamore was located along the eastern boundary. This woodland has been classified as mixed woodland (WD2) and has developed on a small mineral island with a limestone till sub-soil or very shallow peat. The woodland was probably planted in the 19th century as a mainly broad-leaved plantation (marked as mixed woodland on 2nd edition OSI 6 inch map). This woodland was relatively diverse with a wide range of tree species such as Oak, Ash, Birch, Scot's Pine, European Larch, Rowan and Holly. While the canopy is dominated by non-native Beech and Sycamore, the ground flora and shrub layers were dominated by typical native woodland species (similar to native Ash woodland – WN2). Ivy dominates the ground cover in places and other sections are dominated by brambles. There are also patches of Bracken. Typical species include Wood Sedge, Herb Robert, Lords and Ladies, Strawberry, Honeysuckle, Wood Anemone, Male Fern and Hogweed. In the absence of notable grazers there was good natural regeneration within the woodland, however there was evidence that goats were using some of the scrub close by. The Beech and Sycamore are surrounded by a band of mature Scot's Pine that has developed on the transitional zone with the bog where there is more peat. This zone contains species such as Bilberry and Heather. A disused Badger sett was located within the woodland.

The old railway embankment has developed a range of habitats including some woodland dominated by Birch. Scrub with Birch and Elder is predominant and a large section is also dominated by Bracken. Other parts contain Purple Moorgrass-dominated grassland. The southern part of the site is dominated by bare peat as it were being intensively harvested for sod-peat. Several high fields out of production were colonised by dry heath (dominated by Heather,) while several other fields not in production contained pioneer poor fen vegetation.

Lullybeg

An adjoining section to the northwest of the site called Lullybeg is currently being managed by Butterfly Conservation Ireland in order to enhance and maintain habitats for the Marsh Fritillary Butterfly and other species that are present in this section of the site. This area is roughly rectangular in shape and is a mosaic of scrub and dry grassland. The dry grassland was a mixture of several typical cutaway pioneer grassland communities. It has developed around an old silt pond complex. Some of the grassland was dominated by Purple Moorgrass (gMol) and contained frequent to abundant Devil's Bit. Other sections were dominated by Horsetails and were typical of *Anthoxanthum-Holcus-Equisetum*-dominated community (An-Ho-Eq). Some sections were typical of dry calcareous grassland (gCal) and were dominated by Glaucous Sedge. Typical calcareous species such as Ox-eye Daisy and Knapweed were found in all the grassland communities. Young Birch is frequent within the grassland areas. This section of the site is actively managed by removing small areas of scrub in order to encourage areas of species rich grassland to develop. This work will maintain a mosaic of scrub and open grassland areas on the site. Part of this area was grazed during the summer by cattle for a short period with the intention of breaking up clumps of Purple Moor-grass (Harding 2010). Harding (2010) also noted that Purging Buckthorn and Alder Buckthorn were present in the Lullybeg site on the cutaway.

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

None

Adjacent habitats and land-use

The following habitats are all located adjacent to the site, conifer plantation (WD4), active production bog, cutover bog (PB4), improved agricultural grassland (GA1), mixed conifer/broadleaved woodland (WD2), scrub and wet grassland (GS4).

Watercourses (major water features on/off site)

- The Figile River flows along the northern boundary of this site.
- The Crabtree River flows along a section of the western boundary of the site, this watercourse then joins the Figile River to the North West.
- All of the watercourses along the site are located within the South Eastern Barrow catchment.

Fauna biodiversity

Birds

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

- Lapwing (2 breeding pairs)
- Moorhen
- Whitethroat
- Willow Warbler
- Reed Bunting
- Kestrel
- Blackcap
- Stonechat
- Sedge Warbler
- Grey Heron
- Other more common species included Blackbird, Robin, Blue Tit, Wren, Pheasant, Dunnock, Redpoll, Magpie, Chaffinch, Great Tit, Swallow and Wood Pigeon.
- Butterfly Conservation Ireland (report 2010) also has other records of breeding birds including wetland birds. These include Kingfisher, Water Rail, Teal, Woodcock and Buzzard.
- Mick Jacob has recorded Buzzard (3-5), Peregrine (both in mid-summer), Long-eared Owl, Kestrel, Woodcock (probable breeders), Jay, Sparrowhawk, Water-rail, Whooper Swan (3-5), Mute Swan (6-8), Mallard, Wigeon, Moorhen, Lapwing, Golden Plover (wintering - both in autumn)
- Jesmond Harding has recorded Merlin (2011).

Mammals

Signs of the following species were noted on the site

- Fox
- Badger
- Stoat
- Goat in the more mature scrub.
- Butterfly Conservation Ireland (report 2010) also has other records of mammals using the Lullybeg site. These include Red Squirrel and Otter.
- Mick Jacob has recorded frequent signs of Otter where the siltponds are diverted into the stream and Red Squirrel in the area.

Other species

- The butterfly and moth fauna of this site and the adjoining Butterfly Conservation Ireland site is well known. Marsh Fritillary is one of the most important species present on the adjoining site (known as Lullybeg). This rare butterfly species is listed in Annex I of the EU Habitats Directive. Other species of notable conservation value are also present (See Harding 2009). The adjoining site is being actively managed for butterflies with some scrub removal to encourage the development of species-rich grassland. It is likely that these butterfly species use other parts of the overall site.

References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

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

Harding, J. (2009). Annual Butterfly Report. Butterfly Conservation Ireland.

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

In addition to the above, best practice measures around the prevention and spread of Crayfish plague[5] will be adhered with throughout all rehabilitation measures and activities.

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

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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. Lullymore bog is part of the Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2026-2030

The All-Ireland Pollinator Plan 2026-2030 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 1992, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments

- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM 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 BnM'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.

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14 BnM commitments

BnM 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.

In line with BnM'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. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

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.

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APPENDIX VI. 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 BnM 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, stockpile covering, pumps, septic tanks and fuel tanks.

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

Item	Description	Lullymore Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Not relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

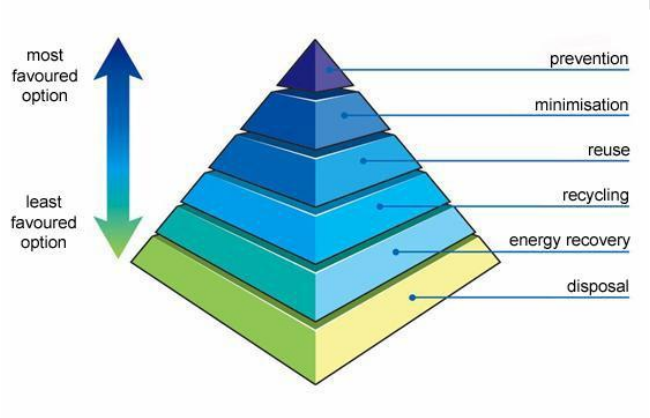
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 cutover 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

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

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER, 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant, 1999) and the **improvement**

of ecological conditions in damaged wildlands through the **reinstatement of ecological processes**. In general, BnM 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 acrotelm – 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.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

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 IPC Licence's Ref. P0503-01 in the Allen-Lullymore Group of Bogs in Counties Offaly and Kildare.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.
- 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.
- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.

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- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

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APPENDIX IX. 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/resources/faqs/environment--you/faq-listing/ , 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 X. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

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



Code of Practice

22

Code of Practice

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

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

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

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

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

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



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.
- Note its position.

- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Lullymore Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet

Document Name:	Lullymore Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Draft v0.1**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	11	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	JOS	MMcC
Date:	06/08/2026	06/08/2026	06/08/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):		JB	CS
Date:		22/10/2026	23/10/2026

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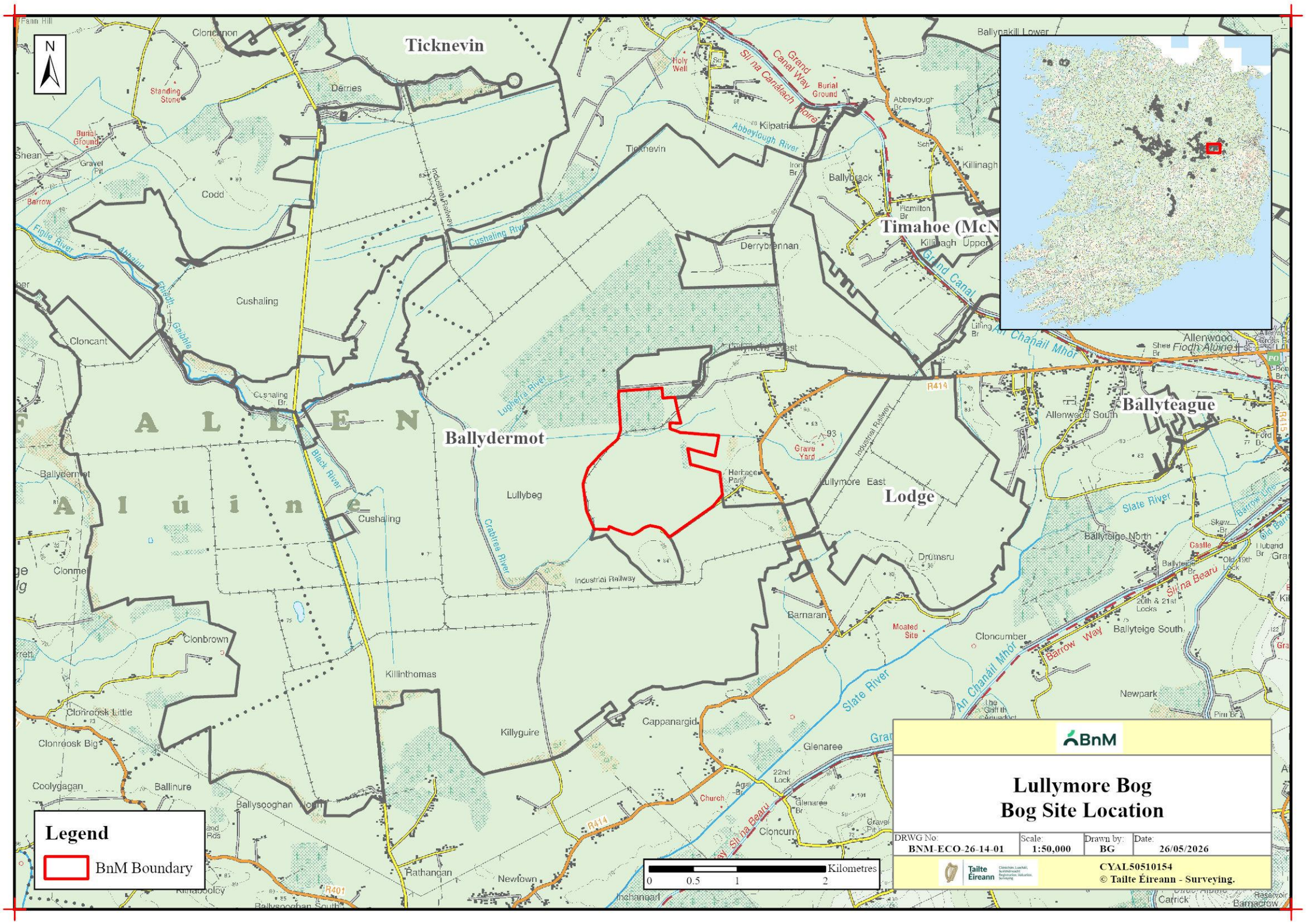
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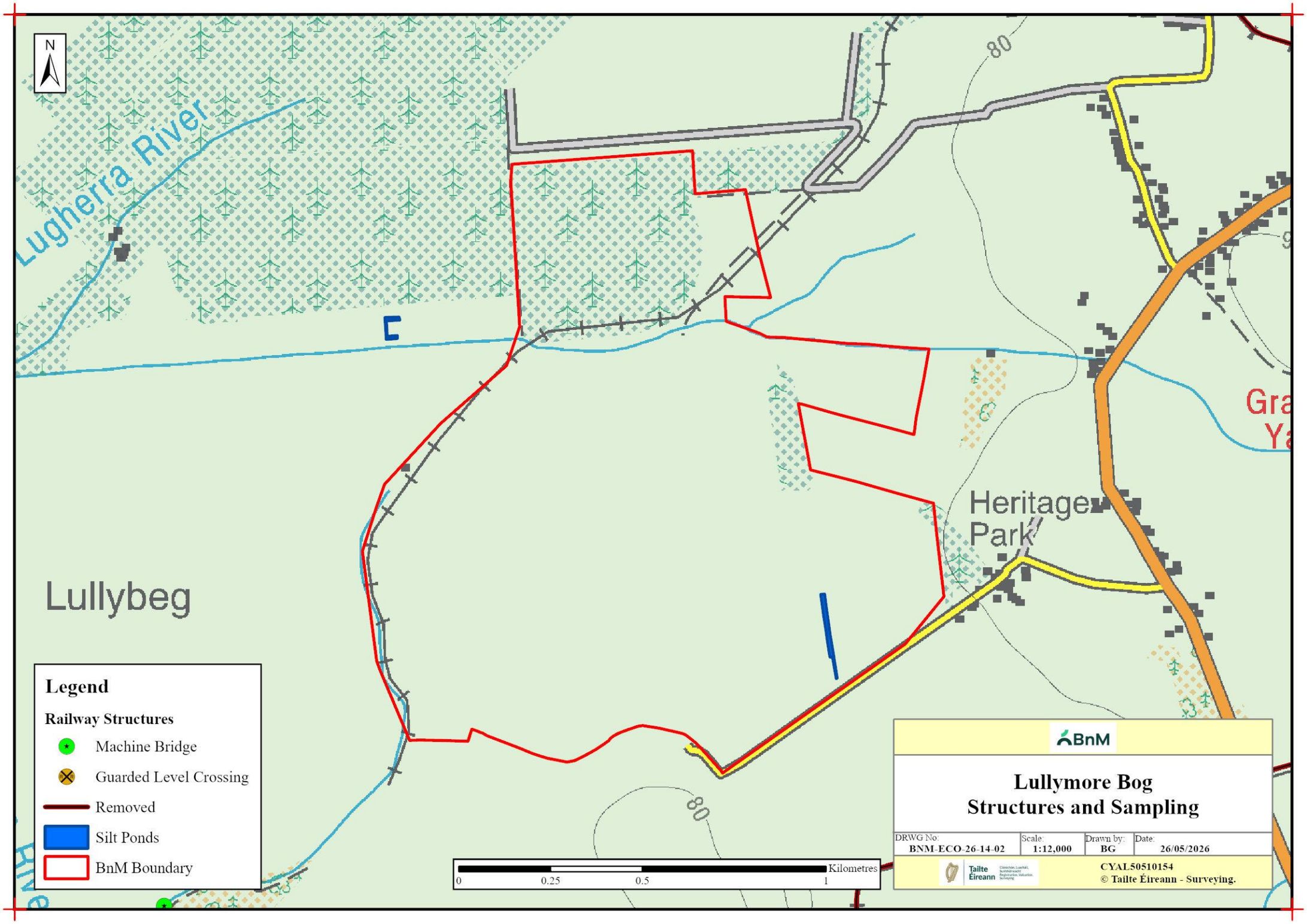
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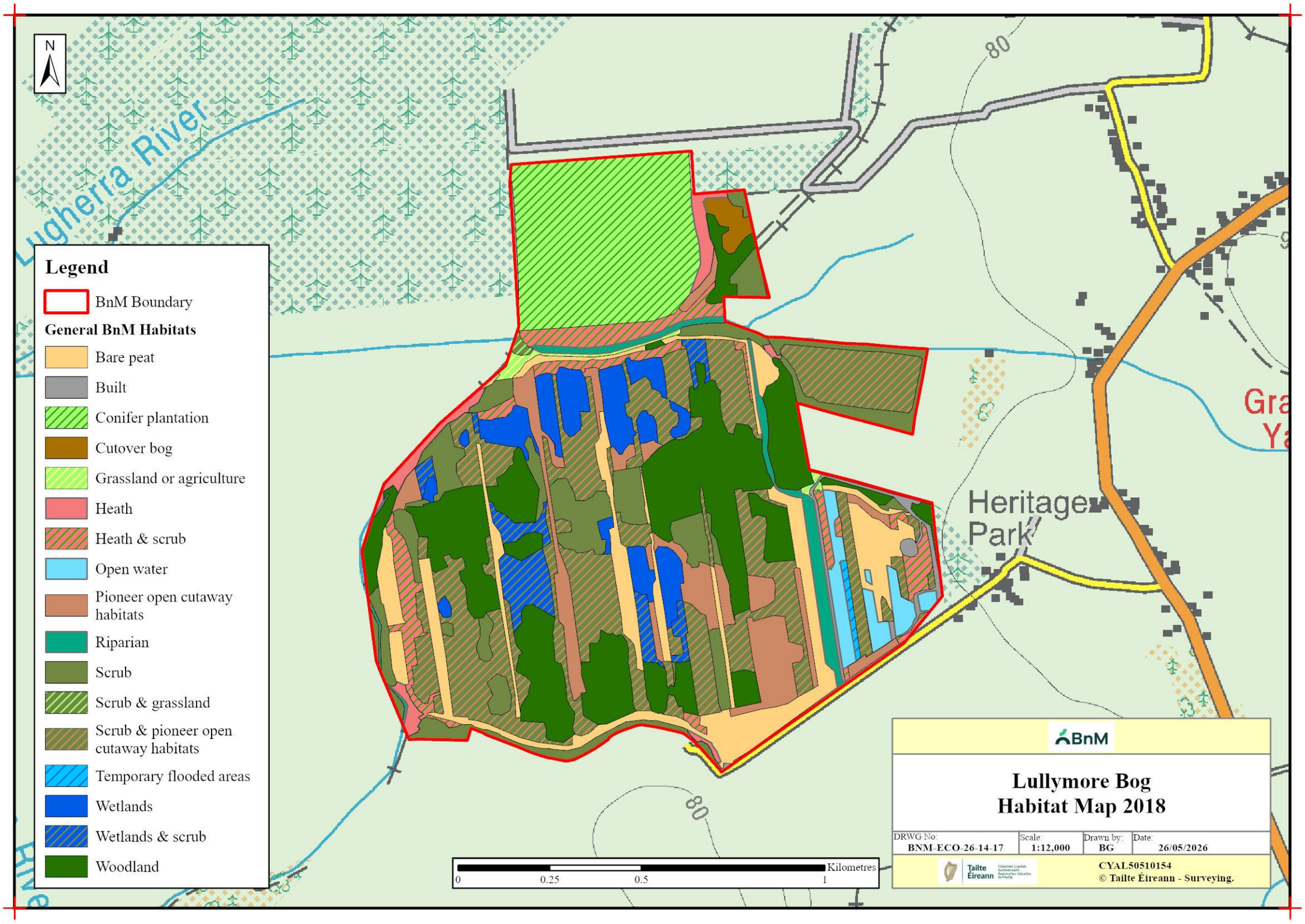
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Heritage
Park
Lullybeg
Legend
Railway Structures
Machine Bridge
Guarded Level Crossing
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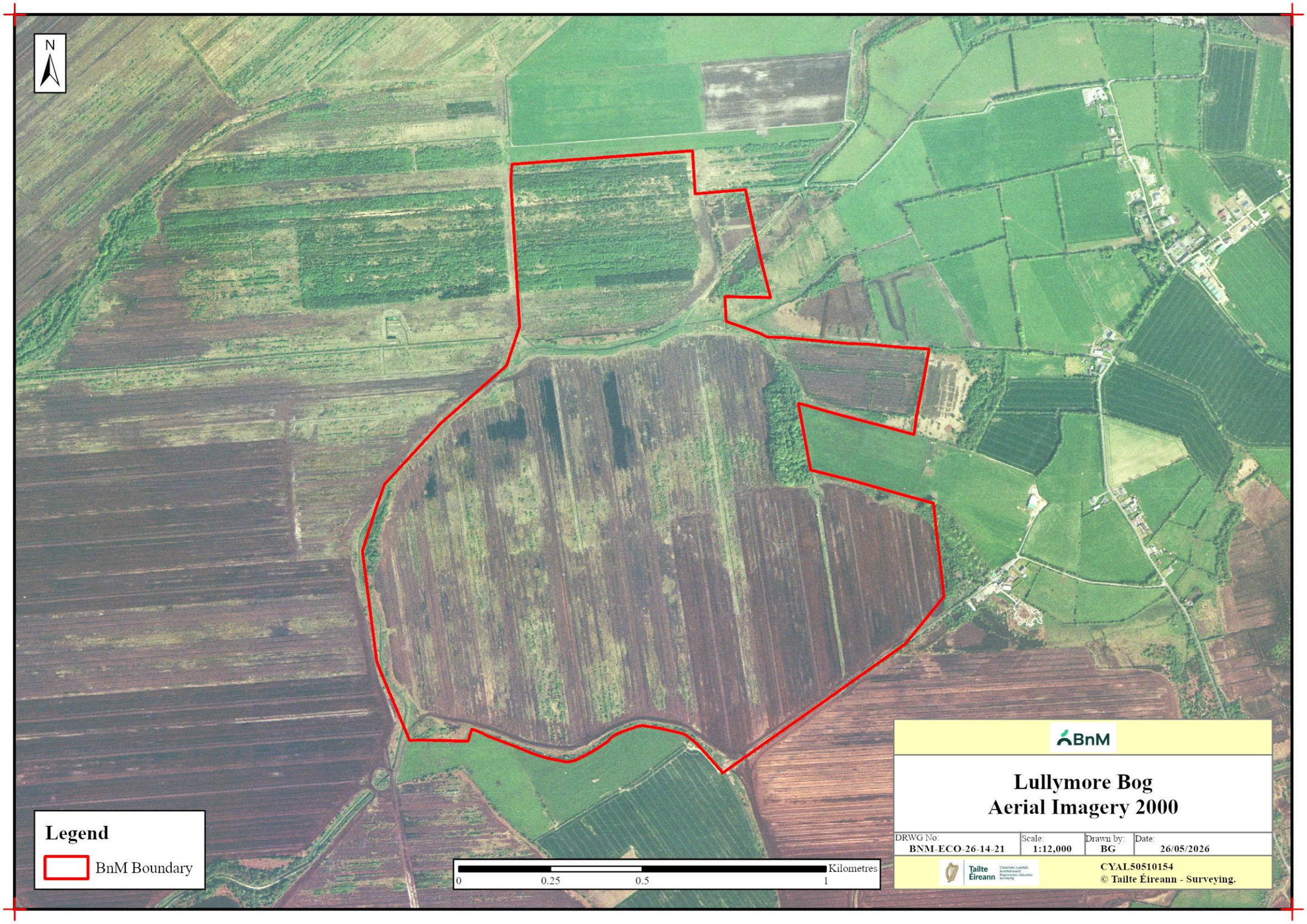
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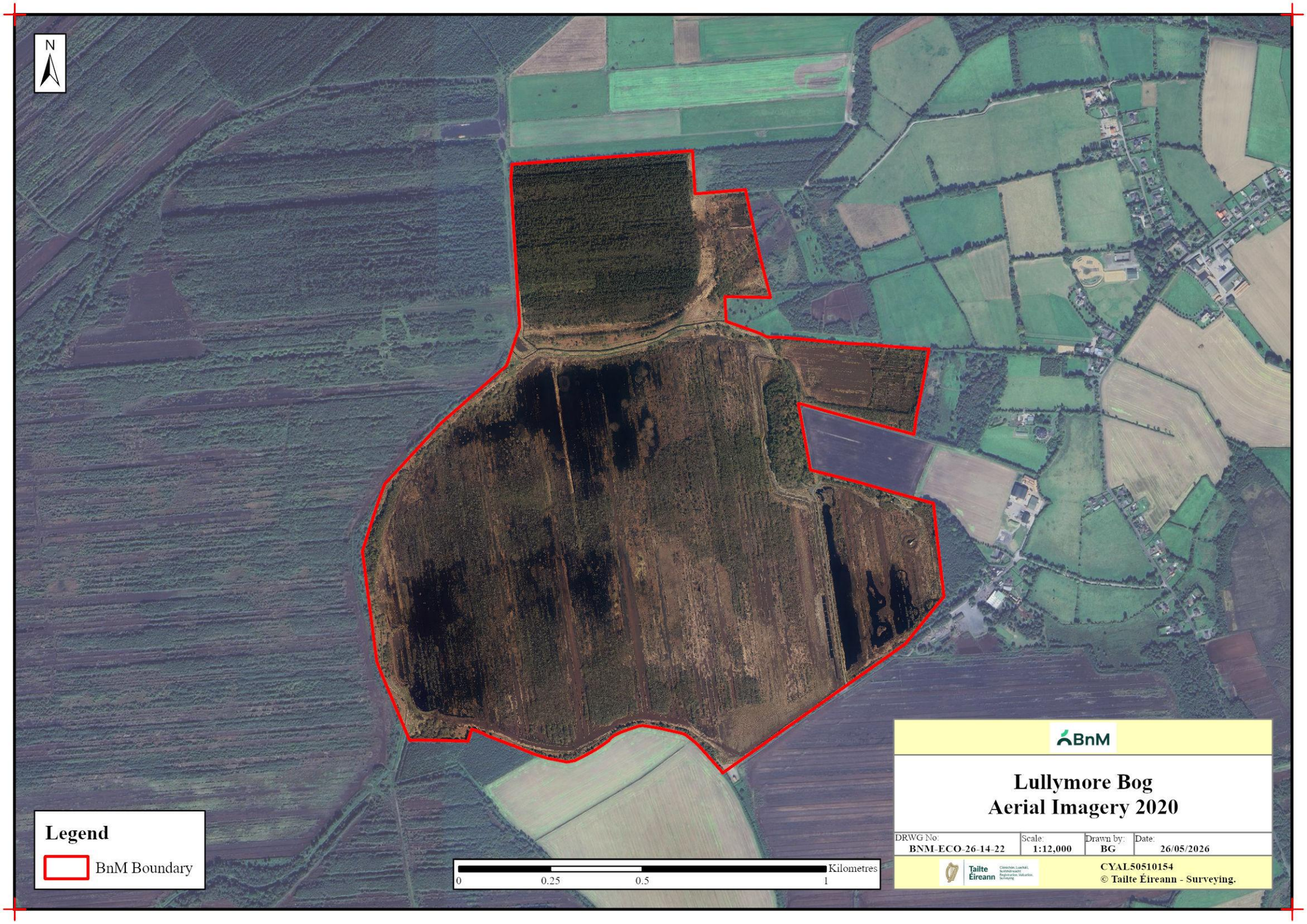
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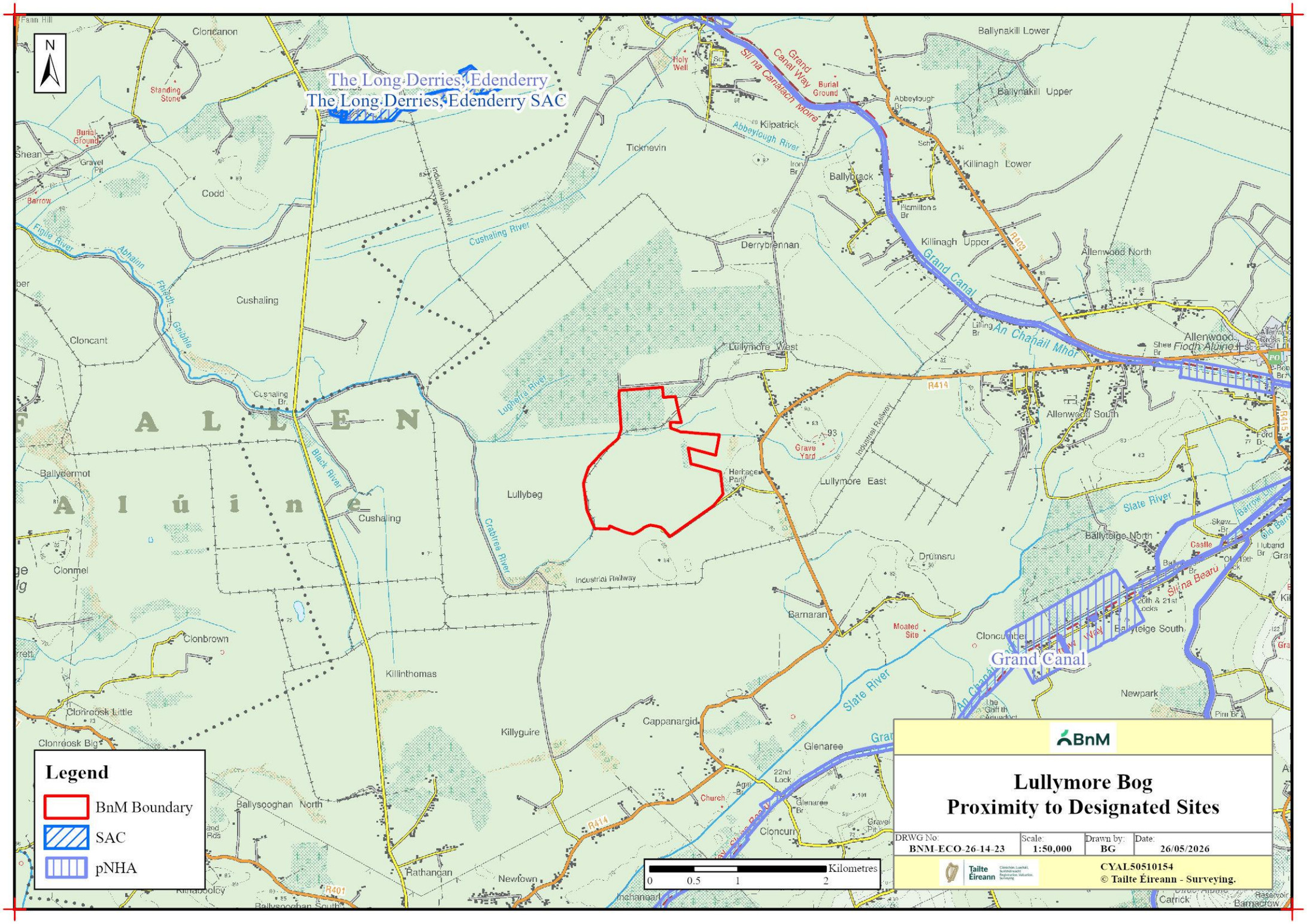
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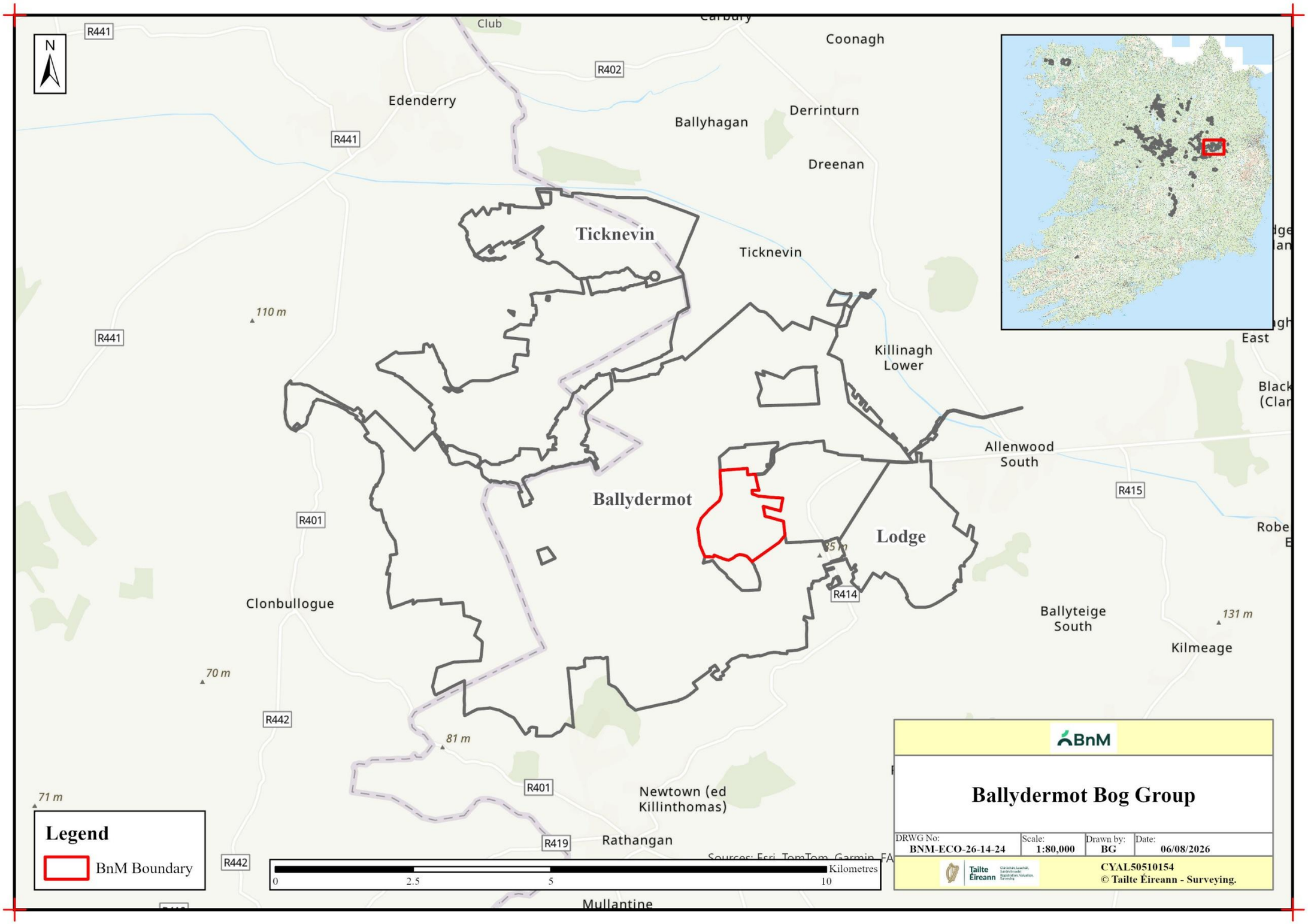
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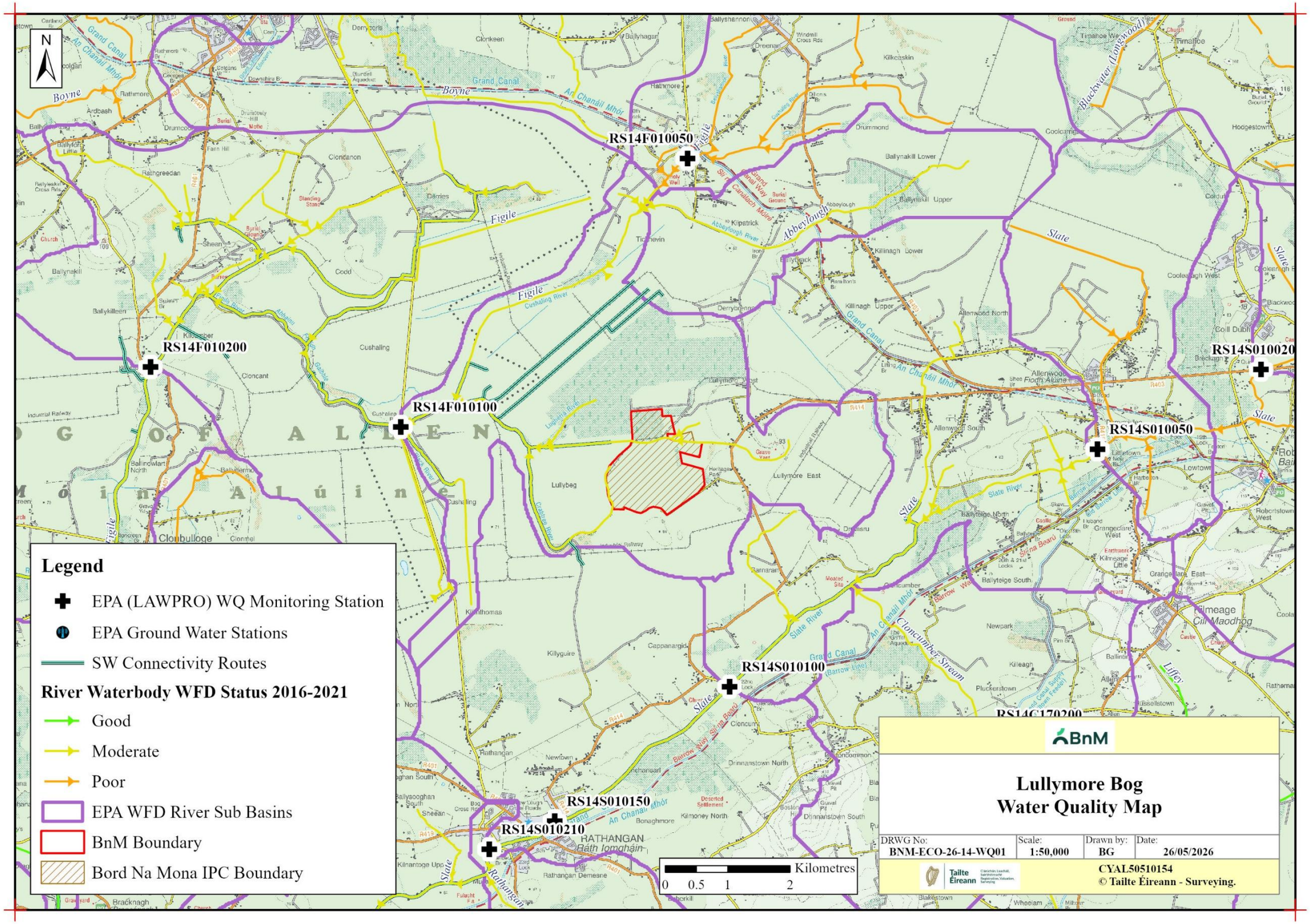
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Hydrology / Topography Maps

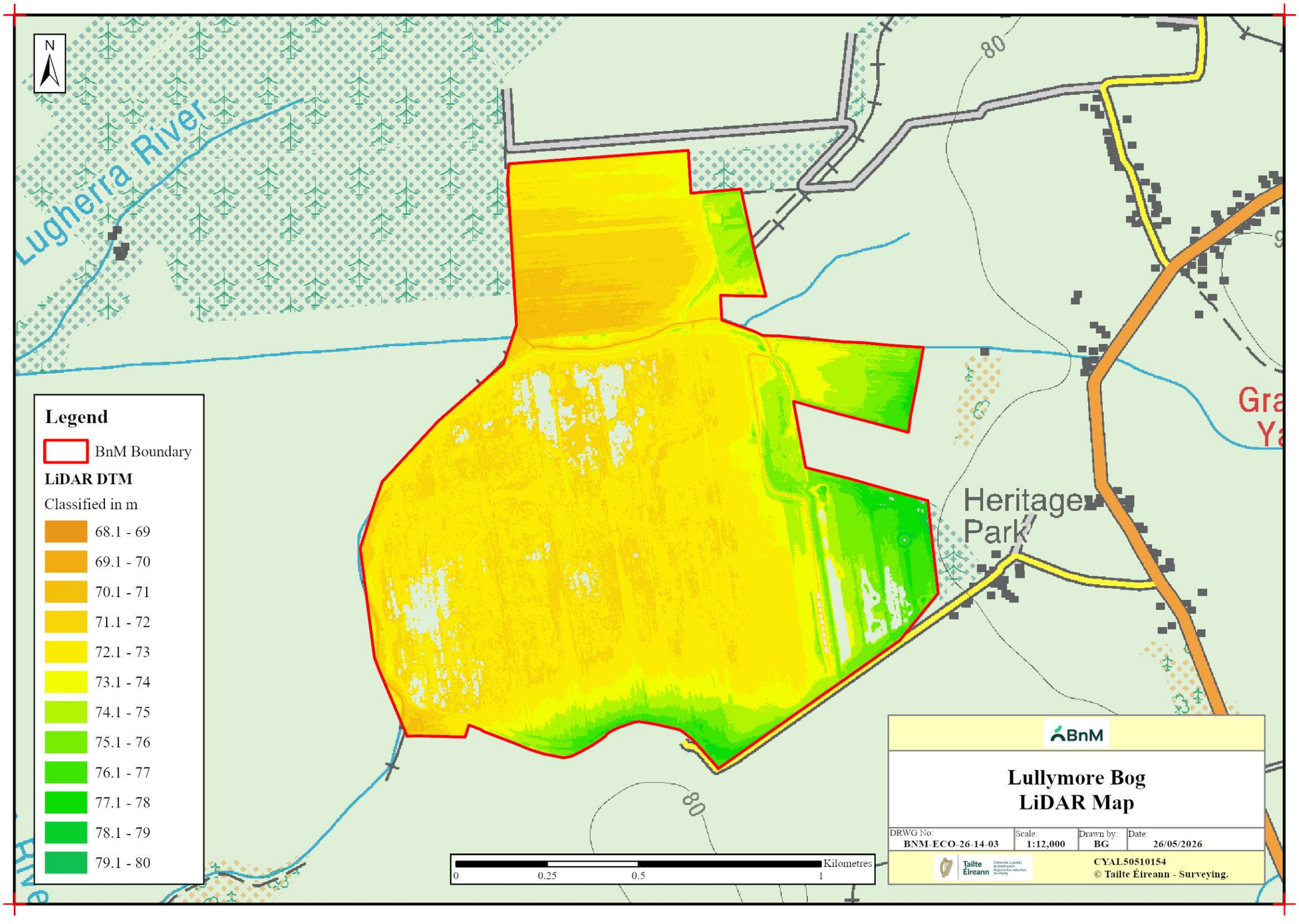
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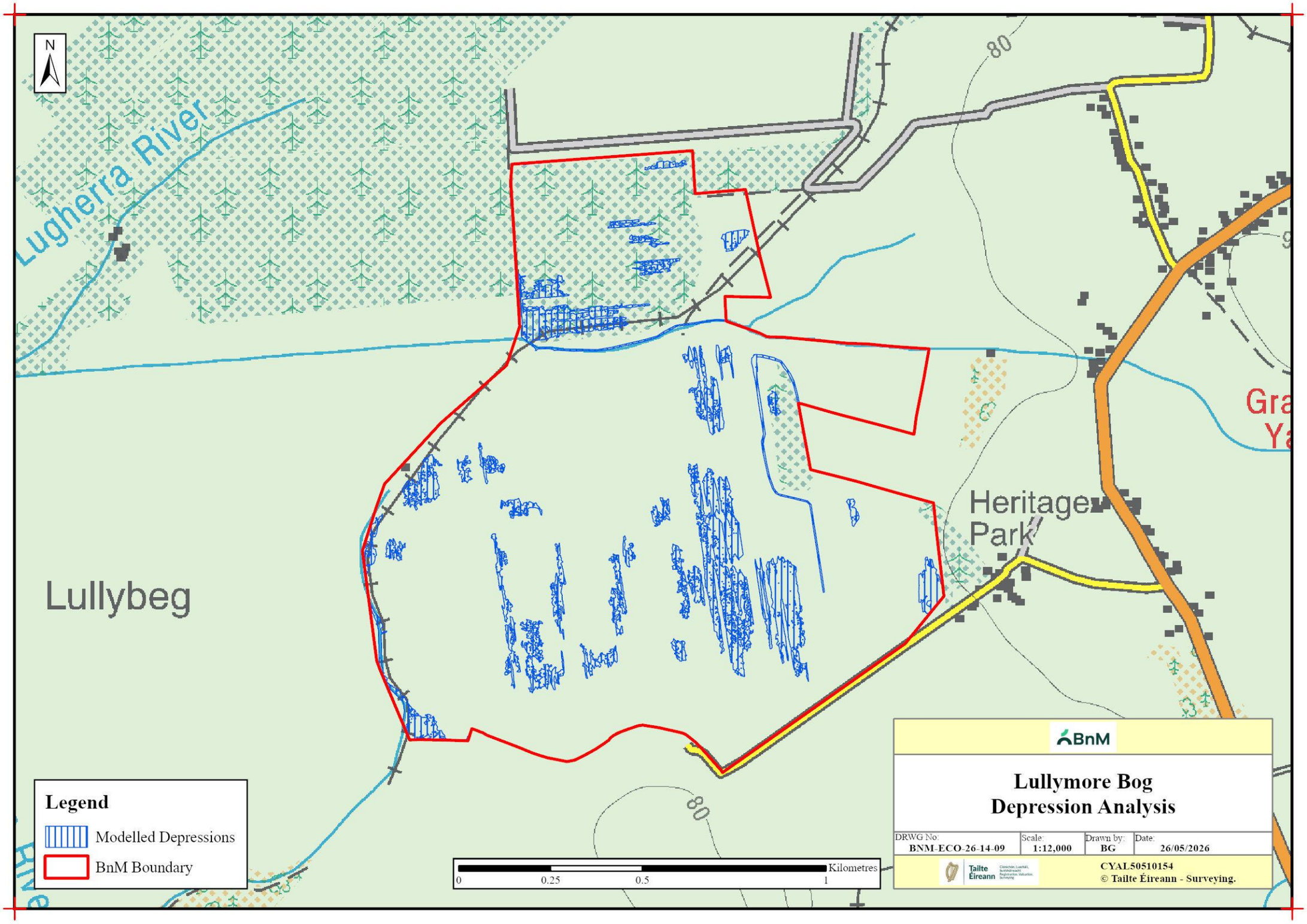
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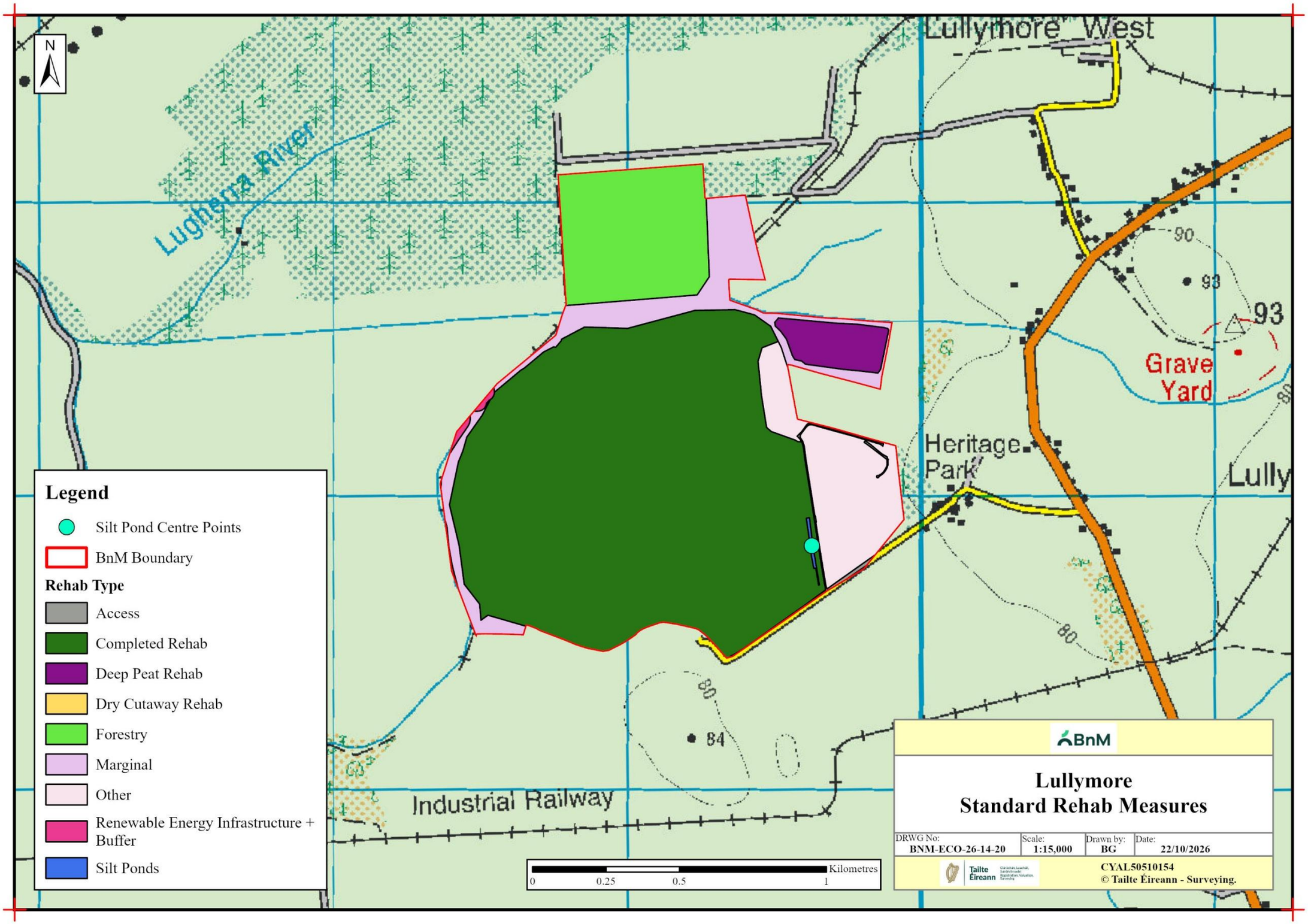
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CYAL50510154
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Rehabilitation Maps


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Lullymore West
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93
93
Grave Yard
Heritage Park
Lully
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80
84
Industrial Railway
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Silt Pond Centre Points
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Rehab Type
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Completed Rehab
Deep Peat Rehab
Dry Cutaway Rehab
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Ticknevin Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

Draft

This document seeks to address the requirements of Condition 10.2 of Integrated Pollution Control (IPC) Licence Ref. P0503-01:

> "*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 BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Ticknevin Bog upon cessation of peat production and complements 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 Ticknevin Bog.

BnM have defined the key rehabilitation outcome at Ticknevin Bog as environmental stabilisation.

Any consideration of any other future after-uses for Ticknevin Bog 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.

BnM are planning to develop a potential renewable energy project at Ticknevin Bog as part of the proposed Ballydermot Wind Farm. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in 2026. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA.

Draft

Document Control Sheet	
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Document File Path:	G:\Ecology Team\EPA draft rehab plans 2017 word docs\Allen 503_Lullymore Bogs (EPL)\Ticknevin\Rehab Plan 2026\Renewables Rehab Plan
Document Status:	Draft

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Non-technical Summary

- BnM is planning to rehabilitate Ticknevin Bog, a sub-section of a larger unit called Ballydermot Bog and is located approximately 4 km south-east of Edenderry and on the Co. Offaly/ Co. Kildare boundary.
- Ticknevin Bog was in industrial peat production by BnM from the 1980s and ceased by 2020. The bog supplied sod moss for the horticulture industry.
- BnM are planning to develop a potential renewable energy project at Ticknevin Bog as part of the proposed Ballydermot Wind Farm. The Wind Farm project is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The wind farm planning boundary overlaps Ticknevin Bog and is considered as a constraint in the rehabilitation plan. Ticknevin Bog will be rehabilitated as part of the Ballydermot Wind Farm development or at a later date. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- The majority of the bog is dominated by bare peat, with the colonisation of emerging pioneer vegetation. Remnant raised bog occurs in the western extent of the site and is subject to private turf cutting/turbary.
- Ticknevin also contains a relatively large area of remnant raised bog (~32.3ha) that was never developed by BnM located west of the local road (L-1001). This area, called Cloncanon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014). Cloncanon bog remnant is now zoned for biodiversity.
- Ticknevin has a partially pumped drainage regime, with one pump in the southern part of the bog.
- This rehabilitation plan has been prepared as BnM as part of obligations to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a “skin” back onto the peat), and minimising effects to downstream waterbodies.
- It will take some time for vegetation and habitats to fully develop at Ticknevin, and for a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- Areas with deeper residual peat have the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions. *Sphagnum* is a key species for restoring naturally functioning raised bog conditions.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of BnM 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.
- Peatland rehabilitation of this bog 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.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and regenerating wet deep peat vegetation (on deeper peat); and wetlands with reedbeds and birch woodland on shallower peat. In time, a naturalised peatland can be developed.

- The development of a range of habitats at Ticknevin Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. Rehabilitation will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new wetland habitats.
- This peatland rehabilitation plan does not outline future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM operates under an IPC Licence issued and administered by the EPA to extract peat within the Allen bog group (Ref. P0503-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0503-01:

> "*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.*"

The Allen Bog Group comprises 2 main sub-groups: Allen - Clonsast and Allen - Lullymore. Ticknevin is located within the Allen-Lullymore bog group (see Appendix I for details of the bog areas within this Group). Ticknevin Bog is located at the northern extent of the bogs within the wider footprint of Ballydermot Bog along the county boundary of counties Offaly and Kildare.

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 V).
- 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.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Ticknevin Bog, and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

The Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) is a scheme being delivered by BnM across its peatlands. This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS) (BnM Peatlands Climate Action Scheme). The additional costs of the scheme are being supported by the Government via Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC). The Peatlands Climate Action Scheme was delivered between 2021-2026. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date, across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part of the EDRRS project are **NOT** proposed as part of this draft Ticknevin rehabilitation plan. The potential implementation of enhanced rehabilitation measures at Ticknevin will be dependent on the selection of this cutaway bog as a site to be included in EDRRS in the future.

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1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

> "*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 document covers the area of **Ticknevin Bog.**

Parts of Ticknevin Bog around the perimeter of the site are currently being used by domestic turf cutters who have turbary rights. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting and turbary issues on Ticknevin Bog. Nevertheless, BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of turf cutting on the delivery of the stated objectives.

BnM are planning to develop a potential renewable energy project at Ticknevin Bog as part of the proposed Ballydermot Wind Farm (see Location | Ballydermot Wind Farm). This proposed wind farm project is located within Ticknevin Bog as well as the adjacent BnM bogs of Ballydermot, Barnaran, Blackriver, Codd, Derrybrennan, Glashabaun, Killinagh, Lodge, Lullybeg and Lullymore. Ballydermot Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm has been taken into account in the preparation of this Rehabilitation Plan. Where proposed wind farm infrastructure overlaps with areas identified for rehabilitation, the timing and sequencing of rehabilitation measures will be coordinated with the proposed development. Accordingly, these areas are treated as a temporal consideration in relation to the implementation of rehabilitation measures.

The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. It is expected that BnM will revise and update the rehabilitation plan for Ticknevin Bog when a decision is made in relation to planning permission for the Wind Farm. BnM remain fully committed to rehabilitation and meeting the conditions of the IPC License. Any consideration of any other future after-uses for Ticknevin Bog 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.

There are known rights of way around the margins of Ticknevin Bog. Where a public right of way or similar burden exists on BnM 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.

Rehabilitation in other areas of the bog may also be constrained due to other property issues.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA– '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan*' (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2011 to 2026 inclusive) and monitoring and desktop analysis, form the basis for the development of this 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);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

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.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.

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- 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, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen bog group 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);

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- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027;
- BnM Annual Report 2025;
- 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 BnM's rehabilitation and Biodiversity Action Plan activities and will be contacted during the rehabilitation process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Ticknevin Bog was surveyed in 2011. Habitat maps were updated in 2017. Additional ecological walkover surveys and visits have taken place between 2011-2026, in advance of the preparation of this rehabilitation plan. 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 (2019), while moss and liverwort nomenclature follows identification keys published by the Atherton *et al*. (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

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

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3. SITE DESCRIPTION

Ticknevin bog is a sub-section of a larger unit called Ballydermot Bog and is located approximately 4 kilometres to the south-east of Edenderry in County Offaly/Kildare. The Grand Canal flows close to the northern boundary of the site and is designated as part of The Grand Canal pNHA (NPWS site code 002104). The Long Derries Edenderry SAC esker is situated to the south of Ticknevin, adjacent to the boundary.

Ticknevin is a relatively young production bog and a significant residual depth of peat remains over most of the bog. The majority of the bog was in sod moss production from the 1980s until 2019, therefore much of the former production area currently comprises bare peat with some development of pioneer open cutaway habitat. There are several isolated high fields through the former production area that are associated with drains or are remnant features of when peat was harvested using the bagger machines. These strips are generally vegetated with Heather, Purple Moorgrass and some scrub like Gorse and Birch.

There is an area of intact raised bog (PB1) located to the west of the site, west of the Edenderry Road (Cloncanon West bog). The intensity of activities around this high bog is low and former cutover bog located along the road has now been abandoned and has re-vegetated. The high bog is notably intact with no recent drainage present. Raised bog to the east of the road is being used intensively for private sod-peat cutting.

The surrounding landscape is a mosaic primarily consisting of low-lying agricultural land (pasture) interspersed with a network of cutover bogs that have also been managed by BnM for industrial peat production within the Allen-Lullymore Bog Group.

The bog has a partially pumped drainage regime, with a single pump along the southern boundary to support drainage of the site.

See Drawing number BNM-ECO-26-14-01: Site Location Map, included in the accompanying Mapbook[1], which illustrates the location of Ticknevin Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Ticknevin supplied milled peat for electricity production and sod moss horticulture use.

The majority of Ticknevin Bog is now cutover, with most of the original raised bog now removed. At the time of cessation of industrial peat production (2019), there was still a significant depth of peat remaining over most of the bog.

Some remnant raised bog remains in the western part of Ticknevin. The bog remnant west of the local Edenderry Road (L-1001) (Cloncanon Bog) was noted in the IPCC Bog of Allen survey (Hurley, 2005) as having regional ecological value. This bog remnant was also assessed by consultants for NPWS as part of the review of the Raised Bog Natural Heritage Area Network (NPWS, 2014). Cloncanon Bog is relatively intact but also relatively small (~32 ha).

There is a BnM industrial railway network throughout the southern section of Ticknevin Bog. This railway has been decommissioned.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Ticknevin Bog Map Book

3.1.2 Current land-use

All industrial peat production at Ticknevin Bog has ceased as of 2019. It is noted that there is some private sod-peat production around the margins of the high bog, both inside and outside the ownership of BnM. Turbary is ongoing on an area of drained raised bog to the west of the industrial production area.

There was hydrological management via pumping to support former industrial peat production and its infrastructure. Pumping is ongoing during the decommissioning phase.

BnM are planning to develop a potential renewable energy project at Ballydermot Bog as part of the proposed Ballydermot Wind Farm (see BnM Wind Farm | Ballydermot Wind Farm). This proposed wind farm project is located within Ticknevin Bog as well as the adjacent BnM bogs. Ticknevin Wind Farm is currently in the pre-planning stage and is expected to be submitted for planning permission in 2026. The proposed Ballydermot Wind Farm infrastructure **partially** overlaps with Ticknevin Bog (see drawing number BNM-BNM-ECO-26-14-20: Standard Rehab Measures); these (infrastructure) areas have been treated as a constraint in the rehabilitation plan.

The Proposed Ballydermot Wind Farm Development Project will consist of the provision of the following:

i. 46 no. wind turbines and 2 no. meteorological masts with a height of 40m, and subsequent decommissioning of the wind turbines and meteorological masts, following a thirty five-year operational life from the date of full commissioning of the wind turbines. The 46 no. wind turbines comprise:

  a. 19 no. wind turbines with turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and

  b. 27 no. wind turbines with turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

ii. Turbine and meteorological mast foundations, hard-standing and assembly areas;

iii. Underground electrical and communications cabling connecting the proposed turbines and meteorological mast to the proposed 220kV onsite electrical substation;

iv. An onsite electrical substation compound (c. 25,615m^2) in the townland of Lullymore East, Co. Kildare, consisting of 1 no. 220kV Gas-Insulated Substation (GIS) building (75m x 22m, with a height of 24m), 1 no. 110kV GIS building (51m x 15.88m, with a height of 16.5m), 1 no. Independent Power Producer (IPP) control building (44.4m x 12.8m, with a height of 7.1m), all associated electrical and communications plant and equipment, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

v. An offsite electrical substation compound (c. 9,307m^2) in the townland of Killybegs, Co. Kildare consisting of 1 no. 220kV GIS building (75m x 22m, with a height of 24m), 2 no. new gantry structures and ancillary apparatus, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;

vi. All works associated with the connection of the wind farm to the national electricity grid, including uunderground electrical (220kV) grid connection cabling, c. 18 no. joint bays, communication chambers and earth sheath links extending for c. 13.1 km primarily located in the public road corridor connecting the proposed onsite substation to the proposed offsite substation, and all associated site development and reinstatement works;

vii. A 220kV loop-in grid connection at the offsite substation consisting of c. 120m of new overhead line (OHL) and the decommissioning / removal of 65m of existing OHL, 2 no. new steel masts, temporary tower build areas and crane pads, and associated hard-standing areas to facilitate the connection into the existing 220kV Maynooth–Dunstown 220kV OHL in the townland of Killybegs, Co. Kildare;

viii. 2 no. telecommunications towers with a height of 36m and 1 no. relay telecommunication mast with a height of 60m and associated foundation and hard-standing areas;

ix. The upgrade of c.2.8km of existing internal site roads/tracks and the provision of c.60 km of new internal site access roads, passing bays, layby areas and set down areas;

x. The provision of c.13.4km of new tracks and c. 842m of boardwalk for the purposes of amenity, seating areas, and amenity signage;

xi. The provision of c. 8.5km of new equestrian track;

xii. Upgrade to 4 no. existing site entrances (1 no. site entrance on R401 regional road, 1 no. site entrance on L3001 local road, 2 no. site entrances on R414 regional road)

xiii. 8 no. new site entrances (3 no. site entrances on L3001 local road, 3 no. site entrances on L1001 local road, 1 no. site entrance on R414 regional road, 1 no. site entrance on L6002 local road);

xiv. Widening and upgrade of wind farm access roads within the existing Cloncreen Wind Farm to facilitate the delivery of turbine components and other abnormal loads;

xv. Temporary works between the R420 regional road to R402 regional road at Ballina Co. Offaly and along the R402 at Ballingar, Co. Offaly to facilitate the delivery of turbine components and other abnormal loads;

xvi. 10 no. temporary construction compounds with temporary offices, containers and staff facilities;

xvii. 4 no. permanent amenity car parks comprising 132 no. spaces for private vehicles, 12 no. spaces for accessible parking, parking for buses and bicycle rack facilities;

xviii. 10 no. temporary Security Cabins;

xix. Watercourse crossings;

xx. Peat and Spoil Areas;

xxi. Site Drainage;

xxii. Tree felling and vegetation removal;

xxiii. Biodiversity mitigation and enhancement measures;

xxiv. Operational stage site signage; and

xxv. All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM'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

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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.

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 Ticknevin Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPS).

As the primary employer in many Midland counties, BnM 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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The bedrock geology[2] at Ticknevin Bog comprises Lucan Formation (dark limestone & shale (`calp)). Quaternary sediment maps indicate that Ticknevin is primarily underlain by peat, with till derived chiefly from Limestone. The site is underlain with a mix of limestone till and marl/lacustrine clay sub-soils.

3.2.2 *Peat type and depths*

Much of Ticknevin Bog is now cutaway and the majority of the original raised bog now been removed. Ticknevin is considered to have relatively deep residual peat, and the majority of the bog is estimated to have between 2m - 5m of peat remaining. Peat depths are generally shallower within the western section of the former production area and along its northern boundary.

3.3 Key Biodiversity Features of Interest

The different cutaway habitats developing across the site reflects the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All bogs have hydrological gradients from wet to dry habitats.

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

The majority of Ticknevin retains deep peat with some shallower peat along the margins of the former production area. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and groundwater has a stronger influence.

Due to the relatively recent cessation of peat production the majority of Ticknevin Bog still comprises bare peat. Some pioneer vegetation is beginning to develop across the cutaway. Several isolated high fields or strips of vegetation occur through the former production area and have developed dry heath and scrub habitats.

There is a large area of cutover bog at the northwestern corner of the site, used for private sod peat production with the marginal high bog being cut for turf. The older cutover sections have revegetated with dry heather dominated vegetation and Purple Moor-grass.

There is some intact raised bog located to the west of the Edenderry Road (Cloncanon Bog). The intensity of the previous activities around this high bog was historically low, and former cutover bog located along the road has re-vegetated. The western margin is planted with conifers and Lodgepole Pine are spreading onto the bog, particularly along the west side. The high bog is notably intact with no recent drainage present.

3.3.1 Current habitats

The most common vegetation communities/ habitats[3] include:

- Bare peat (0-50% cover) (BP)
- Pioneer open habitats in the former production areas including pioneer *Juncus effusus* community (pJeff), Emergent *Betula*-dominated community (eBir), pioneer *Eriophorum angustifolium* community (poor fen).
- Pioneer dry heather dominated vegetation (Heather), scrub (oBir, eGor) (WS1) and Purple Moorgrass-dominated grassland (gMol) (GS4) on high fields, and around siltponds and riparian zones.

The most common habitats[4] found around the margins of the bog include:

- Birch woodland (WN7)
- Scrub (WS1) (Blackthorn scrub and Birch scrub)
- Dry Heather-dominated vegetation (PB4)
- Raised bog remnants (PB1)
- Cutover bog (PB4)
- Dense Bracken (HD1)
- Improved grassland (GA1) and wet grassland (GS4) (former cutaway)

See Appendix II for more detail on site, habitats and local features.

See Drawing number BNM-ECO-26-14-17 titled**:** Habitat Map 2018, included in the accompanying mapbook, which illustrates the habitats at Ticknevin Bog.

3 Codes refer BnM classification of pioneer habitats of production bog

4 Codes refer to Heritage Council habitat classification (Fossitt, 2000)

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3.3.2 Species of Conservation Interest

A number of species of conservation concern have been recorded at Ticknevin Bog. The following is a summary of the records available within both BnM records and those of the National Biodiversity Data Centre (NBDC).

Evidence of multiple mammal species has been recorded on or in close proximity to the bog including Otter (*Lutra lutra*), Pine Marten (*Martes martes*), Badger (*Meles meles*), Red Fox (*Vulpes vulpes*), Irish Hare (*Lepus timidus subsp. hibernicus*), Eurasian Red Squirrel (*Sciurus vulgaris*), Fallow Deer (*Dama dama*) and the invasive species American Mink (*Mustela vison*).

Marsh Fritillary (*Euphydryas aurinia*) larval webs (a rare butterfly species listed in Annex II of the EU Habitats Directive) were recorded within the northern section. It is likely that the adult butterfly of this species uses other parts of the overall site.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. NBDC/BnM records for birds species from the bog (and overlapping tetrads) include the BOCCI red-listed[5] species Meadow Pipit (*Anthus pratensis*), Snipe (*Gallinago gallinago*), Lapwing (*Vanellus vanellus),* Woodcock (*Scolopax rusticola*) and Yellowhammer (*Emberiza citrinella*). BOCCI amber listed bird species recorded included Mallard (*Anas platyrhynchos*), Linnet (*Linaria cannabina*), Starling (*Sturnus vulgaris*), Swallow (*Hirundo rustica*), Teal (Anas crecca), Willow Warbler (*Phylloscopus trochilus*), Brambling (*Fringilla montifringilla*) and Sand Martin (*Riparia riparia*).

3.3.3 Invasive species

The high impact invasive species Japanese Knotweed (*Fallopia japonica*) has been recorded along the southern margins of Ticknevin Bog and along a local road accessing the cutover areas in the northwest of the bog. There has been several phases of Japanese Knotweed control at this site with herbicide treatments reducing the extent of this species. NBDC also holds records for the invasive mammal species Fallow deer (*Dama dama*) within Ticknevin bog.

The invasive species American Mink (*Mustela vison*) has also previously been recorded from Glashabaun bog immediately to the south of Ticknevin which is another sub-site of the wider Ballydermot Bog.

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the proposed rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are a number of European Sites in close proximity (i.e. within a 5km radius at minimum) to Ticknevin Bog.

The Long Derries, Edenderry SAC (Site code: 000925) lies directly adjacent to the southern boundary of Ticknevin Bog. The qualifying interest of this SAC comprises the priority habitat 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]'. The site contains several species of conservation interest including Green-Winged Orchid (*Anacamptis morio*) and Basil Thyme (*Acinos arvensis*). Both are Red-listed species Green-Winged Orchid listed as 'Vulnerable' and Basil Thyme listed as 'Near

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

Threatened' on Irelands Red List (Wyse Jackson *et al*., 2016). The site also contains a notable transition between calcareous grassland and scrub to peatland habitats. Several populations of Basil thyme are present on railway tracks throughout the wider Ballydermot bog unit or on areas of exposed gravel that are associated with the railway tracks as part of the 'weed' or recolonising flora. These species are not typical bog species and are likely to have come on to the former production bog from nearby Long Derries eskers along the southern boundary of Ticknevin or gravel pits. The presence of these species enhances the rare flora resource of Co. Offaly and Kildare.

A number of NHA's (Natural Heritage Areas) and pNHA's (Proposed Natural Heritage Areas) also occur within 5km of Ticknevin Bog including:

- The Long Derries, Edenderry pNHA (Site code 000925) – also designated as an SAC (described above) - lies directly adjacent to the southern boundary of Ticknevin Bog
- The Grand Canal pNHA (Site code: 002104) lies directly adjacent to the northern boundary of Ticknevin Bog
- Carbury Bog NHA (Site code: 001388) lies approximately 4.3 km to the north-east

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

There are no Ramsar sites within close proximity (the nearest is over 15km away) to Ticknevin Bog.

See drawing BNM-ECO-26-14-23: Proximity to Designated Sites in the accompanying map book.

3.5 Hydrology and Hydrogeology

Ticknevin Bog is located on the borders of the Barrow (Catchment ID: 14) and Boyne (Catchment ID: 07) catchments as defined by the EPA under the Water Framework Directive (WFD).

There are several drains/channelised streams around the margins of the site that drain the site. The Clonkeen 07 watercourse (EPA code: 07C36) flows in a westerly direction along the northern boundary of Ticknevin bog; the EPA map-viewer shows that the current drainage from the majority of the bog flows north from here beneath the Grand Canal and is linked with the River Boyne (to the east of Edenderry).

Ticknevin Bog has a partially pumped drainage regime. There is a single pump located on site at the southern boundary. This facilitates drainage from several discharge points for the former peat production and support of infrastructure.

Two segments of an unnamed watercourse (river waterbody code: IE_SE_14F010200) run along sections of the western and southern boundaries of the bog and conjoin into the Codd watercourse; the single drainage pump located on site is situated at the joining of these two watercourses. The Codd watercourse then flows to the south and west towards the Figile River.

The original stream across the bog is now channelized. Pumped drainage may link the bog with the Barrow catchment. The intact bog to the west of the Edenderry Road drains towards the Figile and Barrow River.

Hydrological modelling (BNM-ECO-26-14-09: Depression analysis) indicates that parts of the bog are in natural basins 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.

GSI data indicates that Ticknevin Bog is primarily underlain by Dinantian limestones (undifferentiated), which is classified as a locally important aquifer – bedrock which is moderately productive only in local zones.

Geological Survey of Ireland (GSI) mapping identifies several karst features (enclosed depressions) approximately 4.1km north-east of the bog. No data exists concerning depth to bedrock, however, there is a small area of bedrock approximately 2km north of the bog.

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m^3/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.

Ticknevin bog is located in an area mapped by GSI as of Moderate groundwater vulnerability (GSI Map viewer), whilst the area of intact and cutover bog on the eastern and western sides of Edenderry Road are located within an area of Low groundwater vulnerability. Groundwater vulnerability for the area surrounding Ticknevin Bog is variable between areas of high, moderate and low vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution.

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 Ticknevin 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 bi-annual basis by BnM 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.

Ticknevin Bog has three surface water outlets from previously active peat extraction catchments, which discharge to two segments of the unnamed watercourse (river waterbody code: IE_SE_14F010200) which run along

portions of the western and southern boundaries of the bog and connect into the Codd watercourse; the Codd watercourse then flows to the south and west to the Figile River (14F01). This river is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds and associated surface water emission are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-ECO-26-14-02: Structures and Sampling, along with Drawing number BNM-ECO-26-14-WQ01: Water Quality Map included in the accompanying mapbook, which illustrate the various drainage and water quality infrastructure present at Ticknevin 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 Environmental Protection Agency.

Decommissioning and Rehabilitation Programme - Water Quality Monitoring

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also 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*., 2017). 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) 2022-2027 (DHLGH, 2024) 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 BnM 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 Ticknevin has been completed. This discharge will have improved water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key downstream watercourse receptors, within the Boyne and Barrow catchments and will support the future status of the watercourses achieving ‘good’ status. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Water quality monitoring will be established. 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 for additional rehabilitation.

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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 monitoring for pH, suspended solids, total solids, total phosphorus, total ammonia, colour, and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al*. 2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al*. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther *et al*. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Ticknevin 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. Parts of this bog are expected to develop as regenerating wet *Sphagnum*-rich vegetation on deep peat areas. Other areas of shallower residual peat in topographical depressions are expected to develop wetland mosiac habitats on shallow peat with open water, reed swamp and fen habitats with alkaline peatland emission factors. Birch woodland and Heather is expected to develop on the drier areas and along peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Ticknevin Bog can be rated as **local importance; lower value** to **local importance; higher value.** Bare peat and pioneer habitats in the former production area of Ticknevin Bog are assessed as **local importance**

(lower value). Marginal habitats including wetland, woodland, scrub, pioneer cutaway habitats and bog remnant may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

Cloncanon Bog (remnant to the west of the road) can be rated as **B National Ecological Value**, as it contains Annex I raised bog habitat.

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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 BnM 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 the proposed wind farm development, rehabilitation, biodiversity and other general topics at Ticknevin Bog in relation to the proposed Ballydermot Wind Farm (Ballydermot Wind Farm). Specific consultation relating to the wind farm development and associated amenity development is not listed here, although there has been detailed consultation with stakeholders in relation to these topics and overlap with rehabilitation and biodiversity.

There has been ongoing consultation about rehabilitation, biodiversity and other general topics over the years about the Allen-Lullymore bog group, including Ticknevin 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.
- Bord na Móna Biodiversity Action Plan review days 2010-2018; 2016-2021 Review – held in Lullymore in 2018.
- Peatland rehabilitation in Kildare (2020) (presentation to Kildare County Council and public representatives) and occasional consultation with various local public representatives.
- Peatland rehabilitation in Kildare (2020) (presentation to local Green Party representatives).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Ticknevin Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be 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 Ticknevin Bog.

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

4.2 Topics raised by Consultees

N/A - consultation has not yet commenced.

4.3 BnM response to topics raised during consultation

N/A - consultation has not yet commenced.

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5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- Supporting the proposed Ballydermot Wind Farm Project. Integrating rehabilitation measures with planned renewable energy and any other required infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect planned renewable energy infrastructure or areas required for this proposed project.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to BnM and which optimise climate action and other ecosystem service benefits.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies where possible. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is some potential for the creation of wet cutaway habitats at Ticknevin Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Ticknevin Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. The site has already developed pioneer and maturing cutaway habitats and much of the site is stabilised.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (see section 3.8). this will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- 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), although areas of the site with deeper residual peat have the potential to develop some *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

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- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and BnM). Reducing pressures due to former peat extraction activities at Ticknevin 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 BnM).
- BnM have also carried out rehabilitation measures in some nearby bogs (e.g. Timahoe South and Lodge Bog) in 2022-2023 and have previously carried out re-wetting and rehabilitation at Lullymore bog. Further rehabilitation is planned at Timahoe North (in 2025). There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Planned land uses, such as renewable energy generation infrastructure.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The entire area of Ticknevin Bog.
- EPA IPC Licence - Ref. P0503-01. 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. Ticknevin bog is part of the Allen-Lullymore bog group.
- The local environmental conditions of Ticknevin Bog mean that deep peat measures along with some wetland creation is the most suitable rehabilitation approach for this site. Ticknevin Bog has a partially pumped drainage regime and has significant areas of residual deep peat along with areas of shallow cutaway that are already developing as pioneer vegetation.
- BnM have defined the key goal and outcome of rehabilitation at Ticknevin Bog as **environmental stabilisation** and **optimising residual peat re-wetting** to enhance the development of compatible habitats. Rehabilitation will be integrated with the proposed Ballydermot Windfarm.
- The proposed Ballydermot Wind Farm has been taken into account in determining the timing and sequencing of rehabilitation measures at Ticknevin Bog. In areas associated with proposed wind farm infrastructure, implementation of targeted rehabilitation measures will be phased, as appropriate, to following the construction of the proposed development. BnM remains committed to fulfilling its rehabilitation obligations under IPC Licence Ref. P0503-01.
- A majority of this site is bare peat that is beginning to develop pioneer vegetation. Rehabilitation is proposed to enhance residual peat re-wetting across the site and promoting environmental stabilisation, while taking account of current land-uses (e.g. turbary).
- Rehabilitation of Ticknevin Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of bogs are constrained by their environmental characteristics. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.
- Ticknevin has deeper residual peat present. This would have the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised. There is some potential to develop some wetland habitats across the site by adjusting/stopping pumping, adjusting main outfalls and raising the water-level somewhat.
- **Potential land-use.** It is expected that BnM will update and finalise the draft rehabilitation plan for Ticknevin when a decision is made in relation to the wind farm planning application. BnM remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC license. The targeted

rehabilitation measures set out in this Rehabilitation Plan will be implemented following completion of the construction phase of the proposed Ballydermot Wind Farm in a phased manner under the IPC Licence, subject to agreement and approval by the EPA. BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing. Further details of this proposed development can be obtained at https://www.ballydermotwindfarm.ie.

- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM sites and the surrounding landscape. Care must be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland (see Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM 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.
- **Turf-cutting.** Areas of remnant drained raised bog at the western and north-eastern corner of the site will not be subject to rehabilitation measures. This is largely due to turf cutting.

6.2 Key Assumptions

- It is assumed that BnM 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:

- Areas subject to turf cutting are excluded.
- The longer-term development of stable naturally functioning habitats to fully develop at Ticknevin 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 Ticknevin Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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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 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 BnM 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 a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g. potential suspended solids run-off).

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

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat-forming habitats. 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 BnM 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.
- Removal of invasive Japanese knotweed from the bog.

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 Longford Pass 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 Corlea Bog in Mountdillon over the 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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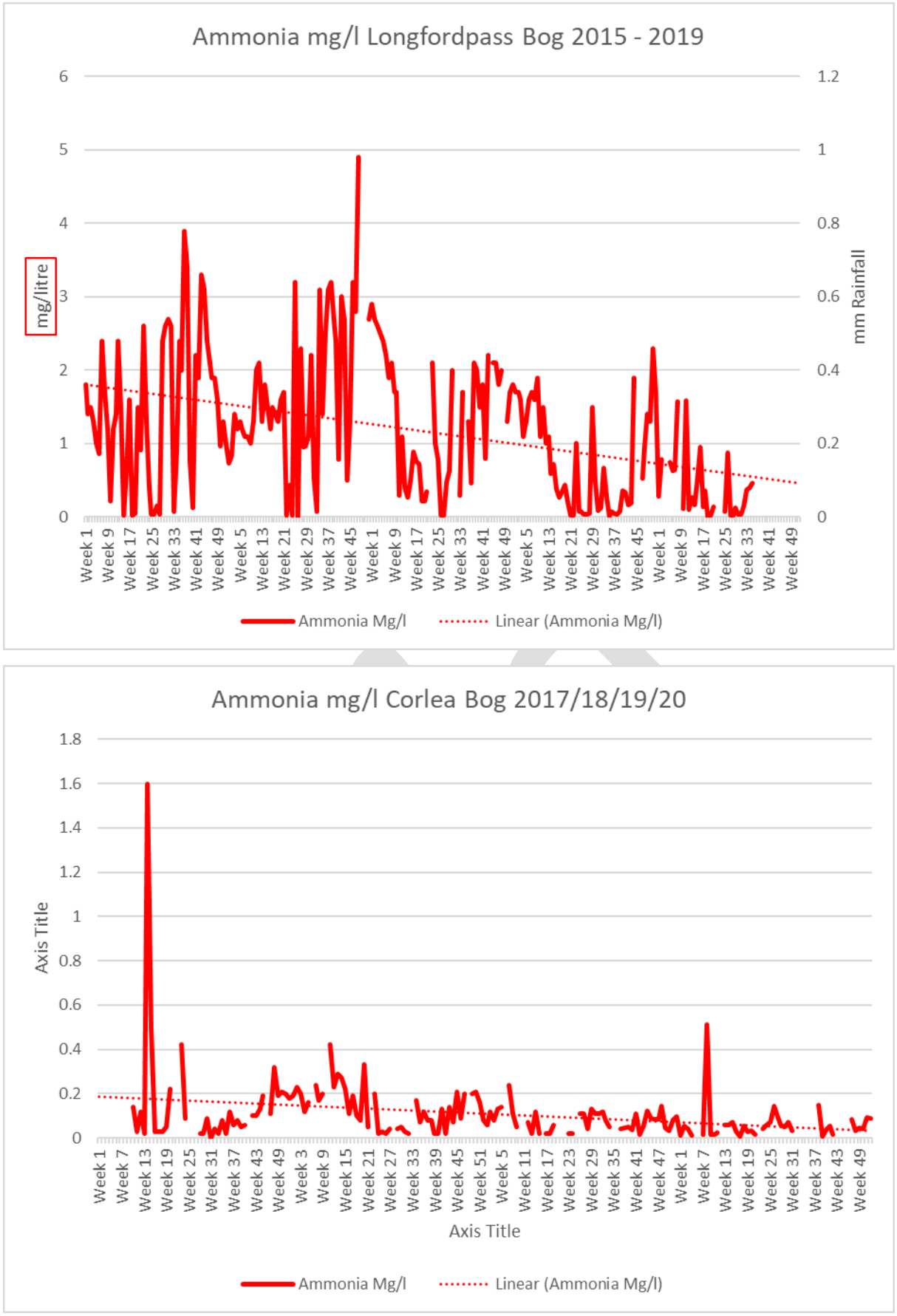


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

Table 7-1 Summary of success criteria, targets, how various success criteria will be measured and expected time-frames.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	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.	3 years
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	2 years
IPC validation	Reducing pressure from drainage 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

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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 (BnM).** BnM maintains a provision on its balance sheet to pay for these future costs. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM 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. BnM 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 BnM 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. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration 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. 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.

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8. Rehabilitation Actions and Time Frame

Peatland restoration and 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 based on environmental characteristics. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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 and LiDAR surface maps, these are included in the accompanying mapbook as the drawings referenced below:

BNM-ECO-26-14-21 titled **Ticknevin Bog: Aerial Imagery 2000**

BNM-ECO-26-14-22 titled **Ticknevin Bog: Aerial Imagery 2020**

BNM-ECO-26-14-04 titled **Ticknevin Bog: Peat Depths**

BNM-ECO-26-14-03 titled **Ticknevin Bog: LiDAR Map**

BNM-ECO-26-14-09 titled **Ticknevin Bog: Depression Analysis**

The restoration and rehabilitation measures are provisionally outlined in drawing titled **BNM-ECO-26-14-20 Ticknevin Bog: Standard Rehab Measures** in the accompanying mapbook.

These rehabilitation measures for Ticknevin Bog will include (see Table 8.1):

- Re-assessment of the pumping regime and removing or reducing the pumping if this is desired and has no significant external impact or impacts on proposed future land-uses. Initial hydrological modelling indicates that a parts of the bog will develop a mosaic of wetland habitats with some permanent deeper water if the pump is decommissioned. 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 at outfalls and by adjusting piped drainage, where possible. More sustainable permanent gravity drainage solutions will be examined. Some pumping is likely to be retained on site. 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 of surrounding rivers.
- A widespread drain-blocking programme will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. There are large areas of deeper bare peat within the central area of the bog. These areas will be targeted for more intensive drain-blocking. More intensive measures will be targeted towards the bare peat and deeper residual peat.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking, modifying outfalls and managing water levels with overflows.
- 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 rehabilitation measures at Ticknevin Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking, modifying outfalls and managing water levels with overflows	32.9
Bog Restoration	DPT2	More intensive drain blocking, modifying outfalls and managing overflows	3.4
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflows	18.1
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway, targeted re-wetting, modifying outfalls and managing water levels with overflows	52.8
Marginal land	MLT1	No work required	52.1
Silt Pond	Silt Pond	Silt Ponds	0.9
Ballydermot Wind Farm	Wind Farm Infrastructure + Buffer	Wind Farm infrastructure areas including turbine bases, internal access roads and turning points, crane hard stand and peat and spoil areas.	33.1
	Renewables Footprint	Areas associated with the proposed Ballydermot Wind Farm where rehabilitation measures will be appropriately sequenced including enhancement areas; peatland restoration, scrub planting.	166.2
Constraint	Constraint	Bog remnant, cutover bog and retained drainage infrastructure.	96.7
Total Area			**456.1**

Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

8.1 Completed and Ongoing

- There has been phased control of Japanese Knotweed at this site.
- The site is predominantly comprised of bare peat with colonisation of pioneer vegetation.

Ticknevin also contains a relatively large area of remnant raised bog (~32.3ha) that was never developed by BnM and this is now zoned for biodiversity. This area, called Cloncanon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

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

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Ticknevin Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- Align proposed rehabilitation with the planned renewable project infrastructure.
- Align proposed rehabilitation with any planned renewable energy project biodiversity mitigation or biodiversity compensation requirements.
- A drainage management assessment of the proposed rehabilitation measures will be 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 will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.
- A review of remaining milled peat stocks is to be carried out.
- 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) will be 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.
- Appropriate Assessment (AA) of the rehabilitation plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implementation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- 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.

8.4 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 9).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC Licence is surrendered.

8.5 Timeframe

- **Year 1 post finalisation**: Short-term planning actions. (subject to successful planning of the proposed Ballydermot Wind Farm project).
- **Year 1-3 post finalisation**: Short-term practical actions.
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation**: Decommission silt-ponds, if necessary

8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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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.
- 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 the site 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.
- Monitoring results will be maintained, trended 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 monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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 BnM 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.

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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 have 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.

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APPENDIX I. BOG GROUP CONTEXT

The Allen Bog Group comprises 2 main sub-groups: Clonsast (17 bog units, 2 land units used for transport & 1 transport link) and Lullymore (15 bog units & 1 land unit (farmland) acquired for linkages).

The Allen-Lullymore Bog Group is located mainly in counties Kildare and Offaly. The majority of these associated bogs are located in the River Barrow catchment, and some bogs are located in the River Liffey catchment.

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry (9 km north-south and 10 km east-west). A second section of peatland is found further east (Timahoe North and Timahoe South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by BnM for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied an old power station at Allenwood (now demolished). Milled fuel peat was then supplied to Edenderry Power Station, Co. Offaly, via the BnM industrial railway. Many bogs were in industrial peat production for a number of decades. BnM also maintained transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group. The use of industrial railway to move peat has ceased.

An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by BnM. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte.

Much of the Allen-Lullymore Bog complex became cutaway as long-term peat extraction activity reduced the peat depth on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen-Lullymore Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management and wetland creation. Some of this was carried out in the 1980s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs, it was found that these require financial investment that generally exceeds any potential commercial output value.

Much of the earliest cutaway was developed from sod peat production and therefore had deeper remnant peat. The first forestry trials on cutaway were developed at Clonsast Bog (Trench 14) in the 1960's and this informed much of the forestry development across BnM cutaway. About 260 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Lullybeg, Lullymore, Glashabaun South and Lullymore in the Lullymore sub-group. There is ongoing management of these areas by Coillte. More recently, new forestry trials (90 ha) were established at Derrybrennan and Lullybeg by BnM.

Wetlands enhancement with the blocking of the main outfall has also been carried out at Lullymore (2009). There has been ongoing targeted management to maintain and raise water levels in 2016 and 2017 with the construction of a berm to block a low-lying corner, blocking of other outfalls and the construction of an overflow piped outfall. Some cutaway bog at Lullymore, used as spread grounds for sod peat up until recently, was treated with fertiliser to enhance natural colonisation. This trial has been very successful.

Several bogs in the Allen Bog Group have been rehabilitated since 2021 as part of PCAS. Lodge Bog and Timahoe South Bog were rehabilitated from 2023. Parts of both sites were constrained from rehabilitation to facilitate the potential future development of renewable energy infrastructure.

BnM have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small portion of cutaway at Lullymore has recently been leased to Lullymore Heritage Centre for amenity and educational use and BnM assisted with its rehabilitation. BnM are also working with Butterfly Conservation Ireland to manage another area of cutaway at Lullybeg for butterfly conservation. This site contains Marsh Fritillary (a rare butterfly species listed in Annex II of the EU Habitats Directive).

The Long Derries, Edenderry SAC (site code: 000925) is located in the Lullymore Bog sub-group. Glashabaun Bog (northern sub section) overlaps the SAC and is designated for the presence of the Annex I habitat, 'Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites) (6210)'. The Long Derries is an esker and BnM used the site in the past to extract gravel for the construction of railway embankments across BnM bogs. Rare plants including Basil Thyme and Blue Fleabane are widely distributed on gravel embankments through the BnM bogs of Ballydermot; the Long Derries esker is likely to have been the source of these new populations.

The Long Derries, Edenderry SAC is located south of Ticknevin Bog. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by BnM. This area, called Cloncanon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS, 2014).

Industrial peat extraction in the Allen-Lullymore Group ceased in 2020. Decommissioning for the Allen Group started in 2021 at a number of individual bogs and rehabilitation commenced is ongoing. A breakdown of the component bog areas for the Allen-Lullymore Bog Group IPC Licence Ref. P0503-01, and current, indicative peat production status, is outlined in Table Ap-1.

Table Ap-1 Allen-Lullymore Group names, area and indicative status (Allen - Lullymore sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballydermot	902	Peat extraction since 1950s Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Ballydermot formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Barnaran	499	Peat extraction since before 1975 Peat extraction ceased in 2020 Parts completely cutaway Parts still have deep peat	Barnaran formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities.	2020	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.		
Blackriver	790	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority completely cutaway	Blackriver formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Codd	548	Peat extraction since before 1975 Peat extraction ceased in 2020 Majority of bog still has relatively deep peat	Codd formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss and bin sod for horticultural use. Majority of the site is bare peat. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Derrybrennan	224	Peat extraction since 1960s Peat extraction ceased in 2015 Majority completely cutaway	Derrybrennan formerly supplied milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part used as a BnM commercial forestry trial. The proposed Irish Water pipeline crosses this bog. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2015	Draft 2026
Glashabaun North	493	Peat extraction since the 1950s. Peat extraction ceased in 2020 Majority completely cutaway	Glashabaun North formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mosaic of pioneer vegetation and bare peat Long Derries SAC. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Glashabaun South	569	Peat extraction since 1950s Part cutaway since 1980s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Glashabaun South formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Cutaway habitats are emerging. Mostly vegetated. Part planted with conifer forestry – Leased to Coillte. The proposed Irish Water pipeline crosses this bog.	2020	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.		
Killinagh	245	Peat extraction since 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2000s Peat extraction completely ceased in 2020 Majority completely cutaway Parts still have deep peat	Killinagh formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Cutaway habitats are emerging. Mostly vegetated. Part used as a forestry trial. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Draft 2026
Lodge	432	Peat extraction since before 1975 Peat extraction completely ceased in 2020 Mosaic of peat depths, part cutaway Parts still have deep peat. Rehabilitation as part of PCAS complete.	Lodge formerly supplied turf for fuel and energy and latterly milled peat for electricity production. Some small sections supplied sod moss for horticultural use. Some areas of cutaway are developing pioneer cutaway vegetation communities. Wetlands cutaway rehab trial BeadaMoss *Sphagnum* inoculation trial. Rehabilitation started 2023 as part of PCAS. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2020	Rebab plan Finalised 2022 Rehabilitation Complete 2023
Lullybeg	271	Peat extraction since the 1930s Part cutaway since 1990s. Ceased milled peat extraction in 2004 Mosaic of peat depths, part cutaway	Lullybeg formerly supplied turf milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.	2004	Draft 2026
Lullymore	184	Peat extraction since 1930s Part cutaway since 1980s. Ceased milled peat extraction in 1990s. Majority completely cutaway Rehabilitation ongoing on a phased basis since 2005	Lullymore formerly supplied milled peat for electricity production and latterly sod moss for the horticulture industry. Part planted with conifer forestry – Leased to Coillte Cutaway habitats are emerging. Mostly vegetated. Cutaway - zoned for biodiversity Wetlands rehabilitation trial Carbon Flux research Part-leased to Lullymore Heritage Group – amenity.	1992	Draft 2026
Ticknevin	459	Peat extraction since 1980s Peat extraction ceased in 2019	Ticknevin formerly supplied milled peat for electricity and latterly milled peat for electricity production.	2019	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Majority of bog still has relatively deep peat	Cloncannon bog remnant – zoned for biodiversity Mostly bare peat. Expected to be part of the proposed Ballydermot Windfarm, which is currently in pre-planning.		
Timahoe McNally	43	Never in peat extraction	Farmland Rail connection.	N/A	N/A
Timahoe North	806	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe North formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Timahoe North a BnM-ESB Solar energy project was constructed on the bog in 2023/2024. The proposed Irish Water pipeline crosses this bog.	2020	Updated 2025
Timahoe South	1699	Peat extraction since 1940s. Widespread BnM extraction ceased in 1990s Peat extraction completely ceased in 2020 (turf) Relatively deep peat remaining	Timahoe South formerly supplied turf for fuel and energy. It was never converted to milled peat extraction. Parts used for turf production in recent years. Cutaway habitats have developed. Mostly vegetated. Resource Recovery (Drehid Facility). Extension of facility in planning. Under consideration for a renewable energy project. Rehabilitation via PCAS progressed across available areas.	2020	Finalised 2023. Rehab ongoing

See Drawing Allen-Lullymore Bog Group number *BNM-ECO-26-14-24 titled: Bog Group Map,* included in the accompanying Mapbook which illustrates the location of Ticknevin Bog and the Allen – Lullymore Bog Group in context to the surrounding area.

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

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

Bog Name:	**Ticknevin**	**Area (ha):**	458.8 ha (1133.8 acres)
Works Name:	Ballydermot	**County:**	Offaly/Kildare
Recorder(s):	MMC	**Survey Date(s):**	22/11/2011. (Report updated 2025)

Habitats present (in order of dominance)

The most common cutaway habitats present at this site include:

- Bare peat (Codes refer BnM classification of pioneer habitats of former production bog)
- Some minor development of pioneer dry heath (dHeath), scrub (oBir, eGor) and Purple Moorgrass-dominated grassland (gMol) around siltponds and riparian zones.
- Some ditched high bog developing as dry heath (HH1) located around the excluded mound in the south-east corner of the site

Other habitats found around the margins of this site (not on production bog/cutaway) include:

- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000)
- Scrub (WS1) (Blackthorn scrub and Birch scrub)
- Dry Heath (HH1)
- Raised bog remnants (PB1)
- Cutover bog (PB4)
- Dense Bracken (HD1)
- Improved grassland (GA1) and wet grassland (GS4) (former cutaway)

Description of site

Ticknevin is located in Co. Offaly, 4 km south of Edenderry. It is part of the Ballydermot group of bogs and Glashabaun North (Ballydermot) is located to the south of this production bog. The Grand Canal flows close to the northern boundary of the bog.

The majority of the bog was previously in sod moss production until 2019, and as such comprises open cutaway habitat. There is some intact raised bog located to the west of the site, west of the Edenderry Road. Raised bog to the east of the road was formerly used intensively for private sod-peat cutting. There has been a long history of peat production at Ticknevin, stretching back to the turn of the 20th century. Peat works were located in the north of the site and along the canal. Turf was transported by barge to Dublin on the canal. The former BnM production bog was partially used to produce sod-peat using the old bagger machines.

All commercial peat extraction at Ticknevin has ceased (as of 2019), and there is still a significant depth of peat remaining over most of the site. Pumps were previously installed along the southern boundary to help with the drainage of the site. There are further pumps at the road that drained this area. However, there has been no significant issues with flooding, as the production bog is still relatively high and the peat is still quite deep. There are several isolated fields or strips of vegetation on banks through the former production area that are associated with drains or are remnant features of when peat was harvested using the bagger machines. These strips are generally vegetated with Heather, Purple Moorgrass and some scrub like Gorse and Birch.

There was some minor cutaway habitat development around the margins of the production bog previously recorded, mainly associated with small remnant areas of bog. Purple Moorgrass-dominated grassland is found around the silt pond complex at the south-west corner of the site. Light scrub and rank grassland are developing on spoil that has been taken from the adjacent deep drainage channel that follows the southern boundary of the production bog. There is also some colonisation by Japanese Knotweed along this southern margin.

Towards the eastern end of the Long Derries esker there is some ditched high bog that has been left around a small mound. The mound has been excluded from the BnM property and has some archaeological features. There is a transition from the former ditched high bog (within BnM property) and a small area of Birch woodland (WN7) to dry heath (HH1) dominated by Heather up the slopes of this mound. Some of the margins of the mound also have some

Bracken cover (HD1). There is then a transition to grassland with elements of both acidic and calcareous grassland present (depending on the position on the slope). The grassland at the top of the mound is quite rank and un-grazed and there is some light scrub cover with Hawthorn. Some of the transitional habitats are within the BnM GIS property line.

There is a large area of cutover bog at the north-eastern corner of the site. Some of this area is still being used for private sod peat production with the marginal high bog being cut for turf. The older cutover sections have re-vegetated with a Heather and Purple Moor-grass. This area was not surveyed directly. It has the potential to be somewhat more diverse and better developed than typical cutover bog as it is older.

There is some intact raised bog located to the east of the Edenderry Road. The intensity of activities around this high bog is low and former cutover bog located along the road has now been abandoned and has re-vegetated. There is some active private sod peat cutting at the south-west corner of the high bog. The western margin is planted with conifers and Lodgepole Pine are spreading onto the bog, particularly along the west side. The high bog is notably intact with no recent drainage present. Old drains that crossed the bog have now infilled. There has been some subsidence along the eastern side and adjacent to the road. The majority of the high bog can be classified as sub-marginal ecotope with Heather and Hare's-tail Bog Cotton prominent. This community is generally quite spongy underfoot. Hummocks of *S. capillifolium* and S. *papillosum* dominated the *Sphagnum* cover. There are very few pools or hollows with *S. cuspidatum* but it is present. There are remnants of former hummock and pool complexes where the pools are now re-vegetating with drier elements. Some of these pools still have some cover of *S. cuspidatum* and *S. magellanicum*, but they are rare. Some of these former pool complex areas approach active raised bog quality, but they cover a very small area. Several large hummocks of *S. austinii* and *S. fuscum* were recorded. White-beak Sedge becomes prominent towards the western side of the high bog. This part of the bog may be relatively flat and surface water led to the development of a *Sphagnum* layer that is now deteriorating. There is a relatively large Scot's Pine tree located towards the centre of the bog. The tree is surrounded by flushed Heather-dominated vegetation. *Aulacomnium palustre* is present and Bog Rosemary was recorded.

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

Ticknevin is located adjacent to two designated areas.

The Long Derries, Edenderry cSAC (NPWS site code 000925)

The Grand Canal pNHA (NPWS site code 002104).

Adjacent habitats and land-use

Wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), scrub (WS1), Birch woodland (WN7), cutaway bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

Watercourses (major water features on/off site)

- Ticknevin is located on the borders of the Barrow and Boyne catchments.
- The EPA map-viewer shows that the current drainage from the majority of Ticknevin production bog flows north under the Grand Canal and linked with the River Boyne (to the east of Edenderry).
- The original stream across the bog is now channelized. Pumped drainage links the bog with Barrow catchment.
- Intact bog to the west of the Edenderry Road drains towards the Figile and Barrow River.

Peat type and sub-soils

The main peat type exposed at present is *Sphagnum* peat.

Towards the northern boundary the underlying sub-soil is mixed gravel till. There is blue-silty clay under peat exposed in some drain profiles around other parts of the bog.

Fauna biodiversity

Birds

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

- Snipe were noted on the intact raised bog to the west of the road.

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- Snipe were also present on the other high bog area to the east of the road.
- Lapwing (2) were noted flying over the site.
- Other common birds noted around the site include Wren (using scrub at several locations around margins), Meadow Pipit (noted on intact raised bog), Blue Tit (using scrub at north-west access point) and Hooded Crow (4) (flying over and roosting on production bog).

Mammals

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

- Hare prints and droppings were noted at several locations around the site (northern boundary & western margin).
- Fox prints noted along the northern boundary.

References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

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

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APPENDIX III. 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 BnM staff and updated as required.

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APPENDIX IV. BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed (which has already previously been recorded within Ticknevin Bog site), Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the spread and 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 BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

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

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

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

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

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) 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, BnM 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 BnM 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.

BnM 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 BnM. 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 BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC Licence Ref. P0503-01). 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 Allen - Lullymore 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 Plc (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on BnM 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 BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

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

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

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM 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.

BnM 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 BnM.

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.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM 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 BnM) for the after-use of cutaway bog.

- BnM 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 BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use 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 BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM 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 River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) 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 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM 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 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 hydro morphological condition of rivers.

The NRBMP 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 BnM 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM 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, pNHAs) and National Nature Reserves). BnM 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.

9 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.

BnM 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. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2026-2030

The All-Ireland Pollinator Plan 2026-2030 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM 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. BnM 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 BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM 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

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2019, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM 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 BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 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 BnM lands. The Bord na Móna

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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 BnM'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.

14 BnM commitments

BnM 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.

In line with BnM'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. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

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.

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APPENDIX VI. 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 BnM 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	Ticknevin Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where required

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

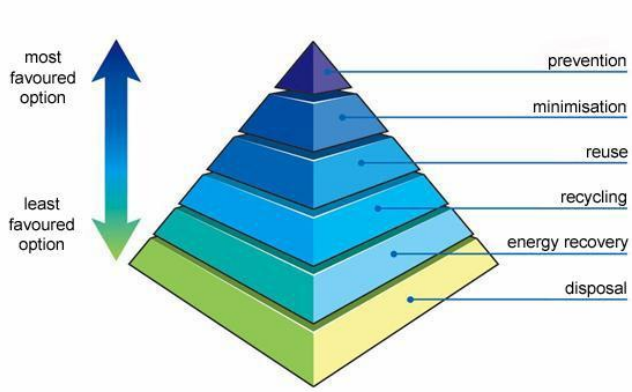
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM 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 cutover 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 embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *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.

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).

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

Restoration: Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide (SER 2004).

Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, BnM 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 acrotelm – 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 BnM 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.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

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 IPC Licence's Ref. P0503-01 in the Allen-Lullymore Group of Bogs in Counties Offaly and Kildare.

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

- Silt Pond excavations and maintenance
- Power Station Screenings
- Bog Timbers

There has been no change to the type and nature of these three waste streams and no new waste streams added to this list. These wastes streams continue to be stored and maintained at between 1 and 3 metres in height.

2.0 Condition 7.5 Extractive Waste Management

- An extractive waste management plan (EWMP) was submitted to the Agency in September 2012 and was approved.
- The EWMP was reviewed in September 2017. There were no substantial changes to the operation of the plan, associated waste facilities or to the waste deposited. The EWMP will be reviewed again in September 2022. At this stage, it is envisaged that many bogs will be entering a decommissioning and rehabilitation phase, which will see a significant reduction in the generation of bog timbers. In addition, and depending on the progress with bog stabilisation and rehabilitation, silt generation will significantly reduce which will lead to reduced volumes to be removed from the silt ponds.

3.0 Minimisation

- The IPC Licence has various conditions that require the installation, inspections and maintenance of silt ponds for operational areas and as such these requirements dictate the need for silt ponds and associated excavation materials and cleanings.
- Peat screenings are a factor of the screening process with Edenderry Power Ltd as these oversized bog timbers, stones and peat cannot be utilised in the power station.
- Bog timbers arise from the active production footprint and are naturally occurring. The active footprint is dictated by the peat production targets and customer supply contract and service level agreements.

4.0 Treatment

- Silt pond excavation and maintenance materials do not require any treatment and are stored as per the EWMP, adjacent to the associated silt pond.
- 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.

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- There is no treatment of bog timbers arising and these are stockpiled at various locations in associated bogs.

5.0 Recovery

- As per the EWMP, there is still no opportunity to recover these silt pond associated materials.
- Given the nature of these screenings as outlined in the EWMP, there is no further use identified, other than the permitted reuse of these natural materials in areas that required improvement for trafficking purposes.
- Bog timbers stored on the bog are natural to the peat bog and while there have been trails to recover this waste material, these have not proved viable.

6.0 Disposal

- Silt pond cleanings continue to be disposed of adjacent to the associated silt pond and will be incorporated back into the rehabilitation plans for these bogs, post production and decommissioning.
- Schedule 3 (ii) of this IPC Licence permits the disposal of peat screenings to the bog at designated locations agreed under Condition 7.4 and this continues to be the case.
- Bog timbers will continue to be stockpiled at suitable locations to be either incorporated back into the bog, as a supply of bog timbers for the crafting industry or will continue to decay naturally.

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APPENDIX IX. 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/resources/faqs/environment--you/faq-listing/ 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 X. ARCHAEOLOGY

Code of Practice

Role of the Archaeological Liaison Officer

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



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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.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Ticknevin Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet	
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Document File Path:	
Document Status:	**Draft v0.1**

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

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Name(s):	BG	CS	MMcC
Date:	06/08/2026	06/08/2026	06/08/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):		JB	CS
Date:		22/10/2026	23/10/2026

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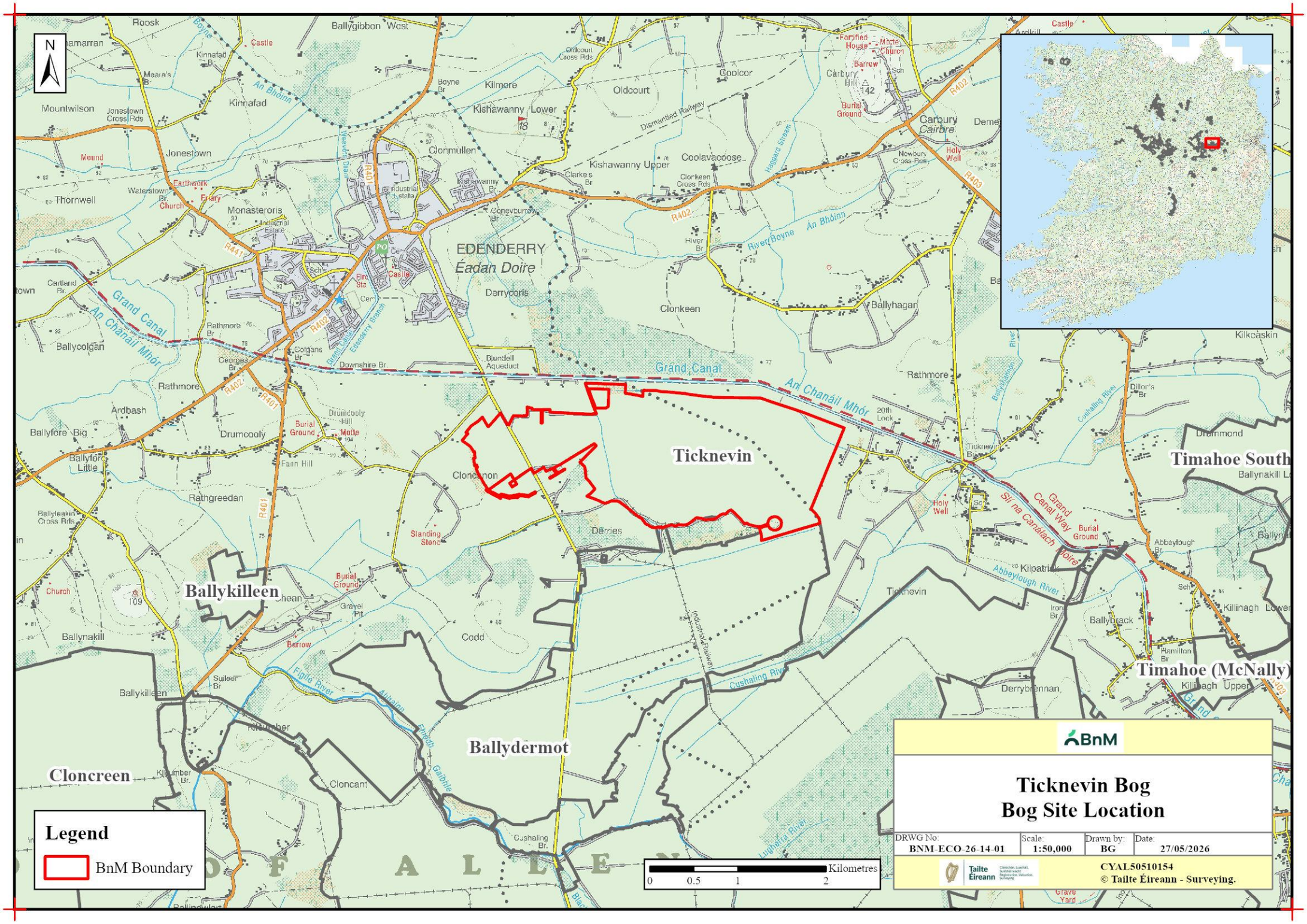
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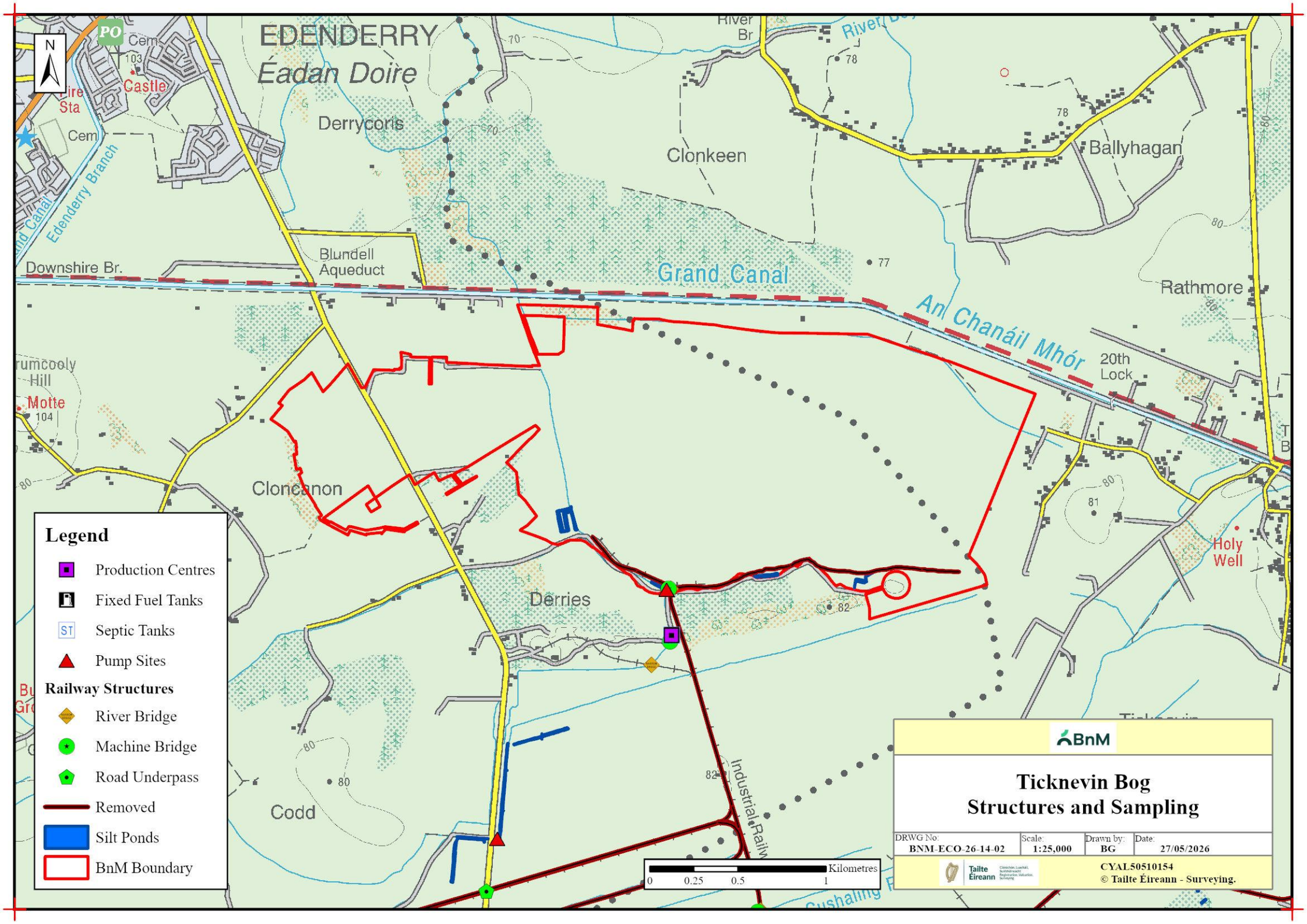
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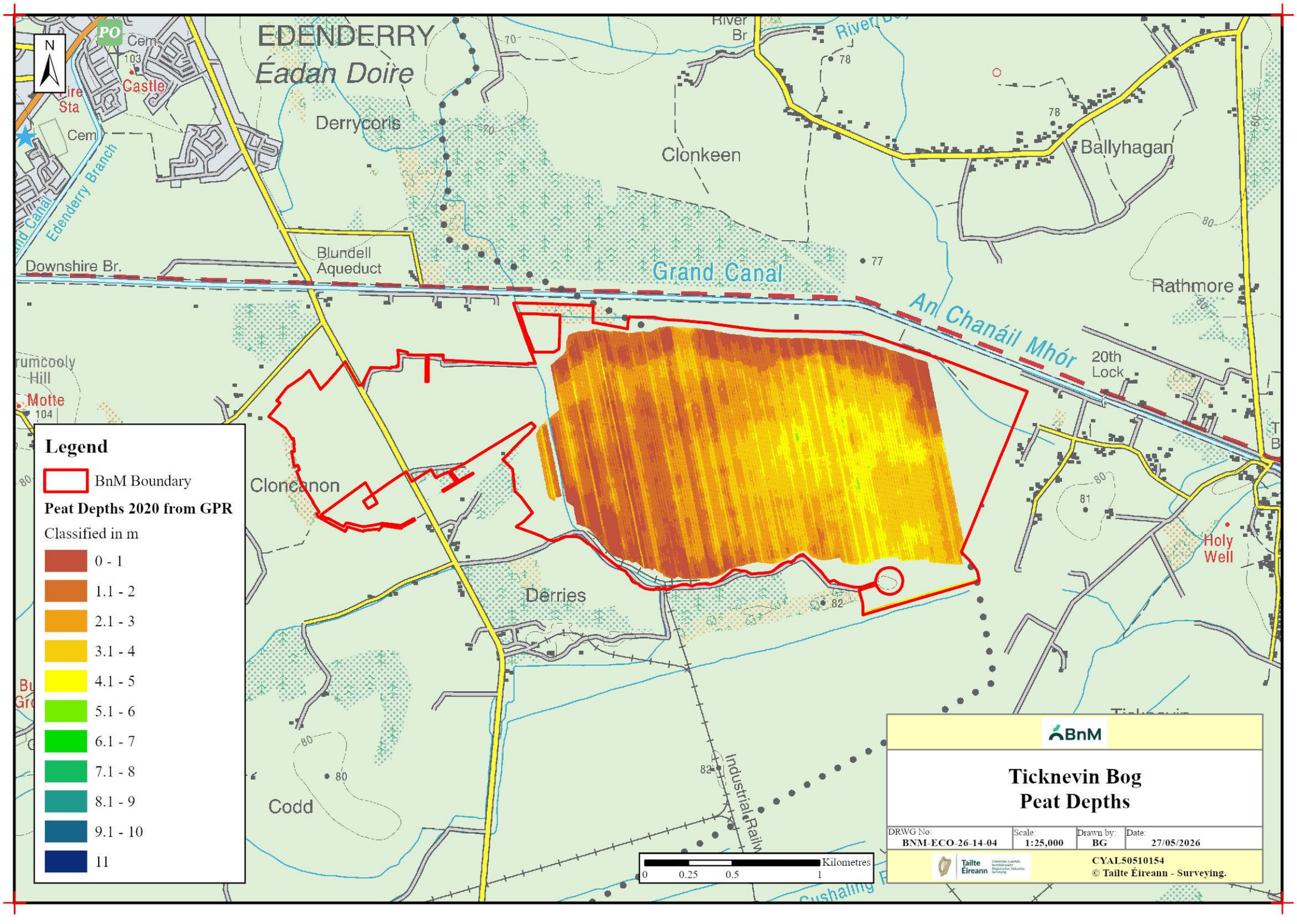
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Motte
Cloncannon
Derries
Codd
Holy Well
20th Lock
River Br
Industrial Railw
Kilometres
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Legend
Production Centres
Fixed Fuel Tanks
ST Septic Tanks
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Silt Ponds
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BnM
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Structures and Sampling
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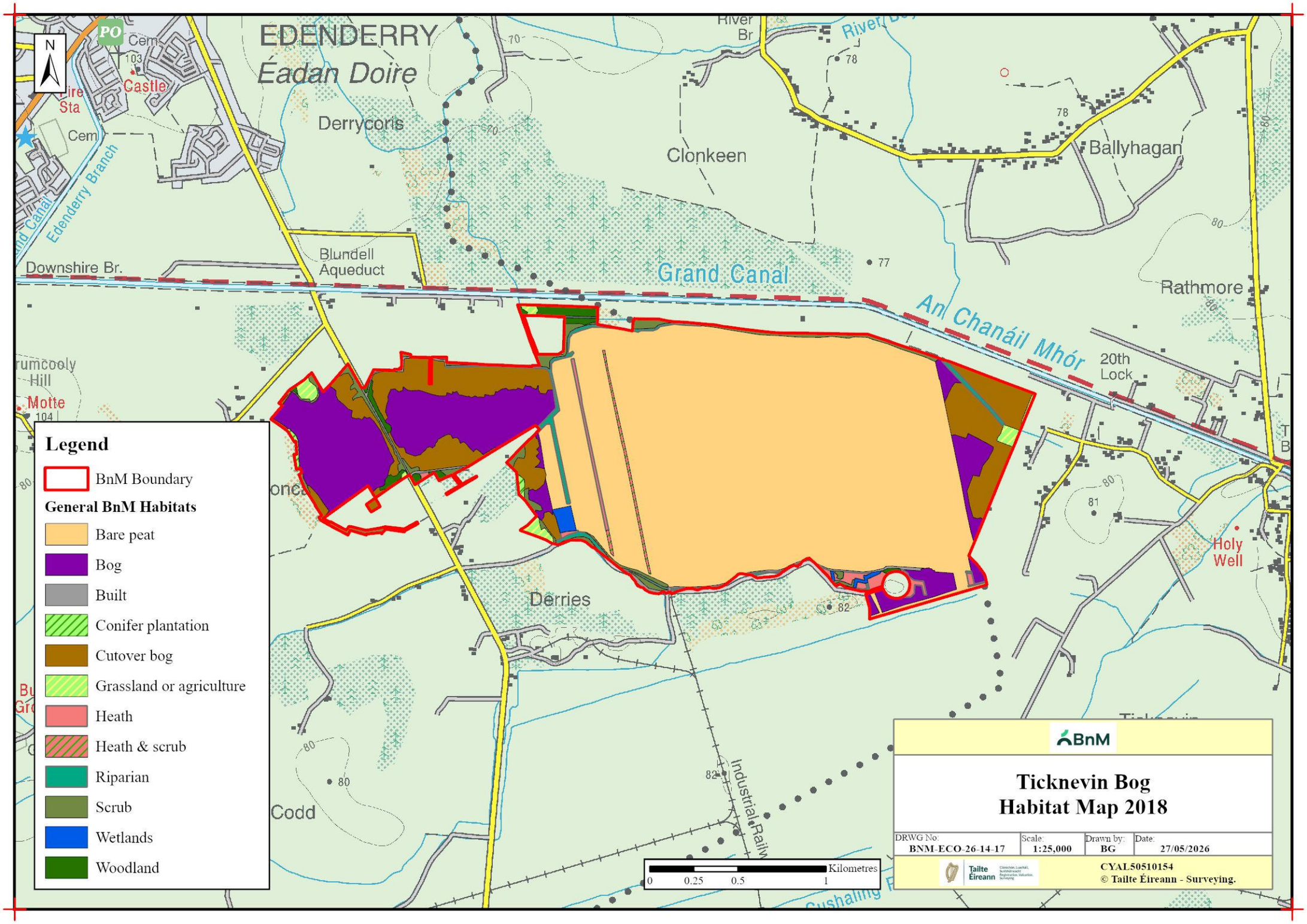
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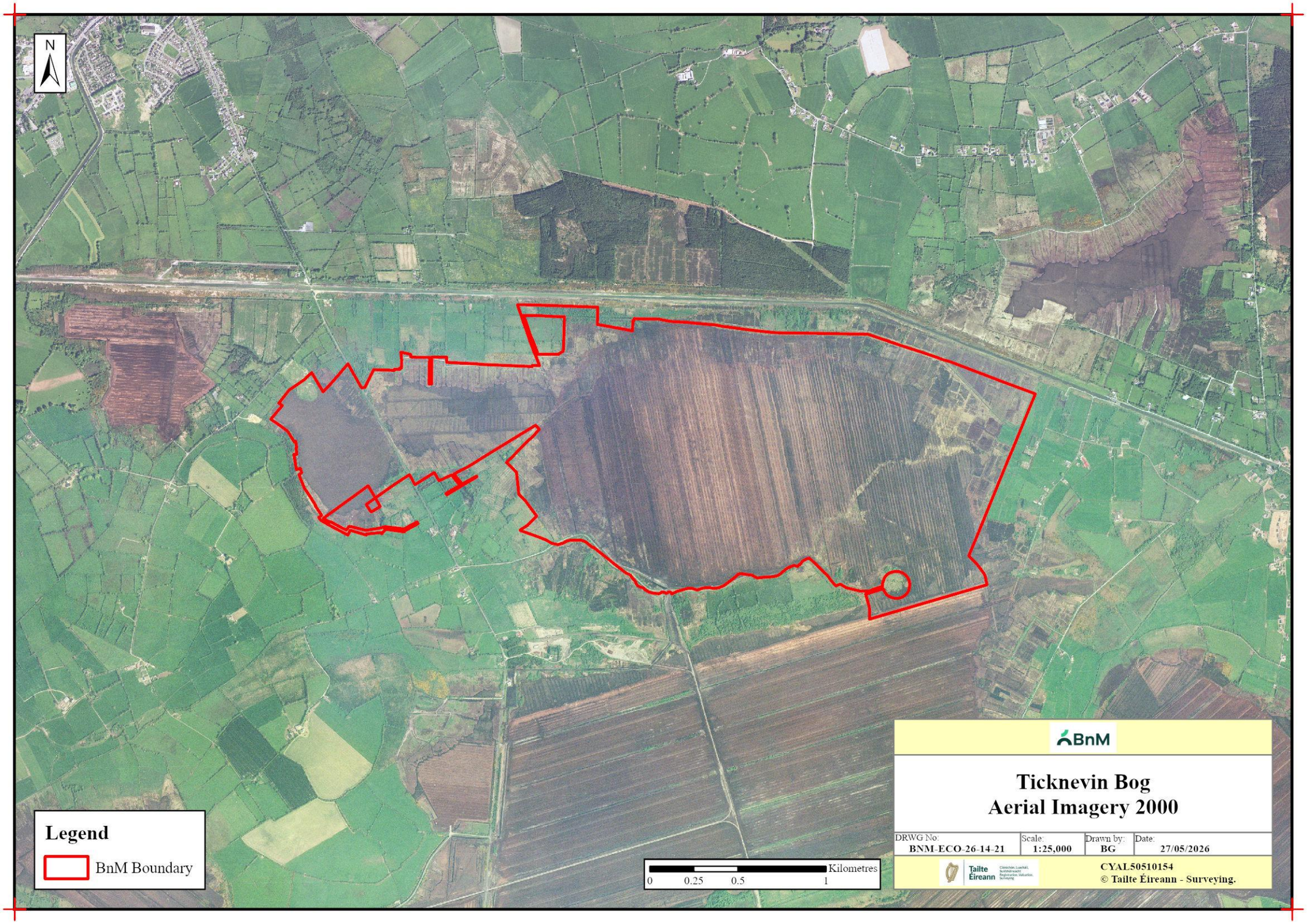
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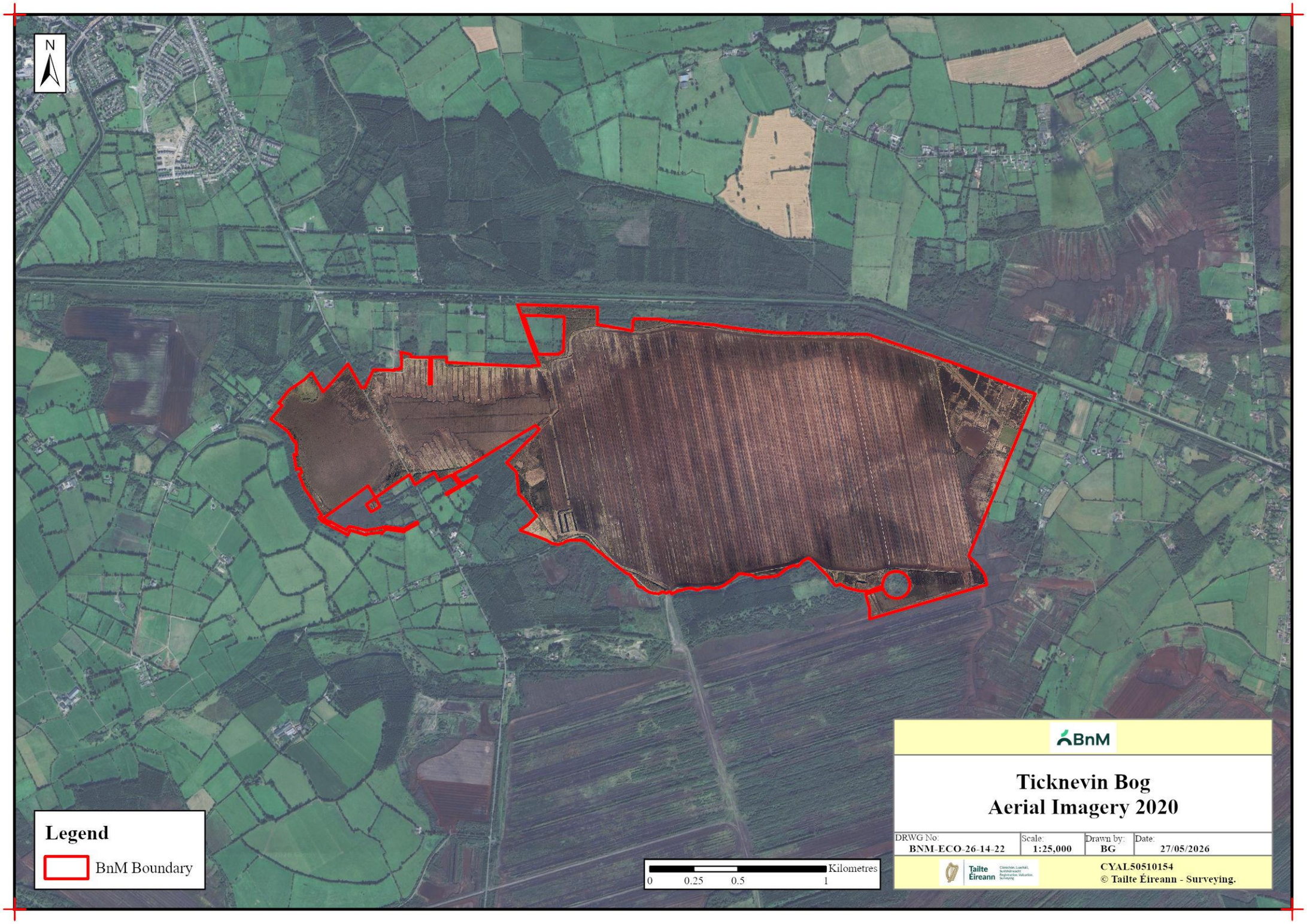
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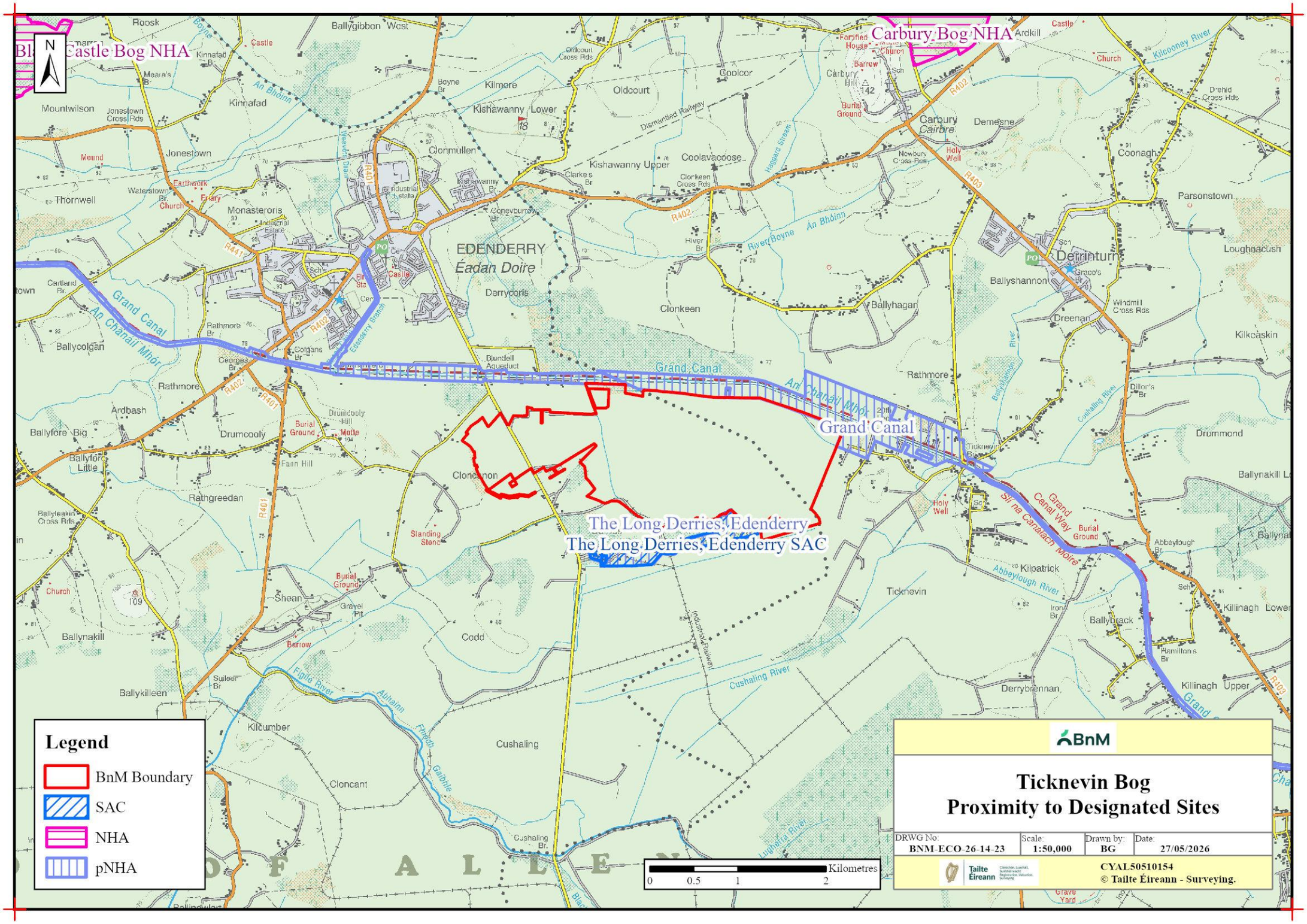
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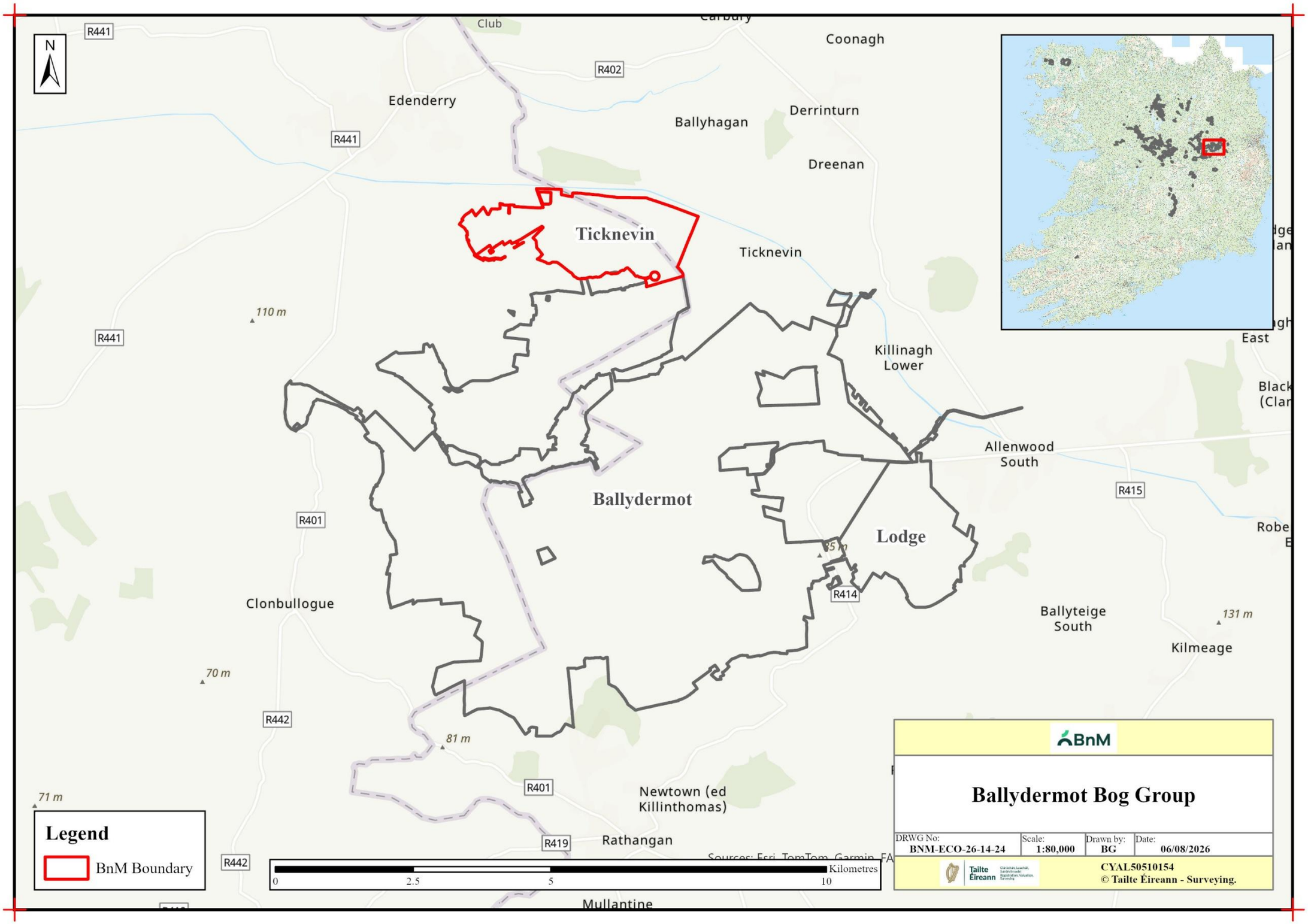
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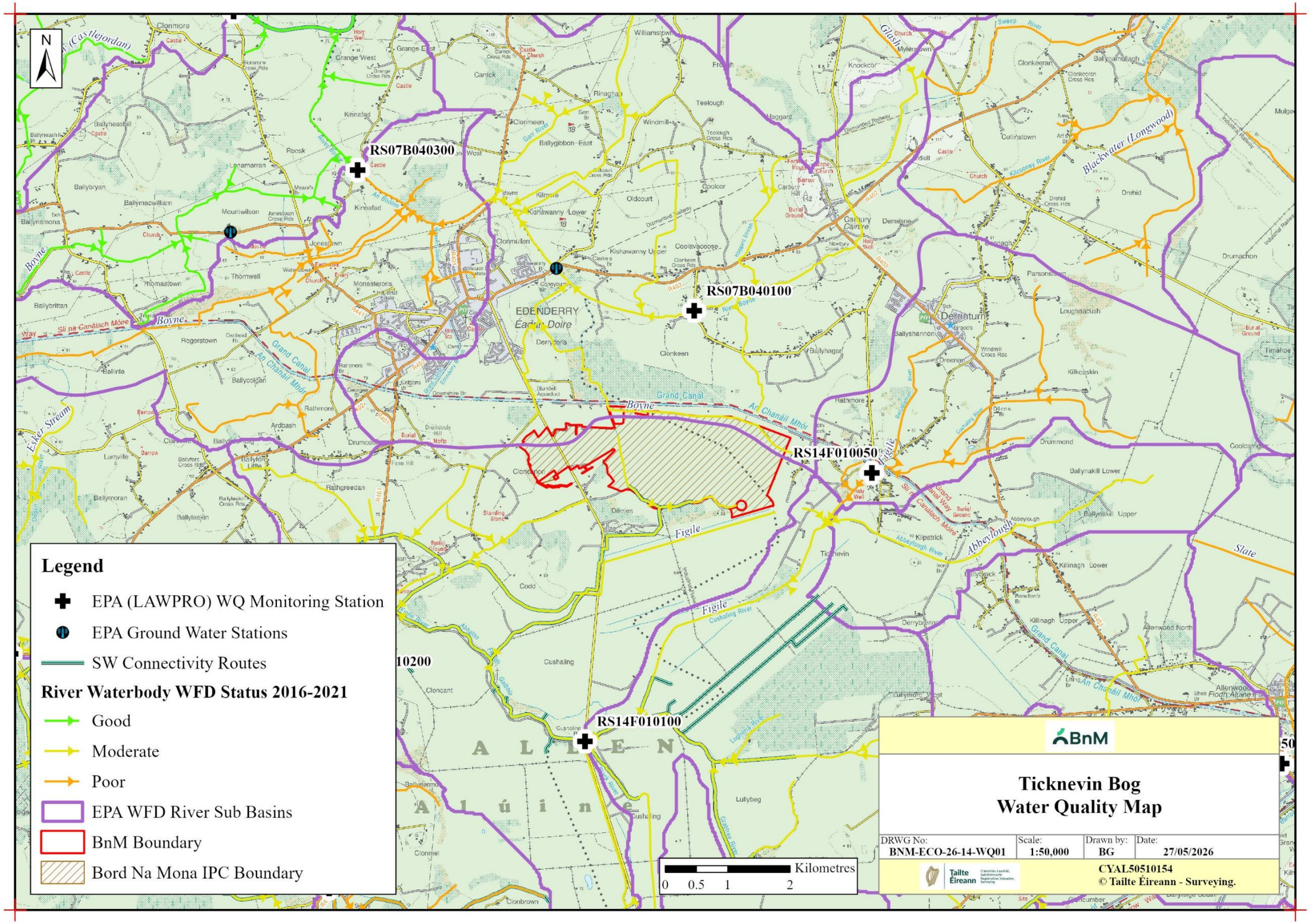
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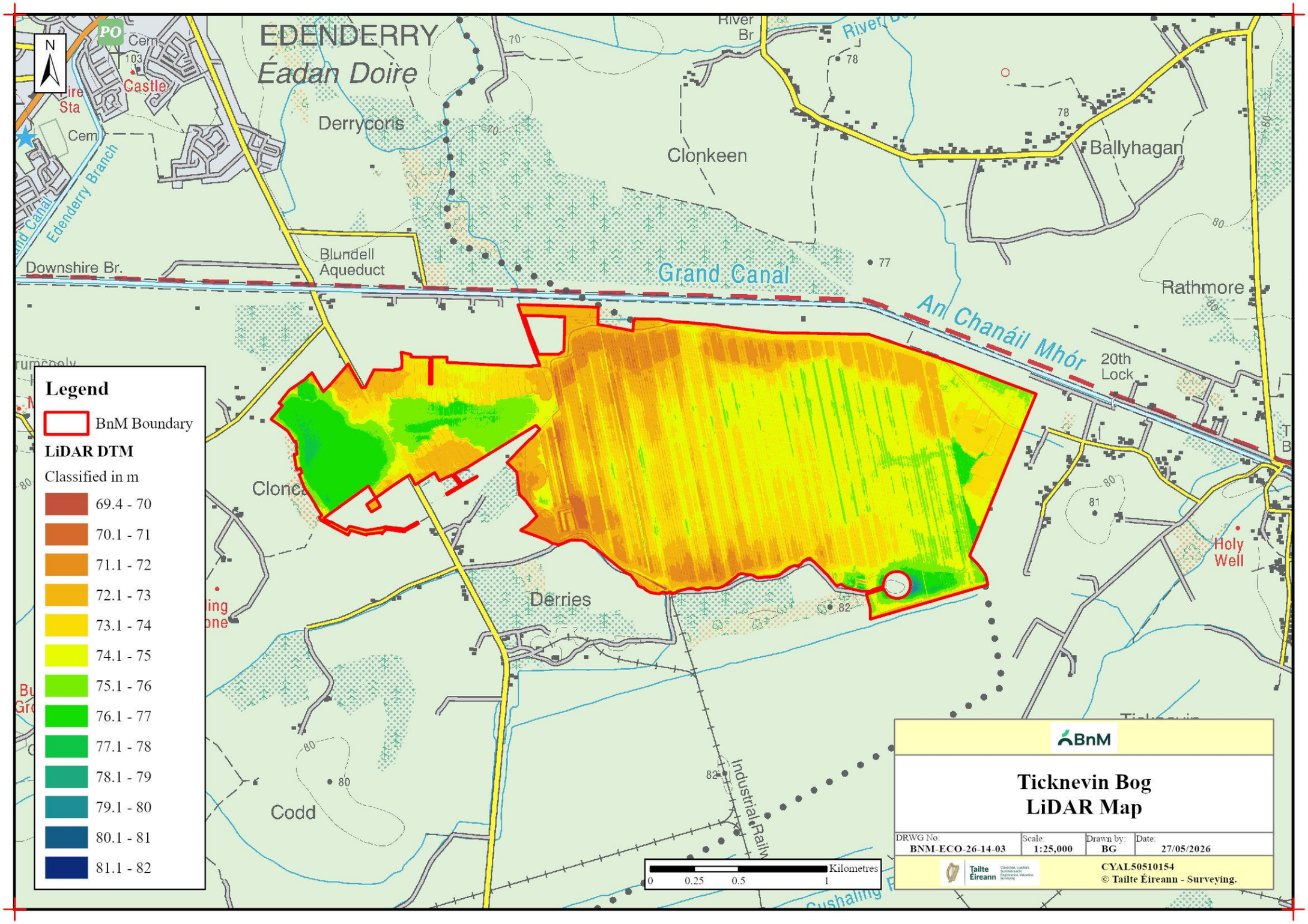
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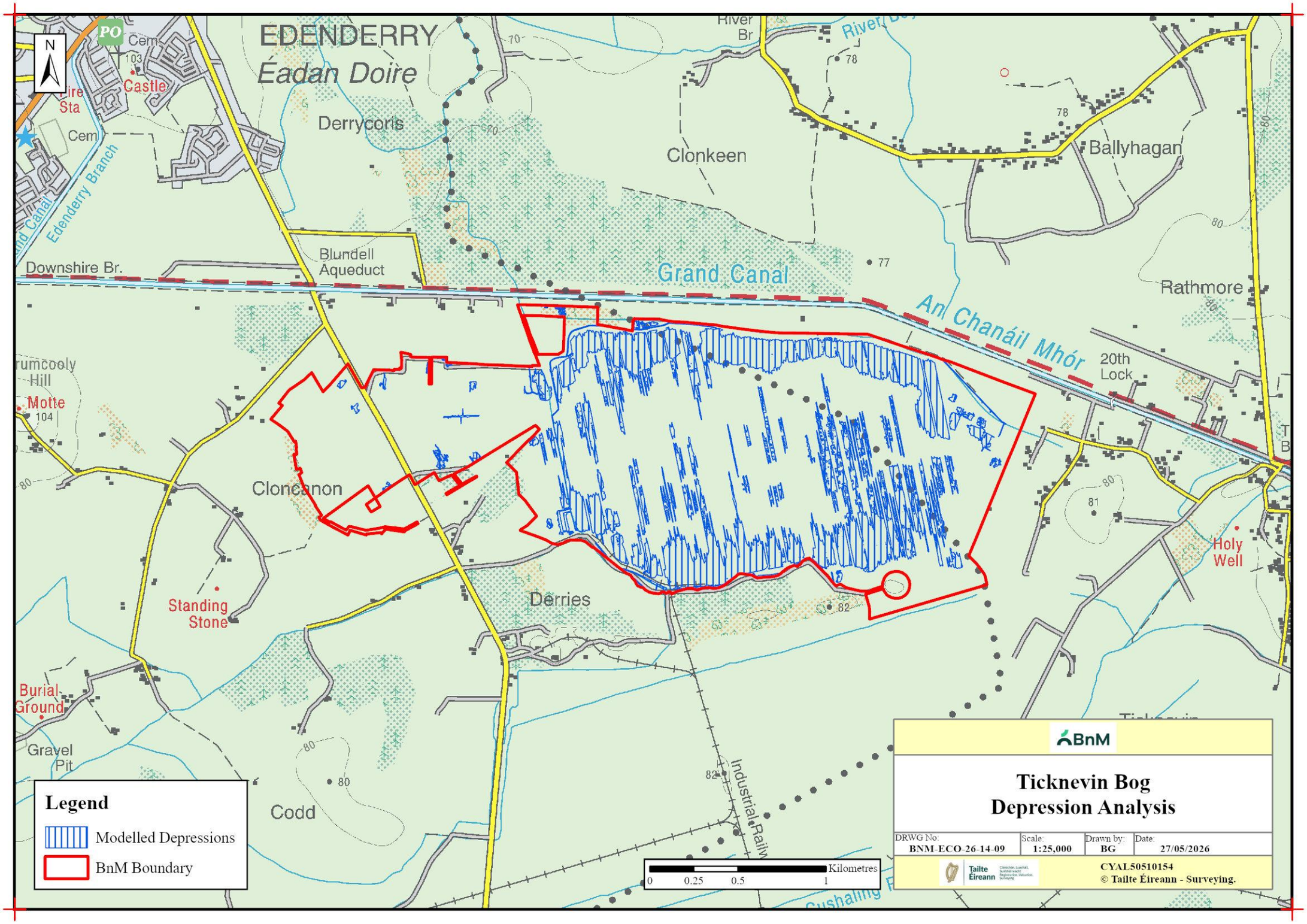
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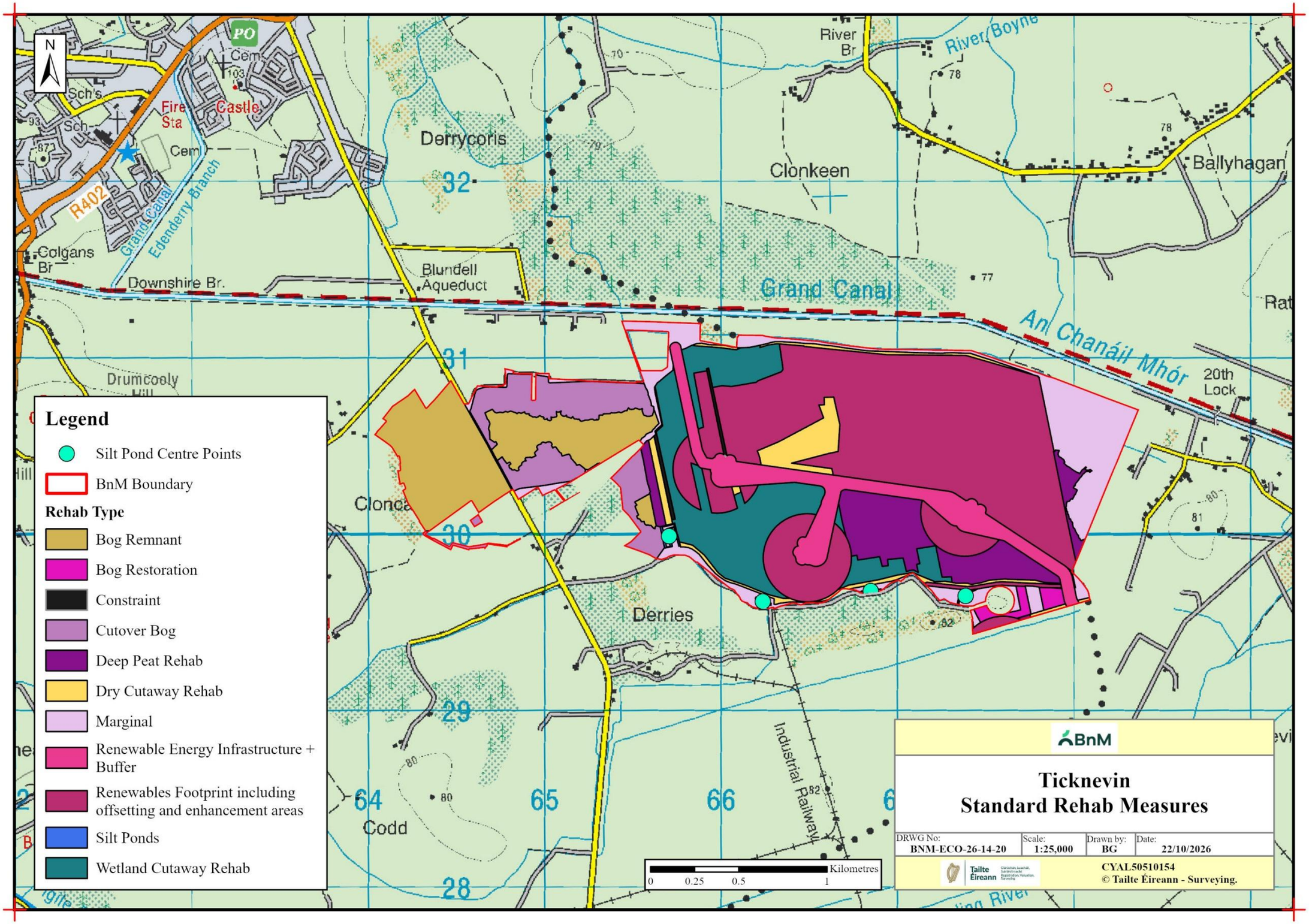
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Edenderry Branch
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Sta
PO
20th Lock
Motte
Cloncanon
Standing Stone
Derries
Holy Well
Burial Ground
Gravel Pit
Codd
Industrial Railw
Legend
Modelled Depressions
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Kilometres
0 0.25 0.5 1
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Ticknevin Bog
Depression Analysis
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Rehabilitation Maps


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Grand Canal
Edenderry Branch
Colgans Br
Downshire Br.
Drumcooly Hill
Derrycoris
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River Br
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Marginal
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Renewables Footprint including offsetting and enhancement areas
Silt Ponds
Wetland Cutaway Rehab
Kilometres
0 0.25 0.5 1
BnM
Ticknevin
Standard Rehab Measures
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