Bord na Móna

Daingean Rathdrum and Daingean Derries

Cutaway Bog Decommissioning and Rehabilitation Plan

2023

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 Daingean Rathdrum and Daingean Derries Bogs 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 both Daingean Rathdrum and Daingean Derries Bogs.

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 Daingean Rathdrum and Daingean Derries bogs, activities which go beyond that required by Condition 10 of the Licence, rehabilitation necessary to comply with the 'standard' requirement of Condition 10 (in the absence of the Scheme) are 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 Daingean Rathdrum and Daingean Derries bogs 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 Daingean Rathdrum and Daingean Derries bogs 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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NON-TECHNICAL SUMMARY

- Industrial peat harvesting is now finished at both Daingean Rathdrum Bog and Daingean Derries Bog.
- Bord na Móna is planning to rehabilitate these bogs, both of which are located approximately 8 km north-east of Tullamore, in Co Offaly.
- 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 (putting a "skin" back onto the peat), and minimising effects to downstream waterbodies. Both bogs were previously drained to allow peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton will thrive.
- Some sections 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.
- Many Bord na Móna bogs cannot be restored back to raised bog in the short-term, as so much peat has been removed and the environmental conditions have been modified. However other peatland habitats with Heather, Bog Cotton, Rushes, Purple Moor-grass, Bog-mosses and scattered trees will develop, and in time a naturalised peatland can be restored.
- The development of a range of habitats in Daingean Rathdrum and Daingean Derries 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 peatland and 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.
- Daingean Derries was first developed in the late 1980's. Daingean Rathdrum Bog was utilised for industrial peat production from the 1980's until 2020. Much of the former production areas of both bogs currently comprise bare peat.
- Measures proposed for both bogs include drain blocking and additional measures required to raise water levels to the surface of the peat (cell bunding for example). Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- Bord na Móna plan to carry out this work in 2023.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- It will take some time for vegetation and habitats to fully develop at Daingean Rathdrum and Daingean Derries Bogs, and for a peatland ecosystem to be restored. However, it is expected that most of these bogs will be developing pioneer habitats after 5-10 years.

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- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments, such as renewable energy. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of these bogs.
- 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.

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1. INTRODUCTION

Bord na Móna operates under an IPC Licence issued and administered by the EPA to extract peat within the Allen Clonsast bog group (Ref. P0503-01) Daingean Rathdrum and Daingean Derries bogs are both part of this bog group. 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 (see Appendix II for details of the bog areas within the Allen Clonsast Bog Group).

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

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix VI).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance, and monitoring.

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

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

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

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

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

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

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

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

Daingean Rathdrum and Daingean Derries Bogs are both proposed to be part of this Scheme (PCAS), which commenced in 2021 and this rehabilitation plan outlines the approach to be taken.

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.*"

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

This document covers the areas of **Daingean Rathdrum and Daingean Derries Bogs**.

Industrial peat extraction at Daingean Rathdrum and Daingean Derries Bogs permanently ceased in 2020 (having commenced in the 1980's), although there is some remaining stock on both sites. Daingean Rathdrum will be cleared of stock by the end of February 2023. Daingean Derries will be cleared of stock by approximately the end

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of April 2023. Currently the former peat production area comprises largely bare peat along with some pioneering cutaway habitats, in addition to marginal[1] habitats.

Raised bog remnants occur around the margins of both bogs which have been subject to drainage, associated with domestic turf cutting. These areas of remnant raised bog were never subject to commercial peat extraction.

High bog remnants (within the areas owned and under the control of Bord na Móna) are currently being used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on these bogs. 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 archaeological features. There are archaeological features present at Daingean Rathdrum Bog including toghers, which may similarly constrain PCAS activities.

A railway line occurs, connecting Daingean Derries and Daingean Rathdrum, following the northern bog boundaries. The rail line will be in operation in the short term until all peat stocks have been removed from the bog.

Kilmurry Bog Walk and Nature Trail partially occurs along the western margin of Daingean Rathdrum bog. This walkway will not be impacted by PCAS rehabilitation.

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[1] 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.

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 (covering the period 2011 to 2023 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

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

2.1 Desk Study

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

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

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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 (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

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

- Allen Clonsast Integrated Pollution Control Licence;
- Allen Clonsast 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
- Bord na Móna Annual Report 2022.
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

A number of stakeholders have been identified during the course of Bord na Móna's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Daingean Rathdrum Bog was surveyed in 2012 with additional surveys carried out in 2015 and 2016. Daingean Derries Bog was surveyed in 2012 with additional surveys carried out in 2017. A survey also took place in January 2023, 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 British Bryological Society (2010). A more detailed Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet.

Detailed ecological survey reports for Daingean Rathdrum Bog and Daingean Derries Bog are contained in Appendix III.

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3. SITE DESCRIPTION

Daingean Rathdrum Bog is located 3.5 km west of Daingean and 7.5 km north-east of Tullamore, in Co Offaly. (Grid reference: N 42432 29103).

Daingean Derries Bog is north-west of Daingean Rathdrum (Grid reference: N 39990 31188) and straddles the border of Co. Offaly and Co. Westmeath. These bogs are connected via Daingean Rail Link. Both bogs are part of the Allen Clonsast group of horticultural bogs.

The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland, and other bogs, many owned and managed by Bord na Móna.

Several EPA watercourses occur in proximity to these bogs. The Kilmurry stream flows in a north-westerly direction along the south western boundary of Daingean Rathdrum while the Kilclonfert stream flows in a westerly direction along its northern boundary. These watercourses are tributaries of the Puttaghan River. The Daingean Stream flows easterly partially along the northern/north-eastern boundary of the Daingean Rathdrum. The Silver [Tullamore] river flows along the northern boundary of Daingean Derries.

See Drawing numbers *BNM-DR-24-02-01: Daingean Rathdrum Bog Site Location* and *BNM-DR-24-03-01: Daingean Derries Bog Site Location*, included in the accompanying map books[2], which illustrate the location of Daingean Rathdrum and Daingean Derries Bogs in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Daingean Rathdrum bog is a relatively recently developed industrial peat production bog and was in peat production from the late 1980's until 2020. The bog was formerly used for both horticultural peat and fuel peat production. There is therefore very little development of pioneer cutaway habitats within the BnM-owned section, and this area is predominately bare peat.

A large section of developed high bog in the south-west of Daingean Rathdrum (32 ha) has not been in production for some years. This area has now re-vegetated with Heather, along with some patches of Bog Cotton and bare peat. This area was zoned for biodiversity has undergone rehabilitation with a drain blocking program bog completed in 2017-2018.

Daingean Derries was first developed in the late 1980's/1990's to supply both horticultural peat and fuel peat. The majority of former production area is bare peat as it was in production until 2020.

3.1.2 Current land-use

The majority of Daingean Rathdrum and Daingean Derries bogs comprises cutover bare peat. Some extant stock is still present onsite (January 2023). Daingean Rathdrum will be cleared of stock by the end of February 2023. Daingean Derries will be cleared of stock by approximately the end of April 2023.

[2] Cutaway Bog Decommissioning and Rehabilitation Plan – Daingean Rathdrum Bog Map Book and Cutaway Bog Decommissioning and Rehabilitation Plan –Daingean Derries Bog Map Book

A section (32 ha) of former production bog that had been left as a peat reserve in the south-west of Daingean Rathdrum was zoned for biodiversity and has already undergone rehabilitation with a bog restoration drain-blocking programme in 2017.

Part of bog adjacent to the south-east of Daingean Rathdrum is privately owned. Milled peat is produced in this area under private management. This company harvests peat using vacuum machines. Drainage of this area is likely to be linked to the overall bog.

Kilmurry Bog Walk and Nature Trail partially occurs along the western margin of Daingean Rathdrum bog. This walkway will not be impacted by PCAS rehabilitation.

Fairfield Gun Club has developed a small duck pond towards the south-west corner of the Daingean-Derries.

Several raised bog remnants occur along the margins of both bogs. These bog remnants have been subject to drainage, associated with domestic turf cutting, which is ongoing. There are large areas of active turbary along the eastern margins of both bogs. These areas of bog were never subject to commercial peat extraction.

A high voltage powerline is located close to the south-eastern boundary of Daingean Derries (on BnM property).

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 Daingean Rathdrum and Daingean Derries Bogs, jobs would have included those to facilitate horticultural peat and fuel peat production.

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).

There are approximately 1400 people working in Bord na Móna at present. There are approximately 215 roles directly involved in PCAS.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology of both Daingean Derries and Daingean Rathdrum bogs comprises the Lucan formation (dark limestone and shale). A small area close to the north-eastern margin of Daingean Rathdrum is underlain by Volcanics (undifferentiated). The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat'. The majority of Daingean Rathdrum bog is underlain with Lacustrine clay with pockets of limestone till occurring on more elevated ground close to the southern margins. Gravel and shell marl are exposed at different locations.

The majority of Daingean Derries is underlain by Marl / Lacustrine clay, with pockets of limestone till occurring on more elevated ground.

3.2.2 *Peat type and depths*

The majority of both Daingean Rathdrum and Daingean Derries comprises "red peat" or Sphagnum peat and significant depths (2 - 5m +) remain at both bogs. Some shallower peat remains on more elevated ground in both bogs.

3.3 Key Biodiversity Features of Interest

The majority of both Daingean Rathdrum and Daingean Derries Bogs consist of bare peat, as these bogs were in production until 2020. Due to the recent cessation of peat production, there has been little opportunity for post-production habitats to develop, and habitats of biodiversity interest are therefore largely confined to the marginal habitats fringing the bare peat.

3.3.1 Current habitats

The most common vegetation communities[3] present in the former production areas at Daingean Rathdrum and Daingean Derries include:

- Bare peat (0-50% cover) (BP)
- Dry *Calluna* community (dHeath)
- *Molinia caerula*-dominated community (gMol)
- Mosaics of pioneer dry grassland dominated by *Molinia caerula*-dominated community (gMol), *Ulex*-dominated community (eGor) and Birch
- Scrub - Emergent Betula-dominated community (eBir) and Open Betula-dominated community (oBir)
- Pioneer dry grassland *Dactylis-Arrhenatherum* community (gDa-An) (travel paths)
- Pioneer dry calcareous grassland (gCal)
- Pioneer poor fen communities dominated by pioneer *Juncus effusus* community and pioneer *Eriophorum angustifolium* community (poor fen)
- Emergent *Betula*-dominated community (eBir)
- Access routes (rail lines and tracks including gravel embankments and associated habitats such as dry grassland communities (GS2) and scrub)
- Silt-pond areas (Silt) with silt ponds and associated spoil heaps and access tracks

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

The most common habitats[4] found around the margins of Daingean Rathdrum and Daingean Derries include:

- Birch woodland (WN7)
- Scrub (WS1)
- Raised bog (PB1)
- Cutover bog (PB4)
- Poor fen (PF2)
- Oak Ash Hazel woodland (WN2)
- Dry heath (HH1)
- Exposed gravel (ED1)
- Dry meadows and grassy verges (GS2)
- Improved grassland (GA1)
- Wet grassland (GS4)
- Artificial pond (FL8)
- Riparian/drainage ditches (FW4)
- Silt ponds
- Access tracks (BL3/ ED2)

See Drawing number *BNM-DR-24-03-17: Daingean Derries Current Habitat Map* and *BNM-DR-24-02-17: Daingean Rathdrum Current Habitat Map* included in the accompanying map books, which illustrate a selection of habitats at Daingean Rathdrum and Daingean Derries Bog.

[4] Codes refer to Heritage Council habitat classification (Fossitt 2000) or BNM habitat classification where relevant.

Table 1: Photos of Habitats at Daingean Rathdrum and Daingean Derries Bogs (January 2023).

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3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Daingean Derries and Daingean Rathdrum Bogs. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre.

Multiple mammal species have been recorded on or in close proximity to the bog including Eurasian Badger (*Meles meles*), European Otter (*Lutra lutra*), Irish Hare (*Lepus timidus* subsp. *hibernicus*), Pine Marten (*Martes martes*), Red Fox (*Vulpes vulpes*) and Wood Mouse (*Apodemus sylvaticus*).

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Records for bird species of conservation concern recorded at Daingean Rathdrum and Daingean Derries bogs include the red-listed[5] species Kestrel (*Falco tinnunculus*), Meadow Pipit (*Anthus pratensis*), Snipe (*Gallinago gallinago*) and the amber listed species Teal (*Anas crecca*). Meadow Pipit (*Anthus pratensis*) and Snipe (*Gallinago gallinago*) were recorded by BnM ecologists during the walkover survey carried out in January 2023.

3.3.3 Invasive species

The invasive species American Mink (*Mustela vison*) has previously been recorded from Daingean Rathdrum Bog. There are no other NBDC or BNM records for high impact invasive species recorded from either of the bogs.

A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with best practice during PCAS activities.

3.4 Statutory Nature Conservation Designations

There are a number of European designated Sites and nationally designated sites in close proximity (i.e. within a 5km radius at minimum) to Daingean Rathdrum and Daingean Rathdrum bogs.

Raheenmore Bog SAC (Site Code: 000582) lies approximately 1.7 km to the north-east of Daingean Rathdrum Bog and to the east of Daingean Derries. The qualifying interests of Raheenmore Bog SAC include Active raised bogs [7110], Degraded raised bogs still capable of natural regeneration [7120] and Depressions on peat substrates of the *Rhynchosporion* [7150]. Raheenmore Bog is also designated as a pNHA.

Split Hills and Long Hill Esker SAC (Site Code: 001831) is located 3.5km north of Daingean Derries Bog. This site is designated for semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210].

There are no Special Protection Areas (SPAs) in close proximity to Daingean Rathdrum and Daingean Derries Bog.

Daingean Bog pNHA (Site Code: 002033) is located approximately 850 m south-east of Daingean Rathdrum. The Grand Canal pNHA (Site Code: 002104) is located adjacent to Daingean Rathdrum along its south eastern boundary. Rahugh Ridge (Kiltober Esker) pNHA (site code: 000918) is located 500m to the west of Daingean Derries bog. Murphy's Bridge Esker pNHA (site code: 001775) also located approximately 470m to the west of Daingean Derries bog.

[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.

Raheenmore Bog is designated as a Ramsar site and lies approximately 1.7 km to the north-east of Daingean Rathdrum Bog and to the east of Daingean Derries. This site is also designated as a SAC and as a pNHA, for its peatland habitats.

3.5 Hydrology and Hydrogeology

Daingean Derries Bog lies in the Shannon Catchment (Catchment ID: 25A) as defined by the EPA under the Water Framework Directive (WFD). The majority of Daingean Rathdrum (central section) lies in the Barrow catchment (Catchment ID: 14), with the remainder falling into the Shannon Catchment (Catchment ID: 25A).

Daingean Derries Bog lies in the Silver [Tullamore]_SC_010 (sub-catchment ID: 25A_3). Daingean Rathdrum Bog is located in three sub-catchments; the majority of the bog lies in the Figile_SC_020, with part of the south-west of the bog located in the Tullamore_SC_010 and part of the north-east located in the Silver [Tullamore]_SC_010.

There are several drains/channelised streams around the margins of Daingean Rathdrum that drain the bog. The Daingean Stream (EPA Code: 14D06) flows easterly partially along the northern/north-eastern boundary of Daingean Rathdrum and is a tributary of the Daingean River. The Kilmurry stream (EPA Code: 25I42) flows in a north-westerly direction along the south western bog boundary and the Kilclonfert stream (EPA Code: 25Q32) flows in a westerly direction along the northern boundary. These watercourses are tributaries of the Puttaghan River (EPA code: 25P40), which flows outside the southern boundary of Daingean Derries bog and flows into the Silver [Tullamore] River downstream.

The Silver [Tullamore] (EPA code: 25S03) flows in a westerly direction along the northern boundary of Daingean Derries bog. The Cappagh 25 stream (EPA code: 25Q07) flows in an easterly direction along the northern boundary of the bog, flowing into the Puttaghan 25.

Daingean Rathdrum Bog and Daingean Derries Bog both have a gravity drainage regime. Hydrological modelling *(BNM-DR-24-02-09: Daingean Rathdrum Depression analysis* and *BNM-DR-24-03-09: Daingean Derries Depression analysis)* indicates that parts of each of the bogs 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.

Regional hydrological data suggest that Daingean-Derries and Daingean-Rathdrum receives average precipitation of 865mm/yr (1981-2010), with an estimated evapotranspiration rate of c. 505mm/yr., leaving an average effective precipitation rate of 360mm/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 360mm/yr, which equates to an annual runoff rate of c. 3,600m^3/ha.

GSI data indicates that both Daingean Rathdrum and Daingean Derries Bogs are primarily underlain by Lucan formation (dark limestone and shale) which is classified as a Locally Important Aquifer (Bedrock which is Moderately Productive only in Local Zones). A small area close to the eastern margin of Daingean Rathdrum is underlain by Volcanics (undifferentiated), which is classified as a Locally important aquifer (Bedrock which is Generally Moderately Productive). Geological Survey of Ireland (GSI) mapping does not identify any karst features within close proximity to the bog. No data exists concerning depth to bedrock.

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.

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 m3/d), dependable springs may be associated with these aquifers.

The entirety of the bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Mapviewer). Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area. Groundwater vulnerability for the area surrounding Daingean Rathdrum Bog and Daingean Derries Bog is generally of moderate/high vulnerability. An area adjacent to the northern boundary of Daingean Derries is classified as Extreme Vulnerability/ Rock at or Near Surface.

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 both bogs.

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

Daingean Derries and Rathdrum bogs have 13 treated surface water outlets from previously active peat extraction catchments. Derries outlets discharge to the Silver River in the Shannon Catchment (IE_SH_25S030010 SILVER (TULLAMORE)_010 & IE_SH_25S030100 SILVER (TULLAMORE)_020), as does Rathdrum north. Rathdrum Bog south discharges mainly to the Grand Canal (IE_14_AWB_GCMLW Grand Canal Main Line West (Barrow)), via a

local stream and the Ballymullen Water Supply. The Silver River was not 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, which is currently in preparation. The Grand Canal does not have any pressures from peat extraction recorded.

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 numbers *BNM-DR-24-02-02: Daingean Rathdrum Structures and Sampling*, *BNM-DR-24-03-02: Daingean Derries Structures and Sampling* along with Drawing number *BNM-DR-24-02-WQ01: Daingean Rathdrum Water Quality Map* and *BNM-DR-24-03-WQ01: Daingean Derries Water Quality Map* included in the accompanying map books, which illustrate the various drainage and water quality infrastructure present at Daingean Rathdrum and Daingean Derries Bogs.

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 and Wildlife Service, Environmental Protection Agency and Local Authority Water Program, amongst a range of stakeholders.

The main emission limit values associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.00mg/l and COD 100mg/l.

From an analysis of any results over previous five years of the IPC licence environmental monitoring of some of the discharges from this bog, these indicate that results were under the Emission Limit Value for Suspended Solids and Ammonia and broadly under the trigger level for COD.

Ammonia averaged 0.205mg/l and ranged from 0.02 to 1.7 mg/l with Suspended Solids ranging from <2 to 14 mg/l and averaging 3.18 mg/l. See Table 3.1.

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Table 3.1. Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Bog	SW	Monitoring	Sample Date	pH	SS	TS	Ammonia	TP	COD	Colour
Daingean Derries	SW-1	Q4 22	14/10/2022	7.8	5	228	0.526	0.05	55	256
Daingean Derries	SW-2	Q4 22	14/10/2022	6.7	2	193	0.229	0.05	78	312
Daingean Derries	SW-3	Q4 22	14/10/2022	5.2	2	102	0.058	0.05	95	333
Daingean Derries	SW-4	Q4 22	14/10/2022	5.5	2	149	0.128	0.05	89	311
Daingean Derries	SW-5	Q4 22	14/10/2022	4.9	2	133	0.123	0.05	83	288
Daingean Derries	SW-6	Q4 22	14/10/2022	6	2	142	0.168	0.05	82	273
Daingean Derries	SW-7	Q4 22	14/10/2022	4.9	2	171	0.491	0.05	94	295
Daingean Derries	SW-7A	Q4 22	14/10/2022	6.8	2	229	0.426	0.05	76	351
Rathdrum	SW-8	Q4 22	14/10/2022	7.3	2	300	0.217	0.06	55	222
Rathdrum	SW-9	Q4 22	14/10/2022	7.5	2	318	0.118	0.05	70	318
Rathdrum	SW-9A	Q4 22	14/10/2022	5	2	361	0.013	0.05	59	202
Rathdrum	SW-10	Q4 22	14/10/2022	7.2	2	231	0.255	0.05	87	455
Daingean Derries	SW-1	Q2 2021	22/06/2021	8.1	2	311	0.013	0.05	72	172
Daingean Derries	SW-2	Q2 2021	22/06/2021	7.8	2	346	0.555	0.05	62	148
Daingean Derries	SW-3	Q2 2021	22/06/2021	5.7	9	162	0.021	0.12	134	520
Daingean Derries	SW-4	Q2 2021	22/06/2021	7.4	2	269	0.014	0.05	82	336
Daingean Derries	SW-5	Q2 2021	22/06/2021	7.3	6	211	0.013	0.05	116	444
Daingean Derries	SW-6	Q2 2021	22/06/2021	7.6	2	484	0.013	0.05	26	70.5
Daingean Derries	SW-7	Q2 2021	22/06/2021	7.6	2	365	0.367	0.07	87	318
Daingean Derries	SW-7A	Q2 2021	22/06/2021	7.6	2	512	0.177	0.05	67	177
Rathdrum	SW-8	Q2 2021	22/06/2021	8.2	2	527	0.014	0.05	38	98.6
Rathdrum	SW-9	Q2 2021	22/06/2021	8.1	2	437	0.016	0.05	58	121
Rathdrum	SW-9A	Q2 2021	22/06/2021	8.2	5	513	0.013	0.05	35	35
Rathdrum	SW-10	Q2 2021	22/06/2021	7.9	2	330	0.014	0.05	64	197
Rathdrum	SW-10A	Q4 2021	12/10/2021	6.7	2	160	0.191	0.05	97	550
Rathdrum	SW-10A	Q2 2020	25/05/2020	7.6	4	259	0.195	0.06	65	204
Daingean Derries	SW-1	Q4 19	14/11/2019	7.7	3	268	0.064	0.07	52	252
Daingean Derries	SW-2	Q4 19	14/11/2019	6.3	6	81	0.254	0.05	46	274
Daingean Derries	SW-3	Q4 19	14/11/2019	4.7	2	77	0.07	0.05	65	294
Daingean Derries	SW-4	Q4 19	14/11/2019	6.1	2	105	0.113	0.05	71	339
Daingean Derries	SW-5	Q4 19	14/11/2019	4.8	2	61	0.116	0.05	43	202
Daingean Derries	SW-6	Q4 19	14/11/2019	6.8	2	46	0.151	0.05	34	179
Daingean Derries	SW-7	Q4 19	14/11/2019	5.8	2	31	0.119	0.05	41	232
Daingean Derries	SW-7A	Q4 19	14/11/2019	6.7	2	39	0.109	0.05	35	186
Rathdrum	SW-8	Q4 19	14/11/2019	7.5	2	358	0.303	0.11	45	200
Rathdrum	SW-9	Q4 19	14/11/2019	7.6	2	284	0.081	0.09	54	196
Rathdrum	SW-9A	Q4 19	14/11/2019	7.6	3	131	0.193	0.13	53	164
Rathdrum	SW-10	Q4 19	14/11/2019	7.2	2	114	0.289	0.07	65	370
Daingean Derries	SW-1	Q2 18	30/05/2018	7.8	13	328	0.02	0.13	82	103
Daingean Derries	SW-2	Q2 18	30/05/2018	7.5	5	378	1.7	0.05	52	322
Daingean Derries	SW-3	Q2 18	30/05/2018	5.9	14	156	0.02	0.33	116	482
Daingean Derries	SW-4	Q2 18	30/05/2018	6.4	5	138	0.28	0.12	101	362
Daingean Derries	SW-5	Q2 18	30/05/2018	7.1	5	172	0.1	0.08	110	295
Daingean Derries	SW-6	Q2 18	30/05/2018	7.2	9	456	0.15	0.05	27	39
Daingean Derries	SW-7	Q2 18	30/05/2018	7.4	5	348	0.75	0.05	89	257
Daingean Derries	SW-7A	Q2 18	30/05/2018	7.4	6	502	0.86	0.05	42	103
Rathdrum	SW-8	Q2 18	30/05/2018	7.6	7	538	0.15	0.1	34	52
Rathdrum	SW-9	Q2 18	30/05/2018	7.9	5	454	0.17	0.05	55	92
Rathdrum	SW-9A	Q2 18	30/05/2018	7.7	5	493	0.02	0.05	15	49
Rathdrum	SW-10	Q2 18	30/05/2018	7.8	8	324	0.02	0.05	68	166
Rathdrum	SW-10A	Q3 18	12/09/2018	7.1	6	264	0.02	0.06	85	174

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 vegetated in some areas. 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) 2018-2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Daingean Rathdrum Bog and Daingean Derries Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream water bodies.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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

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

This new sampling programme commenced in July 2022 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.

Initial monthly results are included in appendix XIII for Daingean Derries and Rathdrum. These results cover the period from July to December 2022 and are from 3 the main surface water outlets from the sections of bog to be rehabilitated in 2023. Peat extraction ceased in these bogs in 2020 and as expected some of the key water quality parameters that can impact water quality from peat extraction activities, remain on a relatively static trajectory, with suspended solids indicating a slight downward trend. During this period, ammonia did not indicate any changes in concentration during the 5 months of sampling, with all other parameters fluctuated slightly, most likely influenced by normal weather patterns, especially rainfall.

Monthly ammonia concentrations from both bogs from July to November 2022 had a range of 0.028 to 0.981 mg/l with an average of 0.251 mg/l. Results for suspended solids for the same period indicate a range of 2 to 4 mg/l with an average of 2.25 mg/l.

In the preparation of this monitoring programme, Bord na Móna 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 Maps.

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.

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

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

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is largely bare peat. 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 will still discharge from designated emission points when rehabilitation at Daingean Rathdrum and Daingean Derries has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key water receptors surrounding the bogs and is expected to support the future status of the receiving waterbodies in reaching 'Good Status'.

3.7 Fugitive Emissions to air

None.

The bog is no longer in industrial peat production. Rehabilitation of the cutaway peatland will seek to re-wet the dry peat where possible and 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

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 CO2-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 CO2-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 CO2-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 CO2 emissions from drained peatlands or increased methane (CH4) 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 CO2 emissions (Gunther *et al.* 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO2 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 Daingean Derries Bog and Daingean Rathdrum Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this bog is expected to develop regenerating wet deep peat vegetation on deep peat areas, and wetland habitats on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of both Daingean Derries and Daingean Rathdrum Bogs can be rated as Local Importance; lower value to Local Importance; higher value. Bare peat and other intensively managed areas are assessed as local importance (lower value). Marginal habitats including woodland, scrub, pioneer cutaway habitats, 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 Bord na Móna over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally focused groups with a national remit.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Allen Clonsast group bogs including Daingean Rathdrum Bog and Daingean Derries 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.
- 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 Daingean Rathdrum Bog and Daingean Derries 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 Daingean Rathdrum Bog and Daingean Derries Bog.

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

4.2 Issues raised by Consultees

N/A Yet as consultation has not commenced.

4.3 Bord na Móna response to issues 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 Bord na Móna want to achieve by implementing the rehabilitation. These include:

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as *At Risk* from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Optimising hydrological conditions for the development of peat forming communities on deep peat, or reed swamp and fen on shallow more alkaline peat and other subsoils, where present.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Supporting expected future land-uses.
- 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 Daingean Rathdrum and Daingean Derries bogs. 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. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction, but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as *At Risk* from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and Bord na Móna). Reducing pressures due to former peat extraction activities

at Daingean Rathdrum and Daingean Derries Bogs will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water body will depend on reducing pressure from a range of different sources, including peatlands in general (private and Bord na Móna).

- Bord na Móna are also planning rehabilitation measures in some nearby bogs (e.g. Toar) in 2023. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the River Daingean 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. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.

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6. SCOPE OF REHABILITATION

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

- The area of Daingean Rathdrum and Daingean Derries Bogs.
- 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. Daingean Rathdrum bog and Daingean Derries Bogs are part of the Allen Clonsast 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 Daingean Rathdrum and Daingean Derries Bogs, in particular, optimising **climate action benefits**.The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Daingean Rathdrum and Daingean Derries Bogs mean that deep peat measures are the most suitable rehabilitation approach for these bogs. Both bogs have a gravity drainage regime and have residual deep peat along with some shallower areas.
- Bord na Móna have defined the key goal and outcome of rehabilitation at Daingean Rathdrum and Daingean Derries Bogs as **environmental stabilisation** of the site via **optimising climate action benefits, where possible**. The re-wetting of residual peat in the area recently out of peat extraction will be optimised, **setting the site on a trajectory towards the development of peat-forming communities on residual deep peat, and the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils.**
- Rehabilitation of Daingean Rathdrum and Daingean Derries Bogs 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.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of cutover sites are constrained by their environmental characteristics. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, and their environmental characteristics have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.), therefore leading to different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- Remaining peat depths are between 2 - 5+ metres deep in the majority of the bog. Some shallower peat remains on higher ground along the west/south western boundary.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.

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- **Archaeology**. There are archaeological features present at Daingean Rathdrum Bog which may similarly constrain PCAS activities. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. While the rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, any new archaeology may require rehabilitation measures will be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) will be carried out to mitigate against any impact on found archaeology. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way**. There are no known rights of way at within the boundaries of either bog. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this will 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.
- **Amenity Development**. Kilmurry Bog Walk and Nature Trail partially occurs along the western margin of Daingean Rathdrum bog. This walkway will not be impacted by PCAS rehabilitation.
- **Turbary.** Areas in which active turbary is ongoing are excluded as they are currently being used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues at these bogs.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Active turbary areas are excluded.
- The longer-term development of stable naturally functioning habitats to fully develop at Daingean Rathdrum and Daingean Derries Bogs. 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 Daingean Rathdrum and Daingean Rathdrum 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 enhanced rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by Bord na Móna as:

- stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation; and
- mitigation of key emissions (e.g. potential run-off of 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 silt run off and to encourage and accelerate the development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are *At Risk* from peatlands and peat extraction. The success criteria will be that the *At Risk* classification will see improvements in the associated pressures from this peatland or if remaining *At Risk,* that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 years, post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7-1 and Figure 7-2).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the past 4 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

As the monthly monitoring program at Daingean Rathdrum and Daingean Derries Bog continues in 2023 and during the rehabilitation works planned for 2023, and data from the 2022 monitoring program is compiled, further trending will be produced to verify any ongoing trends.

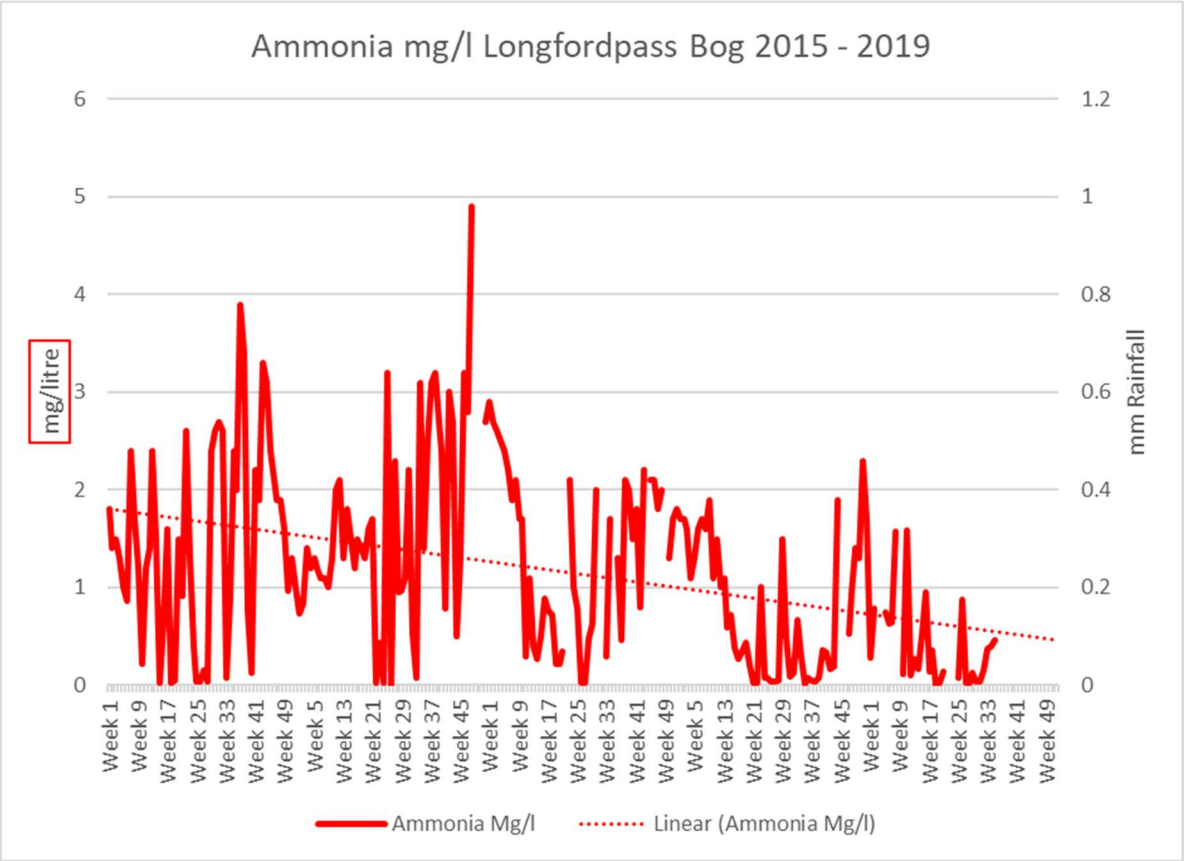

Figure 7-1 Ammonia levels over the period 2015-2019 at Longfordpass.

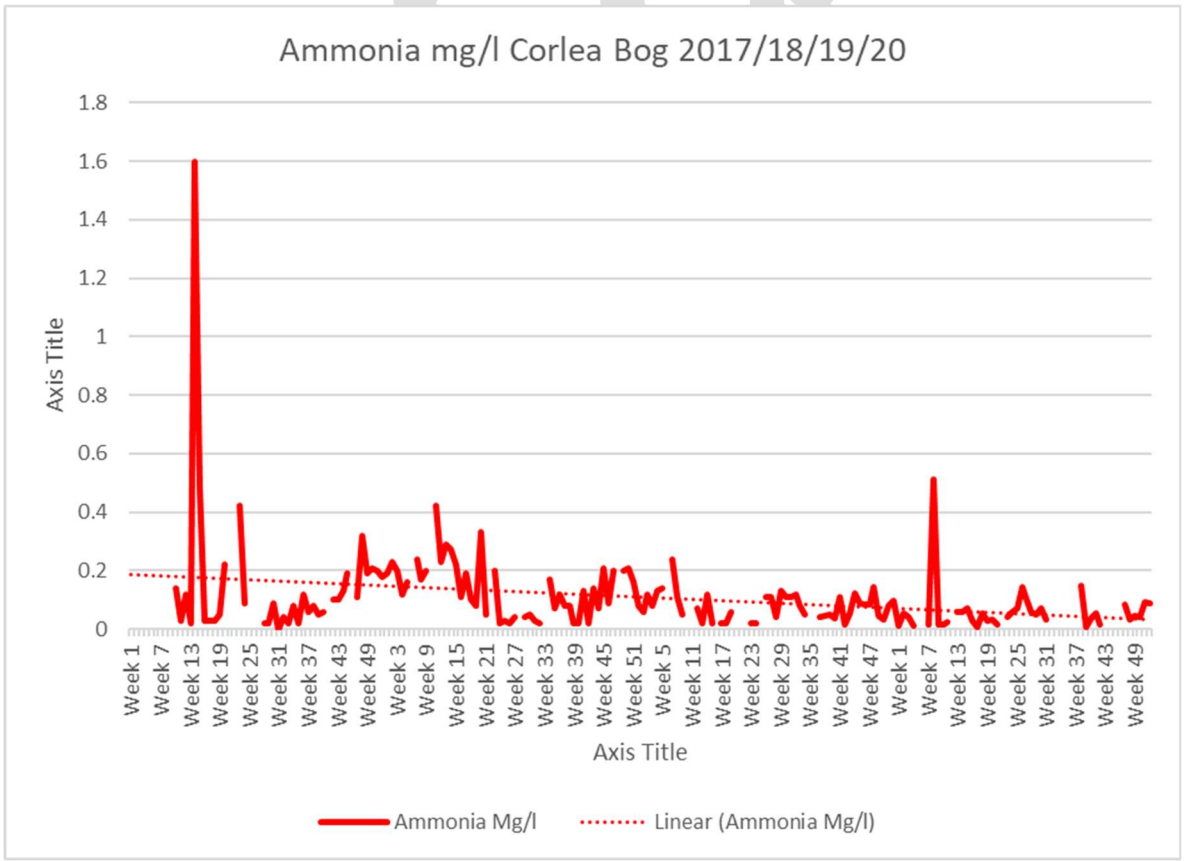

Figure 7-2 Ammonia levels over the period 2017-2020 at Corlea.

Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and the period 2017-2020 at Corlea.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the bog towards becoming a reduced carbon source/carbon sink. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including peat forming communities, wetland, fen, reed swamp, heath, scrub, poor fen, and birch woodland, where conditions are suitable. Some of these habitats have already in part established as pioneer vegetation/wetlands. It will take some time for stable naturally functioning habitats to fully develop at Daingean Rathdrum and Daingean Derries Bog. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/habitat condition assessment. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.

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

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2023-2025
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2022-2024
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule
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	2023-2025

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Criteria type	Criteria	Target	Measured by	Expected Timeframe
			compared against this baseline.	
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a bog condition assessment and appropriate carbon emission factors.	2023-2025
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2023-2025

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

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.

- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, Bord na Móna experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson *et al.* 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths, LiDAR Surface Maps, and Depression Analysis modelling; these are included in the accompanying Mapbook as the drawings referenced below:

BNM-DR-24-02-22: Daingean Rathdrum Aerial Imagery 2020

BNM-DR-24-03-22: Daingean Derries Aerial Imagery 2020

BNM-DR-24-02-04: Daingean Rathdrum Peat Depths

BNM-DR-24-03-04: Daingean Derries Peat Depths

BNM-DR-24-02-03: Daingean Rathdrum LiDAR Map

BNM-DR-24-03-03: Daingean Derries LiDAR Map

BNM-DR-24-02-09: Daingean Rathdrum Depression Analysis

BNM-DR-24-03-09: Daingean Derries 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-24-02-05: Daingean Rathdrum Enhanced Rehabilitation Measures* and *BNM-DR-24-03-05: Daingean Derries Enhanced Rehabilitation Measures* in the accompanying map books (note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for Daingean Rathdrum and Daingean Derries will include (see Table 8-1):

- Deep peat measures including Berms and field re-profiling (45x60m cell), modifying outfalls and managing overflows & drainage channels for excess water & *Sphagnum* inoculation
- Intensive drain blocking and construction of berms in shallow peat areas/modelled depressions on little or no peat to create/promote the spread of wetland habitats.
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls.
- Regular drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes, targeted fertiliser treatment on driers areas of shallow peat.
- More intensive drain blocking (max 7/100 m), field reprofiling, modifying outfalls and managing overflows on areas of deep peat.
- Intensive blocking of drains in targeted marginal (degraded) raised bog remnants around the margins of the site and re-wetting, where possible, using an excavator to install peat blockages.
- Outfall management and/or further drain blocking in one area at least which was formerly subject to rehabilitation, as additional works.

- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Seeding of vegetation and inoculation of *Sphagnum* will be undertaken where required.
- Initial hydrological modelling indicates that a small 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 small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage.

Table 8-1 Types of and areas for enhanced rehabilitation measures at Daingean Rathdrum Bog and Daingean Derries Bog.

Type*	Rehab Code	Enhanced Rehabilitation Measure	Extent (Ha)
Deep Peat	DPT 2	More intensive drain blocking (max 7/100 m) + modifying outfalls and managing overflows	61.9
Deep Peat	DPT 3	More intensive drain blocking (max 7/100 m), + field reprofiling + modifying outfalls and managing overflows	50.54
Deep Peat	DPT 4	Berms and field re-profiling (45x60m cell), modifying outfalls and managing overflows & drainage channels for excess water & *Sphagnum* inoculation	250.7
Dry Cutaway	DCT2	Regular drain blocking (3/100m) + modifying outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	68.2
Wetland	WLT3	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes	0.38
Wetland	WLT4	More intensive drain blocking (max 7/100 m), + modifying outfalls and managing overflows + transplanting Reeds and other rhizomes	14.3
Marginal land	MLT1	No work required	29.2
Marginal land	MLT2	Targeted Drain Blocking	29.2
Additional Work	AW2	Targeted Drain Blocking	48
Silt ponds	Silt pond	Silt ponds	5.04
Constraint	Constraint	Other Constraints	115.7
Total			**645.4**

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

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

- Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme not materialise, from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.

- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Daingean Rathdrum and Daingean Derries Bogs. 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 drainage management assessment of the proposed enhanced 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. There are peat stocks remaining on the bog. Daingean Rathdrum will be cleared of stock by the end of February 2023. Daingean Derries will be cleared of stock by approximately the end of April 2023.
- 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 of the Rehabilitation Plan.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, and fertiliser applications targeting bare peat areas of headlands, high fields and other areas (where required) in addition to wetland creation and management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential 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.

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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

- 2022-2023: Short-term planning actions.
- 2023-2024: Short-term practical actions.
- 2024-2025: Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2025: Decommission silt-ponds, if necessary.

8.5 Budget and costing

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

The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna, 2022). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

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

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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.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years. post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- Enhanced water quality monitoring will aim to include up to 70% of a bogs drainage catchments.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime, but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of

rehabilitation measures, but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

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

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

- Vegetation and habitat monitoring after rehabilitation is completed using a cutaway bog condition assessment (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.

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 have 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:

- The area of Daingean Rathdrum and Daingean Derries 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. Daingean Rathdrum and Daingean Derries Bogs are part of the Allen Clonsast Bog Group.
- The current condition of Daingean Rathdrum and Daingean Derries Bogs. These bogs have a gravity drainage regime.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Boundary drains around both Daingean Rathdrum Bog and Daingean Derries Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Daingean Rathdrum and Daingean Derries Bogs is environmental stabilisation of the site via wetland creation. This is defined as:

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

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

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Criteria for successful rehabilitation

- Rewetting of residual peat and shallow cutaway in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- 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 blockages and re-wetting). This will be demonstrated by a post rehab aerial survey.
- Stabilising potential emissions from the site (e.g. suspended solids). The key target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be demonstrated by water quality monitoring results.

Rehabilitation measures

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

Timeframe

- 2023-2024. 1st phase of rehabilitation. Field drain blocking.
- 2025. 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.
- 2025-2026. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

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- 2025-2026. Decommission silt-ponds, if necessary.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep peat	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	411.2
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	68.2
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	14.6
Marginal Land	MLT1	No work required	30.6
Additional	AW1		48
Other	Silt Pond	Silt ponds	5
Other	Constraint	Rights of Ways and constrained areas/buffers/Archaeology	115.7
Total			**645.4**

See Drawing number *BNM-DR-24-02-20 Daingean Rathdrum Standard Rehab Measures* and *BNM-DR-24-03-20 Daingean Derries Standard Rehab Measures* included in the accompanying map books which illustrate the standard rehab measures to be applied.

Monitoring, after-care and maintenance

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

Validation and IPC Licence surrender

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

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

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APPENDIX II. BOG GROUP CONTEXT

The Allen-Clonsast Bog Group is located mainly in counties Offaly and Westmeath. Garrymore Bog is located in Co. Laois. All the associated bogs are located in the River Barrow Catchment area except Daingean Derries Bog which is located entirely in the Lower Shannon River Catchment and Clonad and Daingean Rathdrum which are located partially in the Lower Shannon River Catchment.

The Allen-Clonsast Bog Group is one of the first developed bog groups in Ireland. Bord na Móna was set up in 1946 and it commenced the development of bogs to fuel power station and supply peat for the horticultural industry. The Allen-Clonsast bogs were developed for the supply of milled peat to the Edenderry Power Station, Croghan Power Station (now decommissioned) and the Croghan Briquette factory (now decommissioned).

Much of the Allen-Clonsast Bog complex became cutaway as long-term peat production 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-Clonsast 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 While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs at Allen-Clonsast, it was found that these require financial investment that exceeds any potential commercial output value. A windfarm has been constructed at Mountlucas Bog and another windfarm project is currently in development at Cloncreen.

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).

A breakdown of the component bog areas for the Allen - Clonsast Bog Group IPC License Ref. P0503-01, and current, indicative Peat Production Status, is outlined in Table Ap-2.

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

Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballycon	281	Cutaway Bog Ballycon was first developed for industrial peat harvesting in the 1960's and the majority of peat has been removed. Ballycon is considered a shallow peat cutaway bog.	Rehabilitation works were carried out in 2006 that consisted of drain blocking and bund construction. Some headlands were fertilised in 2015 to encourage the development of pioneer dry cutaway habitats and there was follow-up drain blocking in 2018. The site is now a mosaic of cutaway wetland and woodland habitats and is a Biodiversity Area. BnM has also operated a workshop on site. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. There is a rail transport link along the southern boundary of the site.	2001	Draft 2022 Rehab commenced 2022
Ballykeane	451	Cutaway Bog	Part of the site is cutaway and has started to develop pioneer vegetation.	2020	Draft 2017

Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Ballykeane Bog was developed for industrial peat production in the 1970's. Ballykeane is a shallow peat cutaway bog.	The majority of the bog is still bare peat. Part of Ballykeane Bog is being used as a herb production trial.		
Cavemount	499	Cutaway Bog Cavemount Bog was first developed for industrial peat production in the 1970's. Peat production ceased in 2015. Cavemount is a shallow peat cutaway bog.	Ongoing rehabilitation has been carried out across the site which is now developing as a wetland, holding nationally important numbers of wintering and breeding wetland birds. A portion of the site still has bare peat but is vegetating. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. Flux tower and GHG monitoring onsite as part of the SmartBOG project. The site is a location for the CarePeat InterReg Project, of which BnM is an associated partner. There is a rail transport link through the site.	2015	Draft 2021 Rehab completed 2022
Clonad	447	Cutaway Bog Clonad Bog was first developed for industrial peat production in the 1970's.	The majority of the former production area is bare peat with some establishing cutaway habitats at various stages of development. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2020	Draft 2021 Rehab completed 2022
Cloncreen	1,009	Cutaway Bog Cloncreen Bog was first developed for industrial peat production in the 1970's. Peat production ceased in 2018 and the majority of peat has been cutaway. Cloncreen Bog is a shallow peat cutaway bog.	The site has developed a mosaic of pioneer cutaway habitats with some bare peat mosaics. Planning Permissions was granted in 2016 for Cloncreen Windfarm. Construction has started (summer 2020) on 22 turbines (Approx. 75 MW) at various locations around the site in association with linking road infrastructure, a sub-station and power-lines. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2018	Finalised 2022 Rehab commenced 2022
Clonsast	1,534	Cutover Bog Clonsast Bog was first developed for industrial peat production in the 1950's and was used for sod peat. Peat production ceased in 1980's. The majority of the bog was never converted to milled peat production and some relatively deep peat remains. Clonsast Bog is considered a deep peat cutover bog.	Clonsast has now established a mosaic of mature cutaway habitats. BnM formerly operated a farm at Clonsast. Farmland was developed on rehabilitated cutaway bog. The farm venture ceased in the 1980's and the farmland was sold. A significant portion of the site has been leased to Coillte and planted with conifer	1980's	Draft 2017

Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			forestry in the 1980s. Some of the original research on establishing forestry on cutaway was established at Clonsast (Trench 14). BnM carried out a re-wetting trial in 2018. This site is largely stabilised. There is a rail transport link through the site.		
Clonsast Bulge	379	Cutover Bog Clonsast Bulge was first developed by BnM in the 1950's.	The majority of Clonsast Bulge used for peat extraction has been developed by Coillte for conifer forestry in the 1980's. Part of the site is undeveloped (Clonavoe Bog remnant). This site is largely stabilised.	1960's	Draft 2017
Clonsast North	191	Cutaway Bog Clonsast North was first developed by BnM in the 1930's. The remaining peat deposits at Clonsast North are generally shallow and so the bog is considered a shallow peat cutaway bog.	The cutaway is naturally colonising with a mosaic of Birch woodland and wetland. The site was partially re-wetted in 2018. There is a rail transport link through the site.	2000's	Draft 2017
Daingean Derries	277	Cutover Bog Daingean Derries was first developed in the late 1980's. Deep peat reserves remain. Daingean Derries is considered a deep peat cutover bog.	Daingean Derries Bog formerly supplied both horticultural peat and fuel peat. The majority of former production area is bare peat. Some bog restoration on part of the site completed in 2017-2018. There is a rail transport link through the site.	2020	To be finalised 2023
Daingean Rathdrum	367	Cutover Bog Daingean Rathdrum was first developed in the late 1980's. Deep peat reserves remain. Daingean Rathdrum is considered a deep peat cutover bog.	Daingean Rathdrum Bog formerly supplied both horticultural peat and fuel peat. The majority of former production area is bare peat. There is a rail transport link through the site. A small area of development bog (32 ha) has been restored.	2020	To be finalised 2023
Daingean Townparks	90	This bog was never drained or developed but there is a transport link along the margin of the site	Daingean Bog NHA (intact raised bog) There is a rail transport link through the site. No rehabilitation required.	N/A	N/A
Daingean Raillink	5	N/A	N/A	N/A	N/A
Derrycricket	190	Derrycricket was originally developed for peat production in the 1950's-1960's. Peat production at Derrycricket ceased in the 1980's.	Coilte developed approximately 80% of the former production area for conifer forestry in the 1980's. This site is largely stabilised. Transport link.	N/A	N/A
Derrylea	665	Cutover Bog Derrylea bog was first developed for commercial peat production in the 1940's. However, peat production at Derrylea	Some rehabilitation has been completed around the margins of the bog. There is a rail transport link through the site.	2020	Draft 2017

Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		predates BnM and is believed to have commenced in the 19th century. Despite a long history of production, deep peat reserves on much of the site with some shallow pockets of peat on the western half of the former production area. Derrylea Bog is considered a deep peat cutover bog.			
Derryounce	389	Cutover Bog Derryounce Bog was first developed prior to 1975. Derryounce is considered a deep peat cutover bog. Peat production at Derrycricket ceased in the 1980's.	Coilte have developed 80% of the former production area as conifer forestry. Rehabilitation was carried out to create a lake and wetland habitats in the 1990s. Derryounce Lake Amenity area is leased to Portarlington Community Development Association. This site is now largely stabilised. There is a rail transport link through the site.	1980's	Draft 2017
Esker	567	Cutover Bog Esker Bog was first developed in 1975. Peat production at Esker ceased in the 2020. There is deep peat remaining on the western side of the former production area but the eastern area is considered cutaway. Esker Bog is a deep peat cutover bog.	The majority of the site is bare peat. The eastern portion is establishing cutaway habitats. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2020	Finalised 2021 Rehab Completed 2022
Garryhinch	814	Cutover Bog Garryhinch Bog was first developed in 1950's. Peat production ceased at Garryhinch in 2020. There is some deep peat remaining on much of the former production area. Garryhinch Bog is considered a deep peat cutover bog.	The majority of the site is re-vegetated with a range of wetland and woodland habitats. Extensive sod peat production (private and licenced by BnM) has occurred across the site in the past few years and these areas are bare peat.	2020	Draft 2017
Garrymore	307	Cutover Bog Garrymore Bog was first developed in the 1980's. Peat production at Garrymore ceased in the 2020. There is deep peat remaining. Garrymore Bog is considered a deep peat cutover bog.	Garrymore Bog formerly supplied horticultural peat. Part of the site is used for sod turf. The former production area is bare peat.	2020	Draft 2017
Mount Lucas	1225	Cutover Bog Peat Production at Mount Lucas commenced in the mid-1970's and ceased in 2020. Most of Mount Lucas is cutaway with shallow residual peat depths. The north-west corner of the former production area retains some pockets of deep peat. Mount Lucas is considered a shallow peat cutover bog.	Peat production ceased across a significant part of the site before 2005 with ongoing peat extraction in the western side up to 2020. The cutaway area has developed a mosaic of cutaway habitats with Birch woodland dominant. The recently ceased production area is bare peat. Mountlucas windfarm is now operational (since 2014).	2020	Finalised 2021 Rehab Completed 2022

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Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Some rehabilitation was carried out in association with windfarm construction, specifically the creation of small wetland features. A public amenity walking route was developed on the existing windfarm. This was opened in 2015. BnM have developed an aquaculture project in partnership with Bord Iascaigh Mhara and have developed herb production trials on site. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.		
Total	9687				

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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:	**Daingean Rathdrum**	**Area (ha):**	381ha
Works Name:	Derrygreenagh	**County:**	Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	16/02/2012, 30/5/2015, 2016

Habitats present (in order of dominance)

The most common habitats present on production bog and cutaway at this site include:

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix I).
- Pioneer poor fen communities dominated by Soft Rush and Bog Cotton (pJeff, pEang (in eastern section)
- Pioneer dry heath communities (dHeath)
- Emerging Birch scrub (eBir)
- Silt Ponds (Silt) with associated habitats such as scrub, Bracken, rank grassland (GS2), dry calcareous grassland (gCal) and typical pioneer communities of disturbed areas (disTuss).

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

- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix I.)
- Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins)
- Raised bog (PB1) (several fragments)
- Cutover bog (PB4) (several small fragments)
- Wet grassland (GS4) along the edges of the site.
- Oak Ash Hazel woodland (WN2) at the north of the site.
- Grand Canal (FW3), flows close to the southern boundary of the site.

Description of site

Daingean Rathdrum is situated 3.5km west of Daingean in Co Offaly. The Grand Canal flows along the southern boundary of the site, while a minor public road passes along the northern boundary of the site. Daingean Rathdrum has a large peat resource remaining with a large area of the site containing red peat or horticultural peat. The majority of the site is in full peat production and is classed as bare peat.

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The southern section of the site is connected to Daingean Townparks to the south by a railway line. The railway line crosses the Grand Canal via a stone railway bridge that was constructed in 2000. The southern section of the site contains a mix of remnant raised bog, old cutover bog and bare peat. A large area of the site that has been used for milled peat in the past has now re-vegetated with Heather. This area is currently undergoing bog restoration. The large section of remnant raised bog located in the south eastern corner of the site is actively used for domestic sod peat production and new drains have been installed within the past year. Large areas of cutover bog exist along the eastern boundary of the site and these areas are used as spread ground for the production of domestic sod peat.

The south western corner of the site is owned by another peat harvesting company. This company harvests peat using vacuum machines (see pictures).

A large proportion (32ha) of the site has been harvested for milled peat in the past, however this area has now re-vegetated with Heather since it has not been harvested in recent years. Heather dominates this section along with some patches of Bog Cotton and bare peat. No *Sphagnum* was found in this area.

A works area is located along the northern boundary of the site. This area was clearly visible at the time of the ecological survey due to the presence of a large mound of gravel. To the west of the works an area of wet grassland occurs and a silt pond is located within it. Immediately to the north of the works area, a section of Oak Ash Hazel woodland occurs. This woodland contained Ash, Hazel, Birch, Holly and Beech. The under storey was comprised up of Ivy, Bramble and tree saplings. This woodland is marked on the six inch map as Killwood although it has been reduced in size since then.

Various different habitats including remnant sections of raised bog (PB1), Birch woodland (WN7) and wet grassland (GS4) are located along the margins of the site; however the majority of Daingean Rathdrum is in active peat production and has been mapped as bare peat.

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

The Grand Canal (Site Code: 002104) is located close to the southern boundary of the site.

Adjacent habitats and land-use

Adjacent habitats include wet grassland (GS4), Birch woodland (WN7), Grand Canal (FW3), raised bog (PB1), cutover bog (PB4) and scrub (WS1). A public walkway is located within an area of Birch woodland that borders the north western corner of the site.

Watercourses (major water features on/off site)

- This site is located at the point where the Shannon, Boyne and Barrow catchments meet.
- The Grand Canal is located 500m from the south of the site.
- A tributary of the Silver River flows along the northern boundary of the site.

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Peat type and sub-soils

The majority of peat at this site was "red peat" or *Sphagnum* peat. The site is underlain with gravel and shell marl at different locations.

Fauna biodiversity

Birds

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

- Flock of 20 Fieldfare.
- >20 snipe along sections of remnant raised bog on the site.
- Other bird species included Wood Pigeon, Meadow Pipit, Blackbird, Song Thrush, Blue Tit, Long-tailed Tit and Raven.

Mammals

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

- Badger
- Fox
- Otter

Other species

Frog

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:	**Daingean Derries**	**Area (ha):**	313ha
Works Name:	Derrygreenagh	**County:**	Offaly/Westmeath
Recorder(s):	MMC & DF	**Survey Date(s):**	17/02/2012
Habitats present (in order of dominance)			

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The most common habitats present on the cutaway at this site include:

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix I).
- Mosaics of pioneer dry grassland dominated by Purple Moorgrass (gMol), Gorse scrub (eGor) and Birch scrub (eBir, oBir)
- Pioneer dry grassland with Cocksfoot and Sweet Vernal Grass (gDa-An) (travel paths)
- Pioneer dry calcareous grassland (gCal)
- Access routes (rail lines and tracks including gravel embankments and associated habitats such as dry grassland communities (GS2) and scrub)
- Silt-pond areas (Silt) with silt ponds and associated spoil heaps and access tracks

The most common habitats found around the margins and in other parts of the site include:

- Raised bog remnants (PB1) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix I.)
- Cutover bog (PB4)
- Scrub (WS1) – Gorse and Birch scrub
- Birch woodland (WN7)
- Wet grassland (GS4) and improved grassland (GA1)
- Artificial pond (FL8)

Description of site

Daingean Derries Bog is located along the northern margin of Co. Offaly with Co. Westmeath, 8 km north-west of Daingean Town. A railway from the site links Daingean-Derries with the adjacent Daingean-Rathdrum bog and onto the Derrygreenagh bog complex. The landscape around the bog is largely agricultural and the bog is located close to Lacken Hill, which over-looks the site. Much of the surrounding land is improved grassland. There is some low-lying land towards the south-eastern side where conifer plantation has been developed.

Daingean Derries Bog is a relatively new production bog and therefore still has relatively deep peat. It was initially developed in the 1980's-1990's. There is therefore very little development of pioneer cutaway habitats within the BnM-owned section, and this area is predominately bare peat. A new railway link and access road has been developed along the northern boundary adjacent to Lacken Hill and this links to Rathdrum through some conifer plantation. The railway cuts through gravel sub-soil and this is exposed along part of the margin. Some of this ground is developed pioneer dry calcareous grassland with Wild Carrot, Knapweed and Glaucous Sedge present.

The 'lac' or subsoil is exposed around parts of the southern margin along the head-land. Some of this ground is developing pioneer dry grassland dominated by Cocksfoot (gDa-An). There is a small area of high bog located along the southern margin that is being used for private sod peat production. The high bog shows frequent indicators of degradation, although it still retains its typical high bog flora with Heather, Bog Cottons, Bog Asphodel and Deergrass. The eastern margin has a band of remnant marginal bog habitat. This is a mosaic of old high bog dominated by Heather and or being invaded by Birch/Gorse. Much of this zone has already

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developed scrub (WS1) and Birch woodland (WN7). A local gun club has developed a small artificial pond for ducks within the cutover bog. However, it is relatively new and there is no development of marginal wetland vegetation yet. The northern margin is also a mosaic of old cutover bog that is developing scrub and Birch woodland. There is also some active cutover and sod-peat production where there is a small portion of remnant high bog.

The north-east part of the site (owned by BnM) contains some typical cutover bog vegetation dominated by Soft Rush. This area was probably never milled by BnM and was used for sod-peat production or for private milled peat production. There are pockets of pioneer dry calcareous grassland where gravel is exposed. Sod-peat cutting is continuing along some remnant high bog in this area, east of the old access route.

The topography of the main production bog is variable and there are several glacial mounds present under the peat. These are likely to be exposed sooner than the surrounding bog, as there is a thinner layer of peat overlaying them. The bog originally contained a small lake surrounded by a flush in the north-east part of the site. This has now been drained.

A large part of southeast section is privately owned. Milled peat is produced in this area and in an adjacent BnM-owned area under private management. This area is accessed via the southern access road. Peat production has been much more intensive in this part of the bog and consequently, the bog surface is at a much lower area. There were indications that some of this ground is inundated with water occasionally, , as there was a flood-line created by debris (and shell marl).

The eastern margin of the privately-owned area is developing typical pioneer cutaway habitats. These are largely dominated by Purple Moorgrass-dominated grassland. There is also some scrub development dominated by Gorse and pockets of young Birch. Gravel has been dug out of drains and placed on spoil heaps. Some of the more-recently disturbed sections are typical of re-colonising bare ground (ED3).

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

None

Adjacent habitats and land-use

Adjacent habitats include conifer plantation (WD4), improved grassland (GA1), scrub/Birch woodland (WS1/WN7), remnant high bog (PB1) and some wet grassland (GS4).

Watercourses (major water features on/off site)

- Daingean Derries is located within the Shannon river catchment
- The northern side of the site is drained by the Silver River, flowing west. This subsequently links to the Clodiagh River and on to the River Brosna. This stream has been channelized.
- The south side is also drained by a channelized stream/drain, which links to the Silver River.
- The southern stream/drain loops around and also drains the north-east corner of the site.

Peat type and sub-soils

Red *Sphagnum* peat is still exposed at this site as it is a relatively young production bog.

Shell marl was exposed in places at the southern end of the site, near the silt ponds. A mixture of gravel and blue-silty clay was exposed in some of the drains towards the western boundary. Glacial gravel was being exposed from drains along the eastern side of the site, towards Lacken Hill.

Fauna biodiversity

Birds

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

- Teal (6) (in a silt pond along the northern side)
- Kestrel (1) (hunting over cutover bog – north-east section)
- Other more common birds noted around the site included Woodpigeon, Snipe, Blackbird & Wren (SW corner).

Mammals

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

- Badger, Fox and Hare prints and spoor were noted around all of the margins.

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

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.

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APPENDIX V. BIOSECURITY

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

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

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

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

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

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

APPENDIX VI. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security. In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, Bord na Móna is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire Bord na Móna business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

Bord na Móna 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 Clonsast bog group (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 bog is part of the Allen Clonsast group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

Bord na Móna (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on Bord na Móna to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 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 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 and EU Climate and Biodiversity 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.

Peatlands rehabilitation and restoration is referenced in Section 17.3.3 of the Land Use, Land Use Change, Forestry and Marine Chapter of the National Climate Action Plan 2021 as follows:

"The rehabilitation of degraded peatlands to a condition in which they regain their ability to deliver specific ecosystem services has considerable potential for initial mitigation gains, and future carbon sequestration. Additional benefits of peatland restoration include positive socio-economic outcomes for the Midlands, increased natural capital, enriched biodiversity, improved water quality, and flood attenuation."

The scheme is included as Action 33 in the Climate Action Plan 2021 Annex of Actions - Deliver the Enhanced Decommissioning, Rehabilitation and Restoration (EDRR) Scheme for Bord na Mona Peatlands.

EDRRS is also referenced in the Climate Action Plan 2021 as a measure to deliver a Just Transition in the Midlands.

International research and scientific understanding of peatlands is now reflected in key Irish national policy and strategy documents such as the National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017 - 2022 (Department of Arts, Heritage and the Gaeltacht 2017), The National Peatland Strategy (Department of Arts, Heritage and the Gaeltacht 2015), The National Biodiversity Action Plan (National Parks and Wildlife Service 2017), The River Basin Management Plan for Ireland 2018-2021 (Department of Housing, Planning and Local Government 2018), and the Biodiversity – Climate Change Sectoral Action Plan (Department of Arts, Heritage and the Gaeltacht 2019). Each of the national plans, which are also complemented with the recently published EU Green Deal communication on Biodiversity Strategy for 2030 (COM 2020) have overlapping objectives and actions that focus on the restoration of peatlands damaged by turf-cutting, drainage and other impacts, as well as the re-wetting of Bord na Móna industrial peat extraction bogs.

While not specifically identified as a restoration implementor, EDRRS objectives are in line with those of the United Nations Decade on Ecosystem Restoration 2021-2030 of Preventing, Halting and Reversing the Degradation of Ecosystems worldwide.

EDRRS is also in line with the EU Commission proposal for a Nature Restoration Law which will apply legally binding targets for nature restoration in different eco-systems to every Member State. The aim is to cover at least 20% of the EU's land and sea areas by 2030 with nature restoration measures and eventually extend these to all ecosystems in need of restoration by 2050.

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.

A new National Biodiversity Action Plan is currently being developed.

7 National conservation designations

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

8 National Raised Bog Special Area of Conservation Management Plan 2017-2022.

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the

important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

Bord na Móna has played a key role in the development of the National Raised Bog Special Area of Conservation Management Plan 2017-2022 and the Review of the Raised Bog Natural Heritage Area Network. Several Bord na Móna sites were assessed by the National Parks and Wildlife Service as part of the above Plan and Review and there is an expectation that several Bord na Móna sites will be designated as SACs and NHAs in the future. This will reinforce the network of protected raised bog sites and replace in part sites that will be de-designated as they have been deemed to be significantly damaged and are deemed to have no raised bog restoration prospects. PCAS is expected to restore several sites that will contribute to The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 targets in relation to the restoration of raised bog habitat.

Bord na Móna has also responded to the needs of the NRBMP and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. Bord na Móna and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

9 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A Bord na Móna specific action in this plan includes the adoption of pollinator-friendly management within the Bord na Móna network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

10 Land-use planning policies

As Bord na Móna operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. Bord na Móna seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to Bord na Móna: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

11 National Archaeology Code of Practice

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

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

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BNM must ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- Bord na Móna will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

The EUs headline target for progress by 2020 is to:

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

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

13 Bord na Móna commitments

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

The company announced that industrial peat production would be cut by over 50 percent in 2019 and would entirely cease over most of its lands by the mid-2020s. Rehabilitation measures would continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, the Climate Action Plan 2019, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. To date, 15,000 hectares of cutaway and cutover bog have been rehabilitated using this approach with 5,000 hectares in active rehabilitation.

In line with Bord na Móna's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025.

The above commitments have now been followed by the decision by the company to cease industrial peat extraction and rehabilitate a target of 33,000 ha between 2021-2025.

These commitments outline the importance of peatland rehabilitation to Bord na Móna. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

14 Bord na Móna Strategic Framework for the future use of cutaway peatlands 2020 (Draft)

The general after-use strategy of Bord na Móna is outlined in the Bord na Móna Strategic Framework for Future-Use of Cutaway Bogs 2020 (draft document). This document outlines how Bord na Móna's cutover peatland estate is complex in nature with great variability in terms of peat depths, peat types, drainage, subsoil condition and environmental value. Thus, future options require consideration on a site-specific basis, also bearing in mind the considerable internal variation within bogs. The development of the land-bank will also take account of national needs, while also taking account of the various national legislation, policies and plans related to the management of peatlands. In general, Bord na Móna will seek to balance and optimise commercial, social, and environmental value of these sites, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

Any consideration of other future after-uses for Bord na Móna land such as development or other mixed uses will be conducted following the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this peatland rehabilitation plan.

Draft

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, stockpile covering, pumps, septic tanks and fuel tanks.

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

Item	Description	Daingean Rathdrum and Daingean Derries Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Peat Stockpile Management
4	Decommissioning or Removal of Buildings and Compounds	Decommissioning or Removal of Buildings and Compounds
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where required
7	Decommissioning or Removal of Septic Tanks	Where relevant

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

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

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

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

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

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

waste.

7.3.3 The ultimate destination of the waste.

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

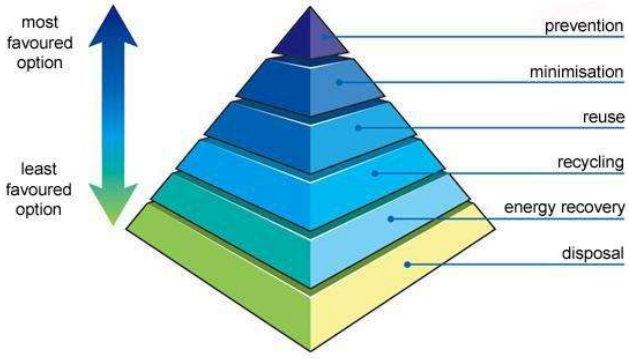
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

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



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

2. Enhanced Decommissioning.

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the licence. The removal of these are deemed as enhanced measures. These may enhance the future after use 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	Daingean Rathdrum and Daingean Derries Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Where Applicable
3	Decommissioning Railway Level Crossing	Where Applicable
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog
5	Removal of High Voltage Power Lines	Where Applicable

Draft

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 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 *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat, but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Enhanced decommissioning: This is defined as decommissioning carried out under the Scheme, which is proposed to be externally funded.

Enhanced rehabilitation: This is defined as rehabilitation carried out under Scheme, which is proposed to be externally funded. It is proposed by Government that Bord na Móna be obligated to carry out enhanced decommissioning, rehabilitation and restoration on peatlands. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and activities supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the costs associated with the additional, enhanced and accelerated measures, i.e., those interventions which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary). The Scheme will consider potential rehabilitation and restoration actions (e.g. drain blocking) within marginal land zones, where appropriate.

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

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

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

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

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

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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 P0503-01, Allen Clonsast Group of Bogs located in County Westmeath, County Offaly and Co. Laois

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

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in the Allen Clonsast 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:
Edenderry Power Station screens the peat from the bogs prior to processing. This screening removes oversized peat, stones and bogs timbers. Schedule 3 (ii) of the IPPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPPC Licence, and as per the attached locations.

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

2.0 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' December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility
(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids
7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.0 Extractive Waste Management Plan

5 (2a)(i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation, and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the IPPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)
The peat bogs do not contain any topsoil, so this is not required.

5 (2a)(v)
Peat mineral resources do not undergo any treatment.

5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.
The peat excavations and cleanings are stored in locations and in a manner that they could not collapse and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

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

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

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPPC Licence requires the following:

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Allen Clonsast IPPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Allen Clonsast IPPC Licence P0503-01.

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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.
- 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.
- No fertiliser will be spread within or in proximity to European Sites. Fertiliser will not be spread within 25m of a hydraulic break (where slope indicates runoff potential); 25m of an area subject to annual winter inundation, 25m of a natural watercourse, or 25m of any drains where conveyance is to be retained through the proposed rehabilitation extent.
- Fertiliser will be applied to headlands and bare fields where the surface slope indicates runoff is directed away from the above areas, and to within 2m of internal drainage channels within the cutover high field areas. These drainage channels will be blocked in advance of fertiliser application, restricting potential run-off to downstream drainage channels

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

APPENDIX XI. CONSULTATION SUMMARIES

Table APX -1 Consultees contacted

Table APX -2 Response summary from Consultees contacted

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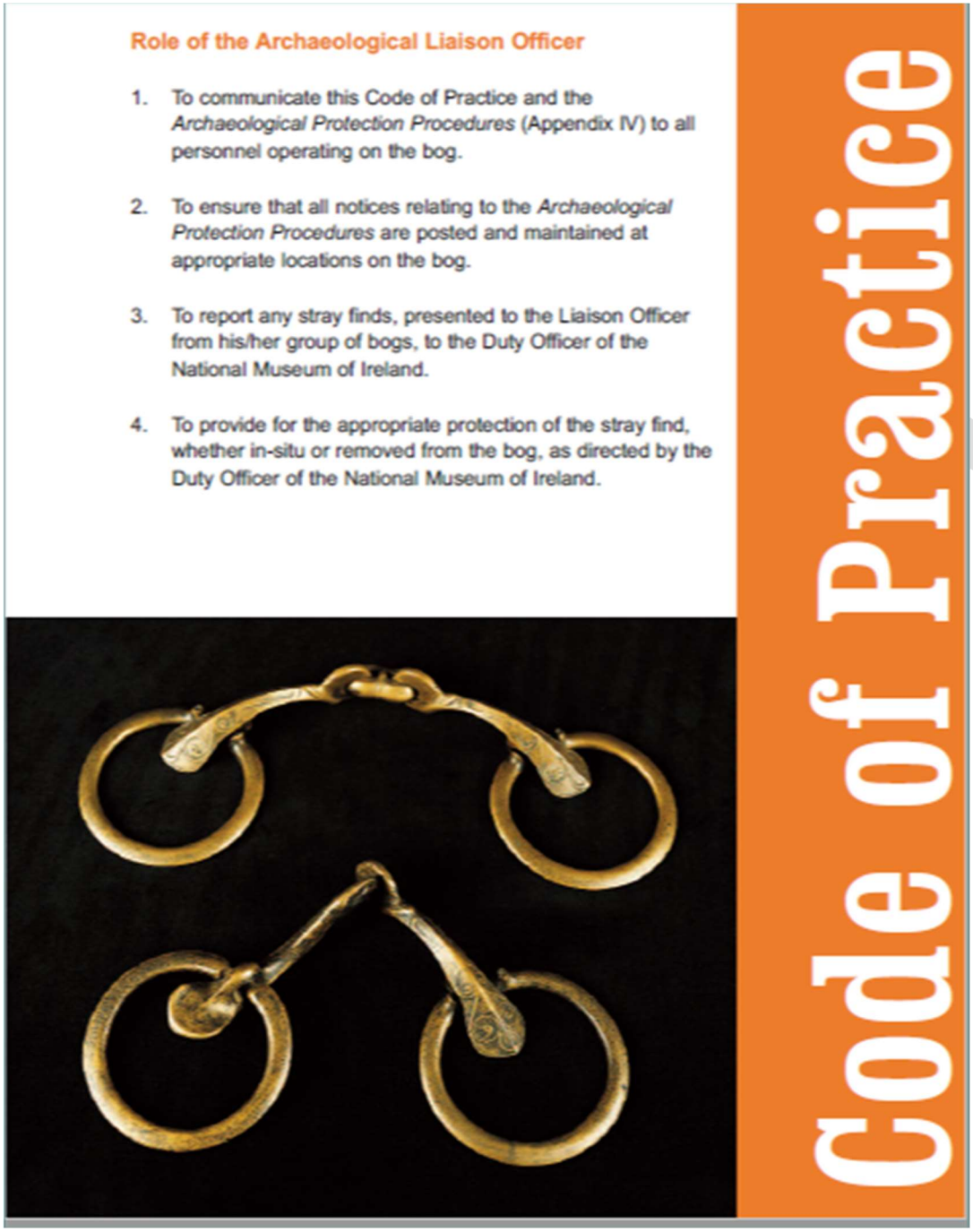
APPENDIX XII. ARCHAEOLOGY



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Code of Practice

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

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

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

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

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

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

Bord na Móna	**Procedure: ENV017**	**Rev: 1**
Title: Archaeological Findings	**Approved: EM**	**Date: 13/10/2020**

1) Purpose

The purpose of this procedure is to describe the arrangements in Bord na Móna for findings of Archaeological material (Stray Finds).

All objects, sites or monuments, no matter how fragmentary, are important elements of our heritage.

2) Procedure

1. Check whether there are any known archaeological monuments in your area.
2. Be vigilant at all times - objects or traces of structures can be found on the field surfaces, in the drain faces, on the bog margins or caught within the mechanics of machinery.
3. If an object is found leave it in place, if it is safe to do so, note its position and immediately contact your Archaeological Liaison Officer who will assess the situation and contact the Duty Officer of the National Museum of Ireland.
4. Resist the temptation to investigate the find spot as this may disturb fragile archaeological deposits.
5. If the object is already dislodged or is in imminent danger, remove it carefully, mark its find spot and report it immediately to your Archaeological Liaison Officer.
6. Objects made of wood, leather or textile, which are removed from peat should be kept in conditions similar to those in which they are found. This can be done by packing them in peat or, if waterlogged, placing them in a clean basin of water and sealing the container. Resist the temptation to clean or remove peat from the object.
7. If timbers or other materials, such as gravel or stones, which could be part of a man-made structure are noted on the bog, mark the location and report it immediately to your Archaeological Liaison Officer. If you suspect the find is of archaeological importance, resist the temptation to expose it any further as this could result in damage to the structure.
8. Report anything that looks unnatural in the bog – your Archaeological Liaison Officer will decide whether it should be referred to the appropriate authorities.

NOTE: Our archaeological heritage is a finite, non-renewable resource. Once a site is destroyed its information is lost forever and we have lost the chance to understand a little more about our past, where we have come from and perhaps the opportunity to learn for the future.

Your Archaeological Liaison Officer is ……

3) Records

Revision Index			
Revision	Date	Description of change	Approved
1	13/09/2020	First release	EMcD
2			

Draft

Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Daingean-Derries Bog, Cos. Offaly and Westmeath

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2002) *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 on c.760 hectares at Daingean Derries Bog, Co. Offaly on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Daingean Derries Bog will include:

- Deep peat measures including Berms and field re-profiling (45x60m cell), modifying outfalls and managing overflows & drainage channels for excess water & Sphagnum inoculation
- Intensive drain blocking and construction of berms in shallow peat areas/modelled depressions on little or no peat to create/promote the spread of wetland habitats.
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls.
- Regular drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes, targeted fertiliser treatment on driers areas of shallow peat.
- More intensive drain blocking (max 7/100 m), field reprofiling, modifying outfalls and managing overflows on areas of deep peat.
- Intensive blocking of drains in targeted marginal (degraded) raised bog remnants around the margins of the site and re-wetting, where possible, using an excavator to install peat blockages.
- Outfall management and/or further drain blocking in one area at least which was formerly subject to rehabilitation, as additional works.
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Seeding of vegetation and inoculation of Sphagnum will be undertaken where required.
- Initial hydrological modelling indicates that a small 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 small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage.

Daingean Derries Bog is located c.3km north-west of Daingean and north of the Kilclonfert road. The bog rehabilitation area occupies the townlands of Bracklin Big and Little, Cruit, Derries, Kilmurry, Lackan and Monasset on OS 6 inch sheets Offaly Nos. 9 and 10, and Westmeath Nos 38, 39 and 40.

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

- The IAWU Peatland Survey
- The 2013 Bord na Móna Re-assessment Survey

- The Record of Monuments and Places
- The Sites and Monuments Record (SMR) that is maintained by the Dept of Housing, Local Government and Heritage
- Previous assessments

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

Desktop assessment

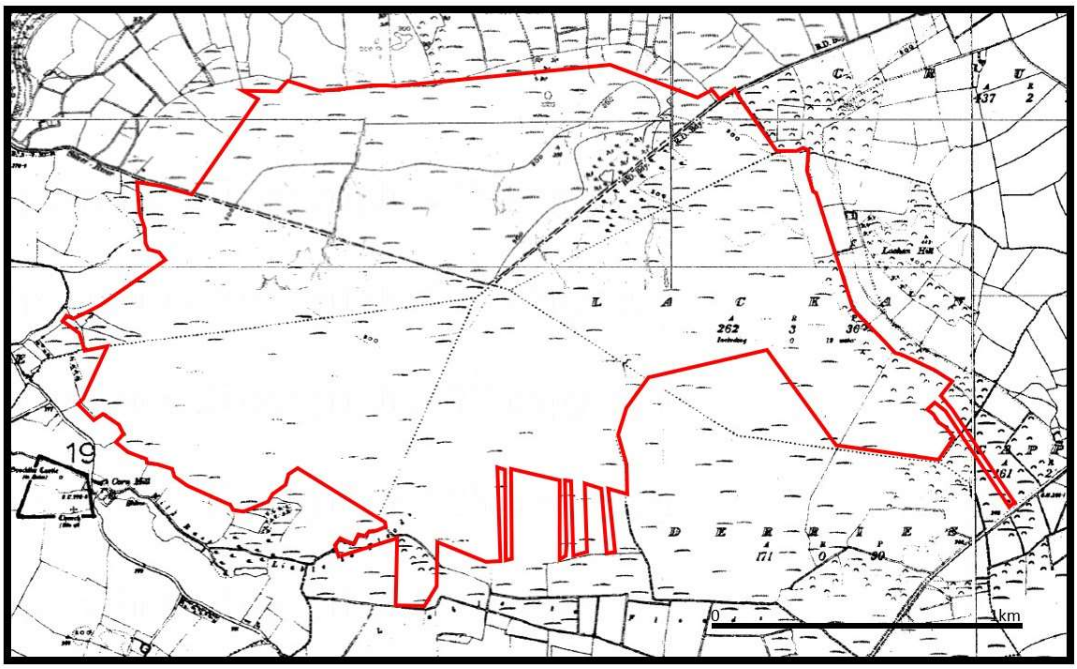

Fig. 1. Daingean Derries Bog, Cos. Offaly and Westmeath, detail of the Record of Monuments and Places map sheets Offaly Nos. 9 and 10, and Westmeath Nos 38, 39 and 40. The proposed rehabilitation area is outlined with the red line.

Peatland survey
Daingean Derries Bog was surveyed by the Irish Archaeological Wetland Unit (IAWU) in 2001 as part of the Archaeological Survey of Ireland Peatland Survey (01E0477). No sightings of archaeological material were made in the bog.

Recorded Monuments
The Record of Monuments and Places (RMP) for Co. Offaly which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1994). This record was published by the Minister in 1994 and includes sites and monuments that were known in Daingean Derries Bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (see Fig. 1).

2013 Bord na Móna Re-assessment Survey
Daingean Derries Bog was surveyed by ADS Ltd in 2013 as part of the Bord na Móna re-assessment survey (Licence No. 13E0230). No sightings of archaeological material were made in the bog.

Archaeological Excavations

A review of the excavations bulletin at excavations.ie indicated that there have been no licenced archaeological excavations carried out in Daingean Derries 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 17th of January 2023. The SMR consists of records of sightings made by the IAWU Survey notified to the Dept and some sighting made by the 2013 Bord na Móna Re-assessment Survey. This review established that there are no sightings entered in the SMR in the proposed rehabilitation area (see Fig . 2).

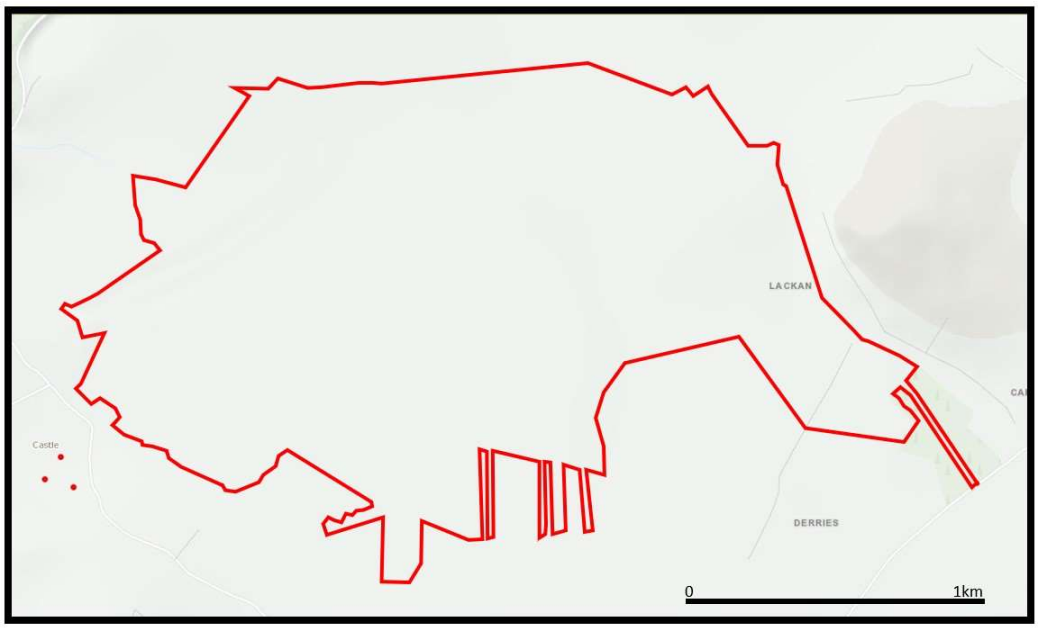

Fig. 2. Daingean Derries Bog, Cos. Offaly and Westmeath, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

Previous assessments

Daingean Derries Bog has been the subject of an Environmental Impact Assessment Report (EIAR) carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-03. This assessment included a review of the topographical files and finds registers of the National Museum of Ireland intended to identify all finds from the bog reported to the Museum by that date. The assessment noted there was a very high potential for archaeological features to be uncovered during the course of any future development works in Daingean Derries Bog.

Reported finds

As noted above the EIAR carried out by Irish Archaeological Consultancy LTD in in relation to IPC Licence P0500-03 noted that no finds from Daingean Derries Bog had been reported to the National Museum of Ireland up to 2018.

Impact assessment

There are no known sightings of archaeological material in the rehabilitation area.

Recommendations

There are no known sightings of archaeological material in the rehabilitation area. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also 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. Between 2001-2013 two field surveys were carried out in the Daingean Derries Bog but no sightings of archaeological material were made and no finds have been reported to the National Museum. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

References

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

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

Mackin *et al.* 2017. Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service.

Dr. Charles Mount
18 January2023

Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Daingean-Rathdrum Bog, Co. Offaly

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2002) *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 on c.646 hectares at Daingean Rathdrum Bog, Co. Offaly on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Daingean Rathdrum Bog will include:

- Deep peat measures including Berms and field re-profiling (45x60m cell), modifying outfalls and managing overflows & drainage channels for excess water & Sphagnum inoculation
- Intensive drain blocking and construction of berms in shallow peat areas/modelled depressions on little or no peat to create/promote the spread of wetland habitats.
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls.
- Regular drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes, targeted fertiliser treatment on driers areas of shallow peat.
- More intensive drain blocking (max 7/100 m), field reprofiling, modifying outfalls and managing overflows on areas of deep peat.
- Intensive blocking of drains in targeted marginal (degraded) raised bog remnants around the margins of the site and re-wetting, where possible, using an excavator to install peat blockages.
- Outfall management and/or further drain blocking in one area at least which was formerly subject to rehabilitation, as additional works.
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Seeding of vegetation and inoculation of Sphagnum will be undertaken where required.
- Initial hydrological modelling indicates that a small 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 small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage.

Daingean Rathdrum Bog is located c.2.3km west of Daingean and south of the Kilclonfert road. The bog rehabilitation area occupies the townlands of Ballycommon, Ballylennon, Barnaboy, Cappagh, Derries, Derrygrogan Little, Kilclonfert, Kilmurry, and Rathdrum, on OS 6 inch sheets Offaly Nos. 9, 10, 17 and 18.

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

- The IAWU Peatland Survey
- The 2013 Bord na Móna Re-assessment Survey
- The Record of Monuments and Places
- The Sites and Monuments Record (SMR) that is maintained by the Dept of Housing, Local Government and Heritage
- Previous assessments

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

Desktop assessment

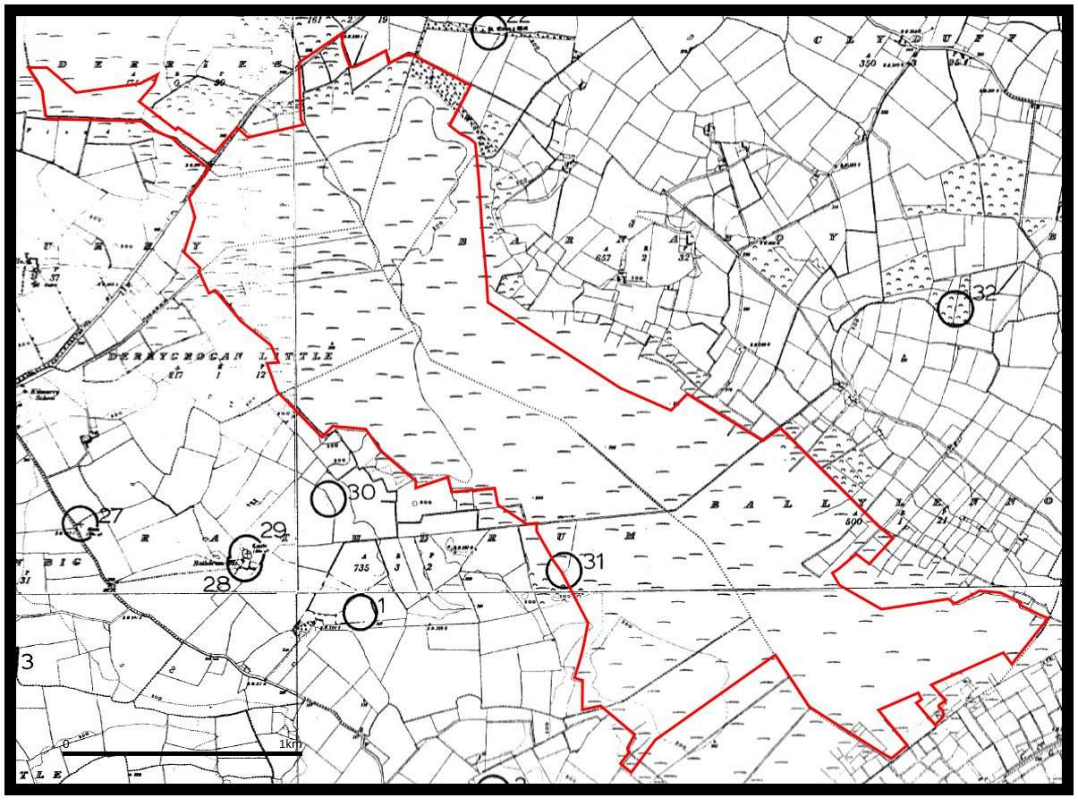

Fig. 1. Daingean Rathdrum Bog, Co. Offaly, detail of the Record of Monuments and Places map sheets Nos. 9, 10, 17 and 18. The proposed rehabilitation area is outlined with the red line.

Peatland survey

Daingean Rathdrum Bog was surveyed by the Irish Archaeological Wetland Unit (IAWU) in 2001 as part of the Archaeological Survey of Ireland Peatland Survey (01E0477). 414 sightings of archaeological material were made, and 4 finds (see Table 1 OF-BLL 0001OF - RDM 0252). These archaeological sightings were notified to the Archaeological Survey of Ireland and included in the SMR.

SMR No	SMR Class	Cat No	IAWU Class	Townland	ITN E	ITN N	Depth BS M
OF018-052---	Structure-peatland	OF-BLL 0001	UWWIS	Ballylennon	643535	728299	0.38
OF018-053, OF010-059---*	Structure-peatland	OF-BLL 0002	UWWIS	Ballylennon	643470	728319	0.54
OF010-060---	Structure-peatland	OF-BLL 0003	UWWIS	Ballylennon	643439	728325	0.20

OF010-061---	Structure-peatland	OF-BLL 0004	UWWIS	Ballylennon	643424	728324	0.13
OF010-062---	Structure-peatland	OF-BLL 0005	UWWIS	Ballylennon	643425	728325	0.33
OF010-063---	Structure-peatland	OF-BLL 0006	WWIS	Ballylennon	643257	728568	0.20
OF010-064---	Structure-peatland	OF-BLL 0007	WWIS	Ballylennon	643276	728609	0.03
OF010-065---	Road-class 3 togher	OF-BLL 0008	TOGHTER	Ballylennon	643243	728574	0.23
OF010-066---	Structure-peatland	OF-BLL 0009	WWIS	Ballylennon	643244	728579	0.50
OF010-067---	Structure-peatland	OF-BLL 0010	WWIS	Ballylennon	643248	728588	0.58
OF010-068---	Structure-peatland	OF-BLL 0011	UWWIS	Ballylennon	643233	728593	0.41
OF010-069---	Road-class 3 togher	OF-BLL 0012	TOGHTER	Ballylennon	643212	728573	0.42
OF010-070---	Road-class 3 togher	OF-BLL 0013	TOGHTER	Ballylennon	643210	728574	0.18
OF010-071---	Structure-peatland	OF-BLL 0014	WWIS	Ballylennon	643208	728575	0.29
OF010-072---	Structure-peatland	OF-BLL 0015	WWIS	Ballylennon	643209	728576	0.57
OF010-073---	Structure-peatland	OF-BLL 0016	UWWIS	Ballylennon	643199	728590	0.31
OF010-074---	Structure-peatland	OF-BLL 0017	UWWIS	Ballylennon	643200	728592	0.06
OF010-075---	Structure-peatland	OF-BLL 0018	UWWIS	Ballylennon	643188	728601	0.18
OF010-076---	Structure-peatland	OF-BBY 0001	WWIS	Barnaboy	643070	729037	0.44
OF010-077---	Structure-peatland	OF-BBY 0002	UWWIS	Barnaboy	642416	729220	0.27
OF010-078---	Structure-peatland	OF-BBY 0003	UWWIS	Barnaboy	642452	729297	0.43
OF010-079---	Structure-peatland	OF-BBY 0004	UWWIS	Barnaboy	642334	729335	0.02
OF010-080---	Structure-peatland	OF-BBY 0005	WWIS	Barnaboy	642379	729428	0.06
OF010-081---	Structure-peatland	OF-BBY 0006	UWWIS	Barnaboy	642382	729439	0.39
OF010-082---	Structure-peatland	OF-BBY 0007	WWIS	Barnaboy	642323	729345	0.17
OF010-083---	Structure-peatland	OF-BBY 0008	UWWIS	Barnaboy	642320	729411	0.62
OF010-084---	Structure-peatland	OF-BBY 0009	WWIS	Barnaboy	642335	729446	0.08
OF010-085---	Structure-peatland	OF-BBY 0010	UWWIS	Barnaboy	642324	729455	0.36
OF010-086---	Structure-peatland	OF-BBY 0011	WWIS	Barnaboy	642325	729458	0.24
OF010-087---	Structure-peatland	OF-BBY 0012	WWIS	Barnaboy	642330	729471	0.27
OF010-088---	Structure-peatland	OF-BBY 0013	WWIS	Barnaboy	642297	729434	0.32
OF010-089---	Structure-peatland	OF-BBY 0014	UWWIS	Barnaboy	642299	729439	0.47
OF010-090---	Structure-peatland	OF-BBY 0015	WWIS	Barnaboy	642312	729468	0.42
OF010-091---	Structure-peatland	OF-BBY 0016	WWIS	Barnaboy	642312	729469	0.18
OF010-092---	Structure-peatland	OF-BBY 0017	WWIS	Barnaboy	642316	729478	0.21
OF010-093---	Structure-peatland	OF-BBY 0018	UWWIS	Barnaboy	642319	729482	0.29
OF010-094---	Structure-peatland	OF-BBY 0019	WWIS	Barnaboy	642322	729488	0.33
OF010-095---	Structure-peatland	OF-BBY 0020	WWIS	Barnaboy	642253	729377	0.46
OF010-096---	Road-class 3 togher	OF-BBY 0021	TOGHTER	Barnaboy	642269	729412	0.00
OF010-097---	Structure-peatland	OF-BBY 0022	UWWIS	Barnaboy	642286	729450	0.18
OF010-098---	Structure-peatland	OF-BBY 0023	UWWIS	Barnaboy	642300	729479	0.26
OF010-099---	Structure-peatland	OF-BBY 0024	WWIS	Barnaboy	642309	729500	0.17
OF010-100---	Structure-peatland	OF-BBY 0025	UWWIS	Barnaboy	642195	729286	0.27
OF010-101---	Structure-peatland	OF-BBY 0026	UWWIS	Barnaboy	642197	729289	0.40
OF010-102---	Structure-peatland	OF-BBY 0027	UWWIS	Barnaboy	642237	729377	0.30
OF010-103---	Structure-peatland	OF-BBY 0028	WWIS	Barnaboy	642246	729399	0.05
OF010-104---	Structure-peatland	OF-BBY 0029	WWIS	Barnaboy	642275	729461	0.36
OF010-105---	Structure-peatland	OF-BBY 0030	UWWIS	Barnaboy	642281	729470	0.00
OF010-106---	Structure-peatland	OF-BBY 0031	UWWIS	Barnaboy	642291	729494	0.12
OF010-107---	Structure-peatland	OF-BBY 0032	WWIS	Barnaboy	642299	729511	0.00
OF010-108---	Structure-peatland	OF-BBY 0033	UWWIS	Barnaboy	642182	729295	0.22
OF010-109---	Structure-peatland	OF-BBY 0034	WWIS	Barnaboy	642187	729304	0.00
OF010-110---	Structure-peatland	OF-BBY 0035	WWIS	Barnaboy	642197	729328	0.00
OF010-111---	Structure-peatland	OF-BBY 0036	UWWIS	Barnaboy	642227	729389	0.22
OF010-112---	Structure-peatland	OF-BBY 0037	UWWIS	Barnaboy	642282	729511	0.32
OF010-113---	Structure-peatland	OF-BBY 0038	WWIS	Barnaboy	642282	729513	0.00
OF010-114---	Structure-peatland	OF-BBY 0039	WWIS	Barnaboy	642287	729524	0.00

OF010-115---	Structure-peatland	OF-BBY 0040	WWIS	Barnaboy	642294	729537	0.24
OF010-116---	Structure-peatland	OF-BBY 0042	UWWIS	Barnaboy	642224	729422	0.24
OF010-117---	Structure-peatland	OF-BBY 0043	WWIS	Barnaboy	642125	729452	0.00
OF010-118---	Structure-peatland	OF-BBY 0044	UWWIS	Barnaboy	642240	729459	0.29
OF010-119---	Structure-peatland	OF-BBY 0045	UWWIS	Barnaboy	642251	729483	0.15
OF010-120---	Structure-peatland	OF-BBY 0046	WWIS	Barnaboy	642254	729489	0.00
OF010-121---	Structure-peatland	OF-BBY 0047	WWIS	Barnaboy	642261	729506	0.00
OF010-122---	Structure-peatland	OF-BBY 0048	UWWIS	Barnaboy	642269	729522	0.00
OF010-123---	Structure-peatland	OF-BBY 0049	UWWIS	Barnaboy	642155	729309	0.14
OF010-124---	Structure-peatland	OF-BBY 0050	WWIS	Barnaboy	642168	729336	0.00
OF010-125---	Structure-peatland	OF-BBY 0051	WWIS	Barnaboy	642185	729374	0.13
OF010-126---	Structure-peatland	OF-BBY 0052	WWIS	Barnaboy	642197	729395	0.00
OF010-127---	Structure-peatland	OF-BBY 0053	UWWIS	Barnaboy	642216	729438	0.10
OF010-128---	Structure-peatland	OF-BBY 0054	UWWIS	Barnaboy	642230	729471	0.14
OF010-129---	Structure-peatland	OF-BBY 0055	WWIS	Barnaboy	642234	729480	0.00
OF010-130---	Structure-peatland	OF-BBY 0056	WWIS	Barnaboy	642240	729492	0.32
OF010-131---	Structure-peatland	OF-BBY 0057	UWWIS	Barnaboy	642258	729534	0.19
OF010-132---	Structure-peatland	OF-BBY 0058	WWIS	Barnaboy	642178	729384	0.11
OF010-133---	Structure-peatland	OF-BBY 0059	WWIS	Barnaboy	642183	729406	0.00
OF010-134---	Structure-peatland	OF-BBY 0060	WWIS	Barnaboy	642199	729437	0.00
OF010-135---	Structure-peatland	OF-BBY 0061	WWIS	Barnaboy	642210	729462	0.00
OF010-136---	Structure-peatland	OF-BBY 0062	UWWIS	Barnaboy	642240	729528	0.46
OF010-137---	Structure-peatland	OF-BBY 0063	WWIS	Barnaboy	642242	729534	0.00
OF010-138---	Structure-peatland	OF-BBY 0064	WWIS	Barnaboy	642248	729548	0.27
OF010-139---	Structure-peatland	OF-BBY 0065	WWIS	Barnaboy	642177	729432	0.00
OF010-140---	Structure-peatland	OF-BBY 0066	WWIS	Barnaboy	642188	729453	0.22
OF010-141---	Structure-peatland	OF-BBY 0067	WWIS	Barnaboy	642208	729495	0.00
OF010-142---	Structure-peatland	OF-BBY 0068	WWIS	Barnaboy	642221	729522	0.00
OF010-143---	Structure-peatland	OF-BBY 0069	WWIS	Barnaboy	642238	729561	0.30
OF010-144---	Structure-peatland	OF-BBY 0070	WWIS	Barnaboy	642102	729302	0.28
OF010-145---	Structure-peatland	OF-BBY 0071	UWWIS	Barnaboy	642135	729371	0.00
OF010-146---	Structure-peatland	OF-BBY 0072	UWWIS	Barnaboy	642151	729408	0.68
OF010-147---	Structure-peatland	OF-BBY 0073	UWWIS	Barnaboy	642154	729414	0.00
OF010-148---	Structure-peatland	OF-BBY 0074	WWIS	Barnaboy	642160	729426	0.00
OF010-149---	Structure-peatland	OF-BBY 0075	UWWIS	Barnaboy	642166	729440	0.17
OF010-150---	Structure-peatland	OF-BBY 0076	WWIS	Barnaboy	642168	729446	0.00
OF010-151---	Structure-peatland	OF-BBY 0077	UWWIS	Barnaboy	642208	729533	0.06
OF010-152---	Structure-peatland	OF-BBY 0078	WWIS	Barnaboy	642147	729434	0.00
OF010-153---	Structure-peatland	OF-BBY 0079	WWIS	Barnaboy	642153	729448	0.06
OF010-154---	Structure-peatland	OF-BBY 0080	UWWIS	Barnaboy	642141	729428	0.00
OF010-155---	Structure-peatland	OF-BBY 0081	WWIS	Barnaboy	642130	729433	0.00
OF010-156---	Structure-peatland	OF-BBY 0082	WWIS	Barnaboy	642138	729452	0.00
OF010-157---	Structure-peatland	OF-BBY 0083	UWWIS	Barnaboy	642191	729572	0.00
OF010-158---	Structure-peatland	OF-BBY 0084	WWIS	Barnaboy	642128	729469	0.26
OF010-159---	Road-class 1 togher	OF-RDM 0001a	TOGHPRI	Rathdrum	643240	728323	0.05
		OF-RDM 0001e	TOGHPRI	Rathdrum			0.30
		OF-RDM 0001f	TOGHPRI	Rathdrum			0.52
		OF-RDM 0001g	TOGHPRI	Rathdrum			0.48
		OF-RDM 0001h	TOGHPRI	Rathdrum			0.37
		OF-RDM 0001i	TOGHPRI	Rathdrum			0.26
		OF-RDM 0001j	TOGHPRI	Rathdrum			0.34
		OF-RDM 0001k	TOGHPRI	Rathdrum			0.37
		OF-RDM 0001l	TOGHPRI	Rathdrum			0.22
		OF-RDM 0001m	TOGHPRI	Rathdrum			0.15

		OF-RDM 0001n	TOGHPRI	Rathdrum			0.30
		OF-RDM 0001o	TOGHPRI	Rathdrum			0.37
		OF-RDM 0001p	TOGHPRI	Rathdrum			0.20
		OF-RDM 0001q	TOGHPRI	Rathdrum			0.32
		OF-RDM 0001r	TOGHPRI	Rathdrum			0.24
		OF-RDM 0001s	TOGHPRI	Rathdrum			0.38
		OF-RDM 0001t	TOGHPRI	Rathdrum			0.16
		OF-RDM 0001u	TOGHPRI	Rathdrum			0.28
		OF-RDM 0001v	TOGHPRI	Rathdrum			0.22
		OF-RDM 0001w	TOGHPRI	Rathdrum			0.05
		OF-RDM 0001x	TOGHPRI	Rathdrum			0.17
		OF-RDM 0001y	TOGHPRI	Rathdrum			0.38
		OF-RDM 0001z	TOGHPRI	Rathdrum			0.20
OF010-160---	Road-class 2 togher	OF-RDM 0002a	TOGHSEC	Rathdrum	643234	728466	0.71
		OF-RDM 0002b	TOGHSEC	Rathdrum			0.81
		OF-RDM 0002c	TOGHSEC	Rathdrum			0.96
		OF-RDM 0002d	TOGHSEC	Rathdrum			0.80
OF018-054---	Structure-peatland	OF-RDM 0003	WWIS	Rathdrum	643117	728192	0.19
OF010-161---	Road-class 1 togher	OF-RDM 0004a	TOGHPRI	Rathdrum	643029	728487	0.00
		OF-RDM 0004b	TOGHPRI	Rathdrum			0.01
		OF-RDM 0004c	TOGHPRI	Rathdrum			0.06
		OF-RDM 0004d	TOGHPRI	Rathdrum			0.00
		OF-RDM 0004e	TOGHPRI	Rathdrum			0.33
		OF-RDM 0004f	TOGHPRI	Rathdrum			0.08
		OF-RDM 0004g	TOGHPRI	Rathdrum			0.06
		OF-RDM 0004h	TOGHPRI	Rathdrum			0.00
		OF-RDM 0004i	TOGHPRI	Rathdrum			0.05
		OF-RDM 0004j	TOGHPRI	Rathdrum			0.23
		OF-RDM 0004k	TOGHPRI	Rathdrum			0.17
		OF-RDM 0004l	TOGHPRI	Rathdrum			0.18
		OF-RDM 0004m	TOGHPRI	Rathdrum			0.00
		OF-RDM 0004n	TOGHPRI	Rathdrum			0.00
		OF-RDM 0004o	TOGHPRI	Rathdrum			0.00
		OF-RDM 0004p	TOGHPRI	Rathdrum			0.18
		OF-RDM 0004q	TOGHPRI	Rathdrum			0.12
		OF-RDM 0004r	TOGHPRI	Rathdrum			0.00
		OF-RDM 0004s	TOGHPRI	Rathdrum			0.17
		OF-RDM 0004t	TOGHPRI	Rathdrum			0.18
		OF-RDM 0004u	TOGHPRI	Rathdrum			0.22
		OF-RDM 0004v	TOGHPRI	Rathdrum			0.00
		OF-RDM 0004w	TOGHPRI	Rathdrum			0.18
		OF-RDM 0004x	TOGHPRI	Rathdrum			0.00
		OF-RDM 0004y	TOGHPRI	Rathdrum			0.00
		OF-RDM 0004z	TOGHPRI	Rathdrum			0.00
OF010-162---	Structure-peatland	OF-RDM 0005	WWIS	Rathdrum	643162	728361	0.35
OF010-163---	Structure-peatland	OF-RDM 0006	WWIS	Rathdrum	643186	728417	0.52
OF010-164---	Structure-peatland	OF-RDM 0007	UWWIS	Rathdrum	643205	728455	0.86
OF010-165---	Structure-peatland	OF-RDM 0008	WWIS	Rathdrum	643226	728500	0.29
OF010-166---	Road-class 1 togher	OF-RDM 0009a	TOGHPRI	Rathdrum	643090	728462	0.00
		OF-RDM 0009b	TOGHPRI	Rathdrum			0.26
		OF-RDM 0009c	TOGHPRI	Rathdrum			0.00
		OF-RDM 0009d	TOGHPRI	Rathdrum			0.10
		OF-RDM 0009e	TOGHPRI	Rathdrum			0.27
		OF-RDM 0009f	TOGHPRI	Rathdrum			0.48

		OF-RDM 0009g	TOGHPRI	Rathdrum			0.56
		OF-RDM 0009h	TOGHPRI	Rathdrum			0.68
		OF-RDM 0009i	TOGHPRI	Rathdrum			0.30
		OF-RDM 0009j	TOGHPRI	Rathdrum			0.00
		OF-RDM 0009k	TOGHPRI	Rathdrum			0.40
		OF-RDM 0009l	TOGHPRI	Rathdrum			0.65
		OF-RDM 0009m	TOGHPRI	Rathdrum			0.33
		OF-RDM 0009n	TOGHPRI	Rathdrum			0.00
OF010-167---	Structure-peatland	OF-RDM 0010	WWIS	Rathdrum	643208	728498	0.18
OF010-168---	Structure-peatland	OF-RDM 0011	WWIS	Rathdrum	643212	728507	0.26
OF010-169---	Structure-peatland	OF-RDM 0012	WWIS	Rathdrum	643212	728507	0.45
OF010-170---	Structure-peatland	OF-RDM 0013	UWWIS	Rathdrum	643212	728508	0.77
OF010-171---	Structure-peatland	OF-RDM 0014	WWIS	Rathdrum	643208	728536	0.37
OF018-055---	Structure-peatland	OF-RDM 0015	WWIS	Rathdrum	643047	728224	0.14
OF018-056---	Structure-peatland	OF-RDM 0016	WWIS	Rathdrum	643053	728237	0.12
OF010-172---	Structure-peatland	OF-RDM 0017	UWWIS	Rathdrum	643180	728513	0.19
OF010-173---	Structure-peatland	OF-RDM 0018	WWIS	Rathdrum	643186	728528	0.52
OF018-057---	Structure-peatland	OF-RDM 0019	WWIS	Rathdrum	643035	728232	0.68
OF018-058---	Structure-peatland	OF-RDM 0020	WWIS	Rathdrum	643036	728234	0.24
OF018-059---	Structure-peatland	OF-RDM 0021	WWIS	Rathdrum	643045	728253	0.48
OF018-060---	Structure-peatland	OF-RDM 0022	WWIS	Rathdrum	643066	728299	0.29
OF010-174---	Structure-peatland	OF-RDM 0023	WWIS	Rathdrum	643105	728386	0.48
OF010-175---	Structure-peatland	OF-RDM 0024	WWIS	Rathdrum	643162	728507	0.70
OF010-176---	Structure-peatland	OF-RDM 0025	UWWIS	Rathdrum	643169	728523	0.17
OF010-177---	Structure-peatland	OF-RDM 0026	WWIS	Rathdrum	643176	728538	0.06
OF018-061---	Structure-peatland	OF-RDM 0027	UWWIS	Rathdrum	643023	728245	0.36
OF018-062---	Structure-peatland	OF-RDM 0028	WWIS	Rathdrum	643035	728270	0.08
OF018-063---	Structure-peatland	OF-RDM 0029	WWIS	Rathdrum	643036	728273	0.32
OF018-064---	Structure-peatland	OF-RDM 0030	TOGHTER	Rathdrum	643037	728273	0.43
OF018-065---	Structure-peatland	OF-RDM 0031	WWIS	Rathdrum	643042	728287	0.39
OF010-178---	Road-class 3 togher	OF-RDM 0032	WWIS	Rathdrum	643036	728309	0.42
OF010-179---	Structure-peatland	OF-RDM 0033	WWIS	Rathdrum	643056	728315	0.46
OF010-180---	Structure-peatland	OF-RDM 0034	UWWIS	Rathdrum	643057	728315	0.69
OF010-181---	Structure-peatland	OF-RDM 0035	WWIS	Rathdrum	643095	728400	0.57
OF010-182---	Structure-peatland	OF-RDM 0036	WWIS	Rathdrum	643162	728546	0.30
OF010-183---	Structure-peatland	OF-RDM 0037	TOGHTER	Rathdrum	643167	728557	0.46
OF010-184---	Road-class 2 togher	OF-RDM 0038	UWWIS	Rathdrum	643168	728560	0.43
OF010-185---	Structure-peatland	OF-RDM 0039	WWIS	Rathdrum	643158	728570	0.17
OF018-066---	Structure-peatland	OF-RDM 0040	WWIS	Rathdrum	642999	728228	0.18
OF018-067---	Structure-peatland	OF-RDM 0041	WWIS	Rathdrum	643015	728262	0.52
OF018-068---	Structure-peatland	OF-RDM 0042	WWIS	Rathdrum	643026	728287	0.70
OF018-069---	Structure-peatland	OF-RDM 0043	UWWIS	Rathdrum	643033	728303	0.62
OF010-186---	Structure-peatland	OF-RDM 0044	WWIS	Rathdrum	643034	728305	0.00
OF010-187---	Structure-peatland	OF-RDM 0045	WWIS	Rathdrum	643038	728312	0.38
OF010-188---	Structure-peatland	OF-RDM 0046	WWIS	Rathdrum	643046	728329	0.40
OF010-189---	Road-class 2 togher	OF-RDM 0047	TOGHSEC	Rathdrum	643018	728380	0.17
OF010-190---	Structure-peatland	OF-RDM 0048	WWIS	Rathdrum	643129	728512	0.58
OF010-191---	Structure-peatland	OF-RDM 0049	WWIS	Rathdrum	643152	728559	0.19
OF018-070---	Structure-peatland	OF-RDM 0050	UWWIS	Rathdrum	642997	728258	0.30
OF018-071---	Structure-peatland	OF-RDM 0051	UWWIS	Rathdrum	643014	728298	0.48
OF010-192---	Structure-peatland	OF-RDM 0052	UWWIS	Rathdrum	643017	728305	0.38
OF010-193---	Structure-peatland	OF-RDM 0053	WWIS	Rathdrum	643028	728329	0.55
OF010-194---	Structure-peatland	OF-RDM 0054	WWIS	Rathdrum	643072	728424	0.32
OF010-195---	Structure-peatland	OF-RDM 0055	UWWIS	Rathdrum	643077	728435	0.48

OF010-196---	Structure-peatland	OF-RDM 0056	UWWIS	Rathdrum	643077	728435	0.20
OF010-197---	Structure-peatland	OF-RDM 0057	UWWIS	Rathdrum	643119	728524	0.42
OF010-198---	Structure-peatland	OF-RDM 0058	UWWIS	Rathdrum	643120	728525	0.17
OF010-199---	Structure-peatland	OF-RDM 0059	WWIS	Rathdrum	643120	728526	0.52
OF010-200---	Road-class 3 togher	OF-RDM 0060	TOGHTER	Rathdrum	643120	728528	0.30
OF010-201---	Structure-peatland	OF-RDM 0061	WWIS	Rathdrum	643120	728529	0.21
OF018-072---	Structure-peatland	OF-RDM 0062	UWWIS	Rathdrum	642982	728265	0.24
OF018-073---	Structure-peatland	OF-RDM 0063	UWWIS	Rathdrum	642987	728276	0.22
OF018-074---	Structure-peatland	OF-RDM 0064	WWIS	Rathdrum	643000	728304	0.43
OF010-202---	Structure-peatland	OF-RDM 0065	UWWIS	Rathdrum	643004	728312	0.94
OF010-203---	Road-class 3 togher	OF-RDM 0066	TOGHTER	Rathdrum	643019	728343	0.64
OF010-204---	Structure-peatland	OF-RDM 0067	WWIS	Rathdrum	643019	728345	0.20
OF010-205---	Structure-peatland	OF-RDM 0068	WWIS	Rathdrum	643027	728362	0.00
OF010-206---	Structure-peatland	OF-RDM 0069	WWIS	Rathdrum	643030	728368	0.30
OF010-207---	Structure-peatland	OF-RDM 0070	UWWIS	Rathdrum	643031	728372	0.15
OF010-208---	Structure-peatland	OF-RDM 0071	UWWIS	Rathdrum	643045	728401	0.88
OF010-209---	Structure-peatland	OF-RDM 0072	WWIS	Rathdrum	643070	728456	0.00
OF010-210---	Structure-peatland	OF-RDM 0073	WWIS	Rathdrum	643102	728526	0.56
OF010-211---	Structure-peatland	OF-RDM 0074	UWWIS	Rathdrum	643106	728533	0.47
OF018-075---	Road-class 3 togher	OF-RDM 0075	TOGHTER	Rathdrum	642979	728295	0.36
OF010-212---	Structure-peatland	OF-RDM 0076	UWWIS	Rathdrum	642983	728304	0.67
OF010-213---	Structure-peatland	OF-RDM 0077	UWWIS	Rathdrum	642988	728313	0.66
OF010-214---	Structure-peatland	OF-RDM 0078	WWIS	Rathdrum	642992	728321	0.65
OF010-215---	Structure-peatland	OF-RDM 0079	WWIS	Rathdrum	643001	728343	0.52
OF010-216---	Structure-peatland	OF-RDM 0080	WWIS	Rathdrum	643011	728363	0.64
OF010-217---	Structure-peatland	OF-RDM 0081	WWIS	Rathdrum	643011	728366	0.24
OF010-218---	Structure-peatland	OF-RDM 0082	UWWIS	Rathdrum	643012	728367	0.04
OF010-219---	Structure-peatland	OF-RDM 0083	UWWIS	Rathdrum	643014	728370	0.62
OF010-220---	Structure-peatland	OF-RDM 0084	WWIS	Rathdrum	643018	728379	0.19
OF010-221---	Structure-peatland	OF-RDM 0085	WWIS	Rathdrum	643044	728438	0.00
OF018-076---	Structure-peatland	OF-RDM 0086	WWIS	Rathdrum	642922	728208	0.62
OF010-222---	Structure-peatland	OF-RDM 0087	WWIS	Rathdrum	642971	728316	0.23
OF010-223---	Structure-peatland	OF-RDM 0088	UWWIS	Rathdrum	642977	728326	0.07
OF010-224---	Structure-peatland	OF-RDM 0089	WWIS	Rathdrum	642986	728346	0.03
OF010-225---	Structure-peatland	OF-RDM 0090	UWWIS	Rathdrum	642987	728347	0.35
---		OF-RDM 0091	FIND	Rathdrum			0.00
OF010-226---	Structure-peatland	OF-RDM 0092	WWIS	Rathdrum	642990	728354	0.34
OF010-227---	Structure-peatland	OF-RDM 0093	UWWIS	Rathdrum	642993	728364	0.12
OF010-228---	Structure-peatland	OF-RDM 0094	UWWIS	Rathdrum	643000	728376	0.55
OF010-229---	Structure-peatland	OF-RDM 0095	WWIS	Rathdrum	643040	728463	0.42
OF010-230---	Structure-peatland	OF-RDM 0096	WWIS	Rathdrum	643080	728552	0.08
OF018-077---	Structure-peatland	OF-RDM 0097	WWIS	Rathdrum	642905	728213	0.00
OF010-231---	Structure-peatland	OF-RDM 0098	WWIS	Rathdrum	642956	728320	0.26
OF010-232---	Structure-peatland	OF-RDM 0099	UWWIS	Rathdrum	642959	728325	0.11
OF010-233---	Structure-peatland	OF-RDM 0100	WWIS	Rathdrum	642961	728332	0.00
OF010-234---	Structure-peatland	OF-RDM 0101	WWIS	Rathdrum	642965	728340	0.15
OF010-235---	Structure-peatland	OF-RDM 0102	WWIS	Rathdrum	642969	728350	0.12
OF010-236---	Structure-peatland	OF-RDM 0103	WWIS	Rathdrum	642974	728360	0.29
OF010-237---	Structure-peatland	OF-RDM 0104	WWIS	Rathdrum	642978	728368	0.34
OF010-238---	Structure-peatland	OF-RDM 0105	UWWIS	Rathdrum	642978	728369	0.00
OF010-239---	Structure-peatland	OF-RDM 0106	WWIS	Rathdrum	642983	728379	0.44
OF010-240---	Structure-peatland	OF-RDM 0107	WWIS	Rathdrum	642993	728397	0.90
OF010-241---	Structure-peatland	OF-RDM 0108	WWIS	Rathdrum	642995	728402	0.00
OF010-242---	Structure-peatland	OF-RDM 0109	WWIS	Rathdrum	643005	728425	0.00

OF010-243---	Structure-peatland	OF-RDM 0110	WWIS	Rathdrum	643006	728427	0.50
OF010-244---	Structure-peatland	OF-RDM 0111	WWIS	Rathdrum	643036	728493	0.18
OF010-245---	Structure-peatland	OF-RDM 0112	WWIS	Rathdrum	643039	728502	0.08
OF010-246---	Structure-peatland	OF-RDM 0113	WWIS	Rathdrum	643069	728566	0.00
OF018-078---	Structure-peatland	OF-RDM 0114	UWWIS	Rathdrum	642875	728179	0.24
OF010-247---	Structure-peatland	OF-RDM 0115	WWIS	Rathdrum	642947	728336	0.44
OF010-248---	Structure-peatland	OF-RDM 0116	WWIS	Rathdrum	642948	728337	0.13
OF010-249---	Structure-peatland	OF-RDM 0117	WWIS	Rathdrum	642950	728345	0.45
OF010-250---	Structure-peatland	OF-RDM 0118	WWIS	Rathdrum	642953	728349	0.15
OF010-251---	Structure-peatland	OF-RDM 0119	WWIS	Rathdrum	642958	728362	0.71
OF010-252---	Structure-peatland	OF-RDM 0120	WWIS	Rathdrum	642960	728364	0.19
OF010-253---	Structure-peatland	OF-RDM 0121	WWIS	Rathdrum	642961	728365	0.19
OF010-254---	Structure-peatland	OF-RDM 0122	UWWIS	Rathdrum	642963	728369	0.10
OF010-255---	Structure-peatland	OF-RDM 0123	WWIS	Rathdrum	642966	728376	0.20
OF010-256---	Structure-peatland	OF-RDM 0124	UWWIS	Rathdrum	642968	728380	0.51
OF010-257---	Structure-peatland	OF-RDM 0125	UWWIS	Rathdrum	642969	728385	0.56
OF010-258---	Structure-peatland	OF-RDM 0126	WWIS	Rathdrum	642954	728386	0.08
OF010-259---	Structure-peatland	OF-RDM 0127	WWIS	Rathdrum	642971	728390	0.38
OF010-260---	Structure-peatland	OF-RDM 0128	WWIS	Rathdrum	642994	728437	0.18
OF010-261---	Structure-peatland	OF-RDM 0129	WWIS	Rathdrum	643023	728502	0.10
OF010-262---	Structure-peatland	OF-RDM 0130	UWWIS	Rathdrum	643060	728582	0.76
OF010-263---	Structure-peatland	OF-RDM 0131	UWWIS	Rathdrum	642930	728332	0.58
OF010-264---	Structure-peatland	OF-RDM 0132	UWWIS	Rathdrum	642930	728335	0.42
OF010-265---	Structure-peatland	OF-RDM 0133	WWIS	Rathdrum	642932	728338	0.66
OF010-266---	Road-class 3 togher	OF-RDM 0134	TOGHTER	Rathdrum	642934	728342	0.76
OF010-267---	Road-class 3 togher	OF-RDM 0135	TOGHTER	Rathdrum	642939	728354	0.49
OF010-268---	Structure-peatland	OF-RDM 0136	WWIS	Rathdrum	642944	728362	0.07
OF010-269---	Structure-peatland	OF-RDM 0137	WWIS	Rathdrum	642933	728375	0.07
OF010-270---	Structure-peatland	OF-RDM 0138	WWIS	Rathdrum	642950	728376	0.23
OF010-271---	Structure-peatland	OF-RDM 0139	WWIS	Rathdrum	642933	728377	0.25
OF010-272---	Structure-peatland	OF-RDM 0140	WWIS	Rathdrum	642954	728387	0.53
OF010-273---	Structure-peatland	OF-RDM 0141	WWIS	Rathdrum	642964	728407	0.65
OF010-274---	Structure-peatland	OF-RDM 0142	WWIS	Rathdrum	642964	728408	0.43
OF010-275---	Structure-peatland	OF-RDM 0143	WWIS	Rathdrum	642977	728438	0.00
OF010-276---	Structure-peatland	OF-RDM 0144	WWIS	Rathdrum	642997	728480	0.38
OF010-277---	Structure-peatland	OF-RDM 0145	UWWIS	Rathdrum	643004	728495	0.62
OF010-278---	Structure-peatland	OF-RDM 0146	UWWIS	Rathdrum	642912	728331	0.68
OF010-279---	Structure-peatland	OF-RDM 0147	UWWIS	Rathdrum	642913	728333	0.37
OF010-280---	Structure-peatland	OF-RDM 0148	WWIS	Rathdrum	642924	728358	0.84
OF010-281---	Structure-peatland	OF-RDM 0149	UWWIS	Rathdrum	642924	728359	0.46
OF010-282---	Structure-peatland	OF-RDM 0150	WWIS	Rathdrum	642934	728379	0.54
OF010-283---	Road-class 3 togher	OF-RDM 0151	TOGHTER	Rathdrum	642938	728388	0.21
OF010-284---	Structure-peatland	OF-RDM 0152	WWIS	Rathdrum	642942	728399	0.06
OF010-285---	Structure-peatland	OF-RDM 0153	WWIS	Rathdrum	642955	728427	0.03
OF010-286---	Structure-peatland	OF-RDM 0154	UWWIS	Rathdrum	642963	728444	0.48
OF010-287---	Structure-peatland	OF-RDM 0155	UWWIS	Rathdrum	642992	728505	0.12
OF010-288---	Structure-peatland	OF-RDM 0156	UWWIS	Rathdrum	642907	728358	0.61
OF010-289---	Structure-peatland	OF-RDM 0157	UWWIS	Rathdrum	642909	728363	0.66
OF010-290---	Structure-peatland	OF-RDM 0158	UWWIS	Rathdrum	642911	728368	0.32
OF010-291---	Structure-peatland	OF-RDM 0159	WWIS	Rathdrum	642920	728386	0.21
OF010-292---	Structure-peatland	OF-RDM 0160	UWWIS	Rathdrum	642922	728389	0.43
OF010-293---	Structure-peatland	OF-RDM 0161	UWWIS	Rathdrum	642934	728417	0.11
OF010-294---	Structure-peatland	OF-RDM 0162	UWWIS	Rathdrum	642946	728442	0.47
OF010-295---	Structure-peatland	OF-RDM 0163	WWIS	Rathdrum	642954	728458	0.23

OF010-296---	Structure-peatland	OF-RDM 0164	UWWIS	Rathdrum	642907	728394	0.00
OF010-297---	Structure-peatland	OF-RDM 0165	UWWIS	Rathdrum	642908	728395	0.70
OF010-298---	Structure-peatland	OF-RDM 0166	WWIS	Rathdrum	642928	728441	0.15
OF010-299---	Structure-peatland	OF-RDM 0167	WWIS	Rathdrum	642929	728442	0.29
OF010-300---	Structure-peatland	OF-RDM 0168	WWIS	Rathdrum	642930	728444	0.14
OF010-301---	Structure-peatland	OF-RDM 0169	UWWIS	Rathdrum	642955	728500	0.66
OF010-302---	Structure-peatland	OF-RDM 0170	WWIS	Rathdrum	642924	728431	0.21
OF010-303---	Structure-peatland	OF-RDM 0171	UWWIS	Rathdrum	642907	728468	0.11
OF010-304---	Structure-peatland	OF-RDM 0172	WWIS	Rathdrum	642872	728433	0.04
OF010-305---	Road-class 3 togher	OF-RDM 0173	TOGHTER	Rathdrum	642881	728448	0.13
OF010-306---	Structure-peatland	OF-RDM 0174	WWIS	Rathdrum	642886	728462	0.70
OF010-307---	Structure-peatland	OF-RDM 0175	UWWIS	Rathdrum	642900	728492	0.20
OF010-308---	Structure-peatland	OF-RDM 0176	WWIS	Rathdrum	642858	728434	0.02
OF010-309---	Structure-peatland	OF-RDM 0177	WWIS	Rathdrum	642891	728508	0.15
OF010-310---	Structure-peatland	OF-RDM 0178	WWIS	Rathdrum	642895	728518	0.19
OF010-311---	Structure-peatland	OF-RDM 0179	WWIS	Rathdrum	642926	728583	0.31
OF010-312---	Structure-peatland	OF-RDM 0180	WWIS	Rathdrum	642867	728490	0.39
OF010-313---	Structure-peatland	OF-RDM 0181	UWWIS	Rathdrum	642888	728537	0.36
OF010-314---	Structure-peatland	OF-RDM 0182	UWWIS	Rathdrum	642853	728497	0.51
OF010-315---	Structure-peatland	OF-RDM 0183	WWIS	Rathdrum	642880	728553	0.54
OF010-316---	Road-class 3 togher	OF-RDM 0184	TOGHTER	Rathdrum	642842	728510	0.19
OF010-317---	Structure-peatland	OF-RDM 0185	WWIS	Rathdrum	642843	728512	0.57
OF010-318---	Structure-peatland	OF-RDM 0186	UWWIS	Rathdrum	642843	728513	0.28
OF010-319---	Structure-peatland	OF-RDM 0187	WWIS	Rathdrum	642831	728519	0.32
OF010-320---	Structure-peatland	OF-RDM 0188	WWIS	Rathdrum	642815	728525	0.29
---		OF-RDM 0189	FIND	Rathdrum			0.76
OF010-321---	Structure-peatland	OF-RDM 0190	UWWIS	Rathdrum	642829	728557	0.35
OF010-322---	Structure-peatland	OF-RDM 0191	WWIS	Rathdrum	642849	728597	0.00
OF010-323---	Structure-peatland	OF-RDM 0192	UWWIS	Rathdrum	642803	728533	0.22
OF010-324---	Structure-peatland	OF-RDM 0193	WWIS	Rathdrum	642791	728543	0.21
OF010-325---	Structure-peatland	OF-RDM 0194	WWIS	Rathdrum	642797	728594	0.36
OF010-326---	Structure-peatland	OF-RDM 0195	WWIS	Rathdrum	642797	728881	0.40
OF010-327---	Structure-peatland	OF-RDM 0196	UWWIS	Rathdrum	642705	728756	0.28
OF010-328---	Structure-peatland	OF-RDM 0197	WWIS	Rathdrum	642713	728775	0.09
OF010-329---	Structure-peatland	OF-RDM 0198	WWIS	Rathdrum	642683	728929	0.18
OF010-330---	Structure-peatland	OF-RDM 0199	UWWIS	Rathdrum	642242	729135	0.41
OF010-331---	Structure-peatland	OF-RDM 0200	WWIS	Rathdrum	642170	729157	0.00
OF010-332---	Structure-peatland	OF-RDM 0201	UWWIS	Rathdrum	642158	729170	0.08
OF010-333---	Structure-peatland	OF-RDM 0202	WWIS	Rathdrum	642180	729216	0.36
OF010-334---	Structure-peatland	OF-RDM 0203	WWIS	Rathdrum	642129	729139	0.00
OF010-335---	Structure-peatland	OF-RDM 0204	WWIS	Rathdrum	642145	729178	0.10
OF010-336---	Structure-peatland	OF-RDM 0205	WWIS	Rathdrum	642148	729184	0.36
OF010-337---	Structure-peatland	OF-RDM 0206	UWWIS	Rathdrum	642153	729195	0.35
OF010-338---	Structure-peatland	OF-RDM 0207	WWIS	Rathdrum	642163	729216	0.39
OF010-339---	Structure-peatland	OF-RDM 0208	WWIS	Rathdrum	642171	729234	0.25
OF010-340---	Structure-peatland	OF-RDM 0209	WWIS	Rathdrum	642120	729155	0.00
OF010-341---	Structure-peatland	OF-RDM 0210	UWWIS	Rathdrum	642137	729195	0.32
OF010-342---	Structure-peatland	OF-RDM 0211	WWIS	Rathdrum	642144	729212	0.37
OF010-343---	Structure-peatland	OF-RDM 0212	WWIS	Rathdrum	642127	729210	0.47
OF010-344---	Structure-peatland	OF-RDM 0213	WWIS	Rathdrum	642115	729221	0.29
OF010-345---	Structure-peatland	OF-RDM 0214	WWIS	Rathdrum	642125	729242	0.00
OF010-346---	Structure-peatland	OF-RDM 0215	UWWIS	Rathdrum	642130	729253	0.05
OF010-347---	Structure-peatland	OF-RDM 0216	WWIS	Rathdrum	642021	729055	0.00
OF010-348---	Structure-peatland	OF-RDM 0217	UWWIS	Rathdrum	642100	729225	0.23

OF010-349---	Structure-peatland	OF-RDM 0218	UWWIS	Rathdrum	642103	729230	0.34
OF010-350---	Structure-peatland	OF-RDM 0219	UWWIS	Rathdrum	642106	729237	0.00
OF010-351---	Structure-peatland	OF-RDM 0220	UWWIS	Rathdrum	642115	729257	0.00
OF010-352---	Structure-peatland	OF-RDM 0221	UWWIS	Rathdrum	642120	729271	0.19
OF010-353---	Structure-peatland	OF-RDM 0222	WWIS	Rathdrum	642102	729267	0.45
OF010-354---	Structure-peatland	OF-RDM 0223	WWIS	Rathdrum	642012	729105	0.00
OF010-355---	Structure-peatland	OF-RDM 0224	UWWIS	Rathdrum	642078	729249	0.49
OF010-356---	Structure-peatland	OF-RDM 0225	UWWIS	Rathdrum	642091	729277	0.09
OF010-357---	Structure-peatland	OF-RDM 0226	UWWIS	Rathdrum	641988	729092	0.13
---		OF-RDM 0227	FIND	Rathdrum			0.00
OF010-358---	Structure-peatland	OF-RDM 0228	WWIS	Rathdrum	641995	729107	0.11
OF010-359---	Structure-peatland	OF-RDM 0229	UWWIS	Rathdrum	642086	729303	0.32
OF010-360---	Structure-peatland	OF-RDM 0230	WWIS	Rathdrum	642089	729309	0.14
OF010-361---	Structure-peatland	OF-RDM 0231	WWIS	Rathdrum	641980	729113	0.35
OF010-362---	Structure-peatland	OF-RDM 0232	WWIS	Rathdrum	641988	729127	0.00
OF010-363---	Structure-peatland	OF-RDM 0233	UWWIS	Rathdrum	642050	729265	0.31
OF010-364---	Structure-peatland	OF-RDM 0234	WWIS	Rathdrum	642078	729324	0.00
OF010-365---	Structure-peatland	OF-RDM 0235	UWWIS	Rathdrum	642011	729214	0.00
OF010-366---	Structure-peatland	OF-RDM 0236	UWWIS	Rathdrum	642034	729263	0.31
OF010-367---	Structure-peatland	OF-RDM 0237	WWIS	Rathdrum	642036	729268	0.00
OF010-368---	Structure-peatland	OF-RDM 0238	UWWIS	Rathdrum	642038	729273	0.18
OF010-369---	Structure-peatland	OF-RDM 0239	WWIS	Rathdrum	642045	729288	0.04
OF010-370---	Structure-peatland	OF-RDM 0240	UWWIS	Rathdrum	641986	729195	0.11
OF010-371---	Structure-peatland	OF-RDM 0241	WWIS	Rathdrum	641989	729203	0.00
OF010-372---	Structure-peatland	OF-RDM 0242	WWIS	Rathdrum	642021	729274	0.23
OF010-373---	Structure-peatland	OF-RDM 0243	WWIS	Rathdrum	642033	729297	0.00
OF010-374---	Structure-peatland	OF-RDM 0244	UWWIS	Rathdrum	641898	729042	0.25
---		OF-RDM 0245	FIND	Rathdrum			0.00
OF010-375---	Structure-peatland	OF-RDM 0246	WWIS	Rathdrum	641979	729220	0.13
OF010-376---	Structure-peatland	OF-RDM 0247	UWWIS	Rathdrum	642023	729314	0.43
OF010-377---	Structure-peatland	OF-RDM 0248	WWIS	Rathdrum	642045	729363	0.20
OF010-378---	Structure-peatland	OF-RDM 0249	UWWIS	Rathdrum	641885	729054	0.53
OF010-379---	Structure-peatland	OF-RDM 0250	WWIS	Rathdrum	641872	729058	0.33
OF010-380---	Structure-peatland	OF-RDM 0251	WWIS	Rathdrum	641973	729276	0.15
OF010-381---	Structure-peatland	OF-RDM 0252	WWIS	Rathdrum	641962	729290	0.00
-	-	OF-DAS-001A	Road-gravel/stone	Ballylennon Rathdrum	643256.3	728594.9	0
-	-	OF-DAS-001B	Road-gravel/stone	Ballylennon Rathdrum	643235.3	728585.9	0
-	-	OF-DAS-001C	Road-gravel/stone	Ballylennon Rathdrum	643208.3	728571.9	0
-	-	OF-DAS-001D	Road-gravel/stone	Ballylennon Rathdrum	643209.3	728571.9	0.26
-	-	OF-DAS-001E	Road-gravel/stone	Ballylennon Rathdrum	643169.3	728556.9	0
-	-	OF-DAS-001F	Road-gravel/stone	Ballylennon Rathdrum	643147.3	728546.9	0
-	-	OF-DAS-001G	Road-gravel/stone	Ballylennon Rathdrum	643086.3	728521.9	0.04
-	-	OF-DAS-001H	Road-gravel/stone	Ballylennon Rathdrum	643064.3	728513.9	0.0m
-	-	OF-DAS-001I	Road-gravel/stone	Ballylennon Rathdrum	643040.3	728502.9	0.0m
-	-	OF-DAS-001J	Road-gravel/stone	Ballylennon Rathdrum	643018.3	728493.9	0.0m
-	-	OF-DAS-001K	Road-gravel/stone	Ballylennon Rathdrum	642982.3	728477.9	0
-	-	OF-DAS-001L	Road-gravel/stone	Ballylennon Rathdrum	642975.3	728472.9	0
-	-	OF-DAS-001M	Road-gravel/stone	Ballylennon Rathdrum	642938.3	728457.9	0

-	-	OF-DAS-001N	Road-gravel/stone	Ballylennon Rathdrum	642935.3	728452.9	0
-	-	OF-DAS-001O	Road-gravel/stone	Ballylennon Rathdrum	642918.4	728448.9	0
-	-	OF-DAS-001P	Road-gravel/stone	Ballylennon Rathdrum	642895.4	728432.9	0
-	-	OF-DAS-001Q	Road-gravel/stone	Ballylennon Rathdrum	642848.4	728413.9	0
-	-	OF-DAS-001R	Road-gravel/stone	Ballylennon Rathdrum			0
-	-	OF-DAS-001S	Road-gravel/stone	Ballylennon Rathdrum			0
-	-	OF-DAS-001T	Road-gravel/stone	Ballylennon Rathdrum			0
-	-	OF-DAS-002	Structure-peatland	Rathdrum	643144.3	728392.9	0
OF010-496---	Structure-peatland	OF-DAS-003	Structure-peatland	Rathdrum	643044.3	728254	0.08m
OF010-490---	Structure-peatland	OF-DAS-004	Structure-peatland	Rathdrum	643117.3	728489.9	0
-	-	OF-DAS-005	Platform	Rathdrum	643081.3	728555.9	0
-	-	OF-DAS-006	Structure-peatland	Rathdrum	643018.3	728412.9	0
-	-	OF-DAS-007	Platform	Rathdrum	643017.3	728406.9	0
-	-	OF-DAS-008A	Road- Class 2 togher	Rathdrum	642971.3	728343.9	0
OF010-493---	Road-class 2 togher	OF-DAS-008B	Road- Class 2 togher	Rathdrum	642944.3	728319.9	0
-	-	OF-DAS-009	Road- Class 3 togher	Rathdrum	642971.3	728376.9	0
-	-	OF-DAS-010	Platform	Rathdrum	643060.3	728580.9	0
-	-	OF-DAS-011	Road- Class 3 togher	Rathdrum	642939.3	728347.9	0
-	-	OF-DAS-012	Platform	Rathdrum	642967.3	728410.9	0
-	-	OF-DAS-013	Road- Class 3 togher	Rathdrum	642938.3	728412.9	0
-	-	OF-DAS-014	Structure-peatland	Rathdrum	642981.3	728551.9	0
-	-	OF-DAS-015	Platform	Rathdrum	642861.4	728428.9	0
-	-	OF-DAS-016A	Road- Class 2 togher	Rathdrum	642855.4	728494.9	0
-	-	OF-DAS-016B	Road- Class 2 togher	Rathdrum	642847.4	728508.9	0
-	-	OF-DAS-016C	Road- Class 2 togher	Rathdrum	642842.4	728517.9	0
-	-	OF-DAS-017A	Road- Class 3 togher	Rathdrum	642818.4	728449.9	0
OF010-492---	Structure-peatland	OF-DAS-017B	Road- Class 3 togher	Rathdrum	642808.4	728457.9	0
-	-	OF-DAS-018	Structure-peatland	Rathdrum	642798.4	728447.9	0
-	-	OF-DAS-019	Structure-peatland	Rathdrum	642797.4	728441.9	0
-	-	OF-DAS-020	Structure-peatland	Rathdrum	642815.4	728480.9	0
-	-	OF-DAS-021A	Road- Class 2 togher	Rathdrum	642833.4	728518.9	0
-	-	OF-DAS-021B	Road- Class 2 togher	Rathdrum	642828.4	728517.9	0
OF010-500---	Structure-peatland	OF-DAS-021C	Road- Class 2 togher	Rathdrum	642812.4	728530.9	0
-	-	OF-DAS-021D	Road- Class 2 togher	Rathdrum	642794.4	728543.9	0
-	-	OF-DAS-022	Structure-peatland	Rathdrum	642792.4	728498.9	0
OF010-498---	Structure-peatland	OF-DAS-023	Platform	Rathdrum	642825.4	728575.9	0
-	-	OF-DAS-024A	Road-gravel/stone	Rathdrum	643302.3	728665.9	0
-	-	OF-DAS-024B	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024C	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024D	Road-gravel/stone	Rathdrum	643250.3	728662.9	
-	-	OF-DAS-024E	Road-gravel/stone	Rathdrum	643234.3	728660.9	
-	-	OF-DAS-024FF	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024GG	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024H	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024I	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024J	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024K	Road-gravel/stone	Rathdrum	643130.3	728656.9	
-	-	OF-DAS-024L	Road-gravel/stone	Rathdrum	643111.3	728652.9	
-	-	OF-DAS-024M	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024N	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024O	Road-gravel/stone	Rathdrum			

-	-	OF-DAS-024P	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024Q	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024R	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024S	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024T	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024U	Road-gravel/stone	Rathdrum	642954.3	728637.9	
-	-	OF-DAS-024V	Road-gravel/stone	Rathdrum	642938.3	728639.9	
-	-	OF-DAS-024W	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024X	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024Y	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024Z	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024AA	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024BB	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024CC	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024DD	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024EE	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024FF	Road-gravel/stone	Rathdrum	642768.4	728634.9	
-	-	OF-DAS-024GG	Road-gravel/stone	Rathdrum	642749.4	728630.9	
-	-	OF-DAS-024HH	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024II	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024JJ	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024KK	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024LL	Road-gravel/stone	Rathdrum	642655.4	728610.9	
-	-	OF-DAS-024MM	Road-gravel/stone	Rathdrum	642636.4	728610.9	
-	-	OF-DAS-024NN	Road-gravel/stone	Rathdrum			
-	-	OF-DAS-024OO	Road-gravel/stone	Rathdrum	642607.4	728615.9	
OF010-495---	Structure-peatland	OF-DAS-025	Structure- peatland	Rathdrum	642830.4	728873.8	0
-	-	OF-DAS-026	Platform	Rathdrum	642677.4	728545.9	0
-	-	OF-DAS-027	Structure- peatland	Rathdrum	642697.4	728658.9	0
OF010-497---	Structure-peatland	OF-DAS-028	Structure- peatland	Barnaboy	642309.5	729352.7	0.13
OF010-491---	Structure-peatland	OF-DAS-029	Platform	Barnaboy	642283.5	729296.7	0
-	-	OF-DAS-030	Platform	Barnaboy	642315.5	729467.7	0
-	-	OF-DAS-031	Platform	Barnaboy	642304.5	729479.7	0
-	-	OF-DAS-032	Platform	Barnaboy	642284.5	729514.7	0
-	-	OF-DAS-033	Structure-peatland	Barnaboy	642263.5	729472.7	0
-	-	OF-DAS-034	Structure- peatland	Rathdrum	642136.5	729200.8	0
-	-	OF-DAS-035	Structure- peatland	Rathdrum	642142.5	729244.8	0
-	-	OF-DAS-036	Structure- peatland	Rathdrum	642132.5	729253.8	0
OF010-494---	Redundant record	OF-DAS-037	Structure- peatland	Rathdrum	642138.5	729272.7	0.12
-	-	OF-DAS-038	Structure- peatland	Barnaboy	642187.5	729385.7	0
-	-	OF-DAS-039	Structure- peatland	Barnaboy	642189.5	729453.7	0
-	-	OF-DAS-040	Road- Class 3 togher	Barnaboy	642241.5	729550.7	0
-	-	OF-DAS-041	Structure- peatland	Barnaboy	642239.5	729564.7	0
-	-	OF-DAS-042	Road- unclassified togher	Barnaboy	642271.5	729522.7	0
-	-	OF-DAS-043	Structure- peatland	Barnaboy	642273.5	729471.7	0
OF010-499---	Platform-peatland	OF-DAS-044	Platform	Barnaboy	642224.5	729424.7	0
-	-	OF-DAS-045	Structure- peatland	Barnaboy	642237.5	729403.7	0
-	-	OF-DAS-046	Structure- peatland	Barnaboy	642243.5	729397.7	0
-	-	OF-DAS-047	Platform	Barnaboy	642211.5	729421.7	0
-	-	OF-DAS-048	Structure- peatland	Barnaboy	642241.5	729493.7	0
-	-	OF-DAS-049	Structure- peatland	Barnaboy	642251.5	729517.7	0
-	-	OF-DAS-050	Structure- peatland	Barnaboy	642208.5	729465.7	0
-	-	OF-DAS-051A	Road- Class 2 togher	Barnaboy	642250.5	729695.7	0.06
OF010-501---	Road-class 3 togher	OF-DAS-051B	Road- Class 2 togher	Barnaboy	642222.5	729675.7	0.32

Table 1. List of all sightings of archaeological material in the rehabilitation with SMR concordance.

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Offaly which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1994). This record was published by the Minister in 1994 and includes sites and monuments that were known in Daingean Rathdrum Bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (see Fig. 1).

Archaeological Excavations 2005

24 sightings were excavated by Archaeological Development Services in 2005 under 7 archaeological licences (see Table No. 2) (Whitaker and Turrell 2021).

SMR No.	License No.	Cat No.	cuttings	Classification
OF010-166	05E0555	RDM0009	6	Road – Class 1 togher
OF010-189	05E0557	RDM0047	3	Road – Class 2 togher
OF010-059	05E0552	RDM0001	5	Road – Class 1 togher
OF010-163	05E0554	RDM006	1	Archaeological Wood
OF010-161	05E0553	RDM0004	5	Road – Class 1 togher
OF010-160	05E0551	RDM0002	3	Road – Class 2 togher
OF010-113	05E0556	BBY00038	1	Worked wood *in situ*

Table 2. Licensed excavations carried out in Toar Bog in 2005.

2013 Bord na Móna Re-assessment Survey

Daingean Rathdrum Bog was surveyed by ADS Ltd in 2013 as part of the Bord na Móna re-assessment survey (Licence No. 13E0230). 118 sightings of archaeological material were made in the rehabilitation area (see Table 1 Catalogue Nos OF-DAS-001A-OF-DAS-051B). These archaeological sightings were notified to the Archaeological Survey of Ireland and 12 were included in the SMR.

Archaeological Excavations 2014

12 sightings were excavated by Archaeological Development Services in 2014 under 12 archaeological licences (see Table No. 3) (Whitaker 2017).

SMR No.	License No.	Cat No.	Cuttings	Classification
OF010-496---	14E0300	OF-DAS003	1	Structure – peatland
OF010-490---	14E0301	OF-DAS004	1	Structure – peatland
OF010-493---	14E0302	OF-DAS008a–b	1	Road – Class 2 togher
OF010-492---	14E0303	OF-DAS017a–b	1	Road – Class 3 togher
OF010-500---	14E0304	OF-DAS021a–c	1	Structure – peatland
OF010-498---	14E0305	OF-DAS023	1	Structure – peatland
OF010-495---	14E0306	OF-DAS025	1	Structure – peatland
OF010-497---	14E0308	OF-DAS028	1	Structure – peatland
OF010-491---	14E0309	OF-DAS029	1	Structure – peatland
OF010-494---	14E0307	OF-DAS037	1	Structure – peatland
OF010-499---	14E0310	OF-DAS044	1	Platform
OF010-501---	14E0311	OF-DAS051a–b	1	Road – Class 3 togher

Table 3. Licensed excavations carried out in Toar Bog in 2014.

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 13th of January 2023. The SMR consists of records of sightings made by the IAWU Survey notified to the Dept and some sighting made by the 2013 Bord na Móna Re-assessment Survey. This review established that there are 362 sightings entered in the SMR in the proposed rehabilitation area. The sightings are indicated in Table 1.

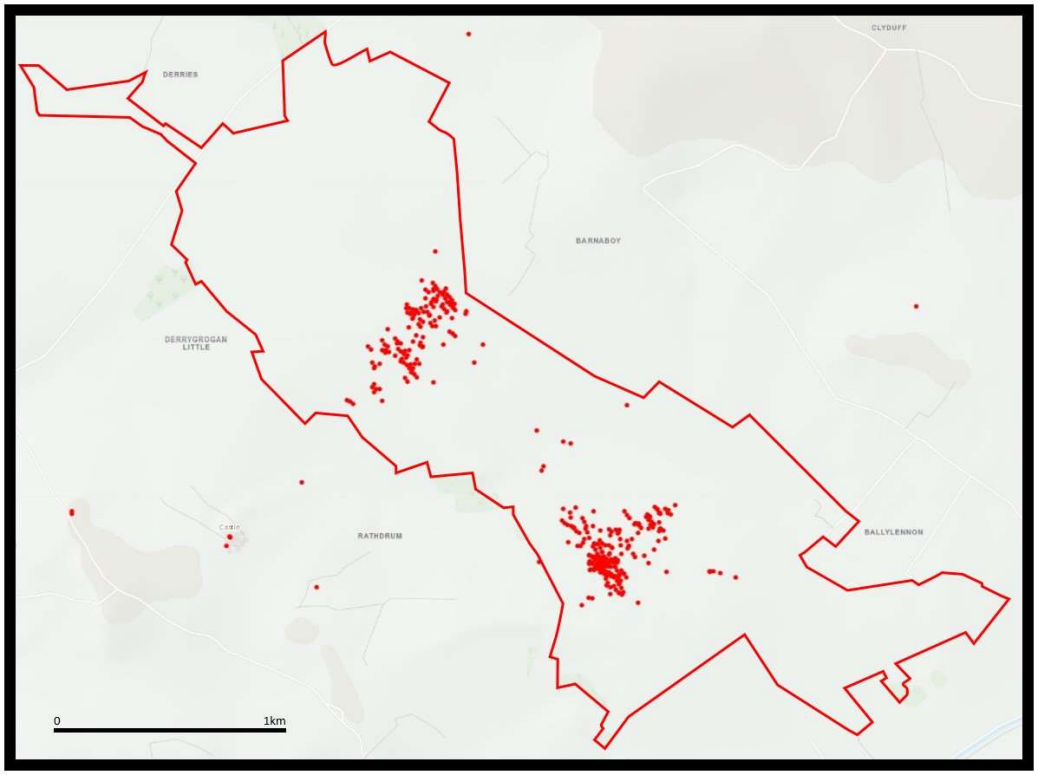

Fig. 2. Daingean Rathdrum Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

Previous assessments

Daingean Rathdrum Bog has been the subject of an Environmental Impact Assessment Report (EIAR) carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01. This assessment included a review of the topographical files and finds registers of the National Museum of Ireland intended to identify all finds from the bog reported to the Museum by that date and these are included below in Table 4 (Pers Comm. Jane Whitaker). The assessment noted the archaeological material identified in the surveys of the bog and noted that there was a very high potential for archaeological features to be uncovered during the course of any future development works in Daingean Rathdrum Bog.

Reported finds

As noted above the EIAR carried out by Irish Archaeological Consultancy LTD in in relation to IPC Licence P0500-03 contains a complete list of known finds from Daingean Rathdrum Bog reported to the National Museum of Ireland up to 2018. Finds made by the IAWU are also included in Table 5.

Townland	Museum No./ catalogue No.	Description
Kilclonfert	1943:99	Late Bronze Age axehead
Rathdrum	01E0477:3a-b	2 fragments of leather
Rathdrum	OF-RDM 0189	Possible artefact left in situ 33cm below the surface.
Rathdrum	01E0477:4	Portion of leather shoe
Rathdrum	01E0477:5	A leather shoe

Table 5. List of archaeological finds from Daingean Rathdrum Bog reported to the National Museum of Ireland.

Impact assessment

There are 534 known sightings of archaeological material in the rehabilitation area. Note, some of the sightings made in 2013 re-assessment are probably sightings already reported in the IAWU survey. Grid references are available for 435 sightings and information on depth below the surface is known for 494 sightings. Information on both location and depth below ground level is known for 435 of the sightings. 425 of these sightings have LIDAR peat depth data available for 2008 and 2020. This data indicates that all these 425 sightings have been removed by harvesting. Of the 494 sightings with recorded depth below the surface the average depth is 0.23m with a range from 0 - 0.96m. The range of peat removed from 2008 – 2020 by harvesting rages from 0.34-1.66m with an average depth of 0.79m (see Table 6). This suggests that none of the sightings without recorded depths have survived.

SMR No	Cat No	Survey Class	Townland	ITM E	ITM N	Depth BS M	2020_Depth	2008_Depth	Peat_Remov m	Status
OF018-052---	OF-BLL 0001	UWWIS	Ballylennon	643535	728299	0.38	0.00	0.00	No Data	Prob gone
OF018-053, OF010-059--- *	OF-BLL 0002	UWWIS	Ballylennon	643470	728319	0.54	0.00	0.00	No Data	Prob gone
OF010-060---	OF-BLL 0003	UWWIS	Ballylennon	643439	728325	0.2	0.00	0.00	No Data	Prob gone
OF010-061---	OF-BLL 0004	UWWIS	Ballylennon	643424	728324	0.13	0.00	0.00	No Data	Prob gone
OF010-062---	OF-BLL 0005	UWWIS	Ballylennon	643425	728325	0.33	0.00	0.00	No Data	Prob gone
OF010-063---	OF-BLL 0006	WWIS	Ballylennon	643257	728568	0.2	3.76	4.84	1.08	Gone
OF010-064---	OF-BLL 0007	WWIS	Ballylennon	643276	728609	0.03	3.76	4.27	0.51	Gone
OF010-065---	OF-BLL 0008	TOGHTER	Ballylennon	643243	728574	0.23	4.01	4.81	0.80	Gone
OF010-066---	OF-BLL 0009	WWIS	Ballylennon	643244	728579	0.5	3.78	5.00	1.22	Gone
OF010-067---	OF-BLL 0010	WWIS	Ballylennon	643248	728588	0.58	3.65	4.99	1.34	Gone
OF010-068---	OF-BLL 0011	UWWIS	Ballylennon	643233	728593	0.41	3.90	4.92	1.03	Gone
OF010-069---	OF-BLL 0012	TOGHTER	Ballylennon	643212	728573	0.42	4.11	4.99	0.87	Gone
OF010-070---	OF-BLL 0013	TOGHTER	Ballylennon	643210	728574	0.18	3.85	4.73	0.89	Gone
OF010-071---	OF-BLL 0014	WWIS	Ballylennon	643208	728575	0.29	3.90	4.73	0.83	Gone
OF010-072---	OF-BLL 0015	WWIS	Ballylennon	643209	728576	0.57	3.91	4.73	0.82	Gone
OF010-073---	OF-BLL 0016	UWWIS	Ballylennon	643199	728590	0.31	3.89	4.61	0.72	Gone
OF010-074---	OF-BLL 0017	UWWIS	Ballylennon	643200	728592	0.06	3.59	4.45	0.86	Gone
OF010-075---	OF-BLL 0018	UWWIS	Ballylennon	643188	728601	0.18	3.58	4.33	0.74	Gone
OF010-076---	OF-BBY 0001	WWIS	Barnaboy	643070	729037	0.44	4.00	5.04	1.04	Gone
OF010-077---	OF-BBY 0002	UWWIS	Barnaboy	642416	729220	0.27	4.31	5.24	0.92	Gone
OF010-078---	OF-BBY 0003	UWWIS	Barnaboy	642452	729297	0.43	4.65	5.28	0.62	Gone
OF010-079---	OF-BBY 0004	UWWIS	Barnaboy	642334	729335	0.02	4.85	6.27	1.42	Gone
OF010-080---	OF-BBY 0005	WWIS	Barnaboy	642379	729428	0.06	4.86	5.93	1.06	Gone
OF010-081---	OF-BBY 0006	UWWIS	Barnaboy	642382	729439	0.39	4.98	6.38	1.40	Gone
OF010-082---	OF-BBY 0007	WWIS	Barnaboy	642323	729345	0.17	4.84	5.79	0.95	Gone
OF010-083---	OF-BBY 0008	UWWIS	Barnaboy	642320	729411	0.62	4.95	5.59	0.64	Gone
OF010-084---	OF-BBY 0009	WWIS	Barnaboy	642335	729446	0.08	4.88	6.05	1.17	Gone
OF010-085---	OF-BBY 0010	UWWIS	Barnaboy	642324	729455	0.36	4.80	5.66	0.86	Gone
OF010-086---	OF-BBY 0011	WWIS	Barnaboy	642325	729458	0.24	4.73	6.04	1.31	Gone

OF010-087---	OF-BBY 0012	WWIS	Barnaboy	642330	729471	0.27	4.94	6.13	1.19	Gone
OF010-088---	OF-BBY 0013	WWIS	Barnaboy	642297	729434	0.32	4.73	5.89	1.16	Gone
OF010-089---	OF-BBY 0014	UWWIS	Barnaboy	642299	729439	0.47	4.93	6.01	1.08	Gone
OF010-090---	OF-BBY 0015	WWIS	Barnaboy	642312	729468	0.42	4.67	6.13	1.45	Gone
OF010-091---	OF-BBY 0016	WWIS	Barnaboy	642312	729469	0.18	4.76	6.13	1.36	Gone
OF010-092---	OF-BBY 0017	WWIS	Barnaboy	642316	729478	0.21	4.86	6.14	1.28	Gone
OF010-093---	OF-BBY 0018	UWWIS	Barnaboy	642319	729482	0.29	4.80	6.05	1.25	Gone
OF010-094---	OF-BBY 0019	WWIS	Barnaboy	642322	729488	0.33	4.96	6.06	1.09	Gone
OF010-095---	OF-BBY 0020	WWIS	Barnaboy	642253	729377	0.46	5.18	6.15	0.97	Gone
OF010-096---	OF-BBY 0021	TOGHTER	Barnaboy	642269	729412	0	5.32	6.28	0.95	Gone
OF010-097---	OF-BBY 0022	UWWIS	Barnaboy	642286	729450	0.18	5.13	6.39	1.26	Gone
OF010-098---	OF-BBY 0023	UWWIS	Barnaboy	642300	729479	0.26	5.04	6.21	1.17	Gone
OF010-099---	OF-BBY 0024	WWIS	Barnaboy	642309	729500	0.17	5.36	6.34	0.98	Gone
OF010-100---	OF-BBY 0025	UWWIS	Barnaboy	642195	729286	0.27	3.17	4.33	1.16	Gone
OF010-101---	OF-BBY 0026	UWWIS	Barnaboy	642197	729289	0.4	3.22	4.12	0.90	Gone
OF010-102---	OF-BBY 0027	UWWIS	Barnaboy	642237	729377	0.3	5.06	6.17	1.10	Gone
OF010-103---	OF-BBY 0028	WWIS	Barnaboy	642246	729399	0.05	5.08	6.19	1.11	Gone
OF010-104---	OF-BBY 0029	WWIS	Barnaboy	642275	729461	0.36	5.23	6.13	0.90	Gone
OF010-105---	OF-BBY 0030	UWWIS	Barnaboy	642281	729470	0	5.29	6.09	0.80	Gone
OF010-106---	OF-BBY 0031	UWWIS	Barnaboy	642291	729494	0.12	5.17	6.22	1.05	Gone
OF010-107---	OF-BBY 0032	WWIS	Barnaboy	642299	729511	0	5.08	5.95	0.87	Gone
OF010-108---	OF-BBY 0033	UWWIS	Barnaboy	642182	729295	0.22	3.43	4.52	1.09	Gone
OF010-109---	OF-BBY 0034	WWIS	Barnaboy	642187	729304	0	3.61	4.32	0.71	Gone
OF010-110---	OF-BBY 0035	WWIS	Barnaboy	642197	729328	0	4.42	5.58	1.16	Gone
OF010-111---	OF-BBY 0036	UWWIS	Barnaboy	642227	729389	0.22	4.86	5.84	0.98	Gone
OF010-112---	OF-BBY 0037	UWWIS	Barnaboy	642282	729511	0.32	4.79	6.21	1.43	Gone
OF010-113---	OF-BBY 0038	WWIS	Barnaboy	642282	729513	0	4.79	6.18	1.39	Gone
OF010-114---	OF-BBY 0039	WWIS	Barnaboy	642287	729524	0	4.89	6.06	1.17	Gone
OF010-115---	OF-BBY 0040	WWIS	Barnaboy	642294	729537	0.24	4.75	5.64	0.88	Gone
OF010-116---	OF-BBY 0042	UWWIS	Barnaboy	642224	729422	0.24	4.79	5.96	1.17	Gone
OF010-117---	OF-BBY 0043	WWIS	Barnaboy	642125	729452	0	4.30	5.49	1.20	Gone
OF010-118---	OF-BBY 0044	UWWIS	Barnaboy	642240	729459	0.29	4.71	6.19	1.48	Gone
OF010-119---	OF-BBY 0045	UWWIS	Barnaboy	642251	729483	0.15	4.84	6.01	1.17	Gone
OF010-120---	OF-BBY 0046	WWIS	Barnaboy	642254	729489	0	4.42	6.06	1.64	Gone
OF010-121---	OF-BBY 0047	WWIS	Barnaboy	642261	729506	0	4.67	5.96	1.30	Gone
OF010-122---	OF-BBY 0048	UWWIS	Barnaboy	642269	729522	0	4.50	5.87	1.37	Gone
OF010-123---	OF-BBY 0049	UWWIS	Barnaboy	642155	729309	0.14	3.25	4.52	1.27	Gone
OF010-124---	OF-BBY 0050	WWIS	Barnaboy	642168	729336	0	3.43	4.37	0.94	Gone
OF010-125---	OF-BBY 0051	WWIS	Barnaboy	642185	729374	0.13	3.87	4.94	1.07	Gone
OF010-126---	OF-BBY 0052	WWIS	Barnaboy	642197	729395	0	4.64	5.39	0.75	Gone
OF010-127---	OF-BBY 0053	UWWIS	Barnaboy	642216	729438	0.1	4.80	5.63	0.83	Gone
OF010-128---	OF-BBY 0054	UWWIS	Barnaboy	642230	729471	0.14	4.90	5.95	1.05	Gone
OF010-129---	OF-BBY 0055	WWIS	Barnaboy	642234	729480	0	4.72	5.70	0.98	Gone
OF010-130---	OF-BBY 0056	WWIS	Barnaboy	642240	729492	0.32	4.79	5.56	0.77	Gone
OF010-131---	OF-BBY 0057	UWWIS	Barnaboy	642258	729534	0.19	4.25	5.62	1.36	Gone
OF010-132---	OF-BBY 0058	WWIS	Barnaboy	642178	729384	0.11	4.45	5.38	0.92	Gone
OF010-133---	OF-BBY 0059	WWIS	Barnaboy	642183	729406	0	4.04	5.48	1.45	Gone
OF010-134---	OF-BBY 0060	WWIS	Barnaboy	642199	729437	0	4.80	5.73	0.93	Gone
OF010-135---	OF-BBY 0061	WWIS	Barnaboy	642210	729462	0	4.68	5.31	0.63	Gone
OF010-136---	OF-BBY 0062	UWWIS	Barnaboy	642240	729528	0.46	4.47	5.51	1.04	Gone
OF010-137---	OF-BBY 0063	WWIS	Barnaboy	642242	729534	0	4.47	5.42	0.95	Gone
OF010-138---	OF-BBY 0064	WWIS	Barnaboy	642248	729548	0.27	4.42	5.45	1.03	Gone
OF010-139---	OF-BBY 0065	WWIS	Barnaboy	642177	729432	0	4.76	5.80	1.04	Gone
OF010-140---	OF-BBY 0066	WWIS	Barnaboy	642188	729453	0.22	4.68	5.37	0.69	Gone

OF010-141---	OF-BBY 0067	WWIS	Barnaboy	642208	729495	0	4.64	5.37	0.73	Gone
OF010-142---	OF-BBY 0068	WWIS	Barnaboy	642221	729522	0	4.54	5.50	0.96	Gone
OF010-143---	OF-BBY 0069	WWIS	Barnaboy	642238	729561	0.3	4.69	5.85	1.16	Gone
OF010-144---	OF-BBY 0070	WWIS	Barnaboy	642102	729302	0.28	3.67	4.51	0.84	Gone
OF010-145---	OF-BBY 0071	UWWIS	Barnaboy	642135	729371	0	3.57	4.45	0.87	Gone
OF010-146---	OF-BBY 0072	UWWIS	Barnaboy	642151	729408	0.68	4.07	5.09	1.03	Gone
OF010-147---	OF-BBY 0073	UWWIS	Barnaboy	642154	729414	0	4.34	4.67	0.33	Gone
OF010-148---	OF-BBY 0074	WWIS	Barnaboy	642160	729426	0	4.60	5.30	0.70	Gone
OF010-149---	OF-BBY 0075	UWWIS	Barnaboy	642166	729440	0.17	4.64	5.24	0.60	Gone
OF010-150---	OF-BBY 0076	WWIS	Barnaboy	642168	729446	0	4.57	5.27	0.71	Gone
OF010-151---	OF-BBY 0077	UWWIS	Barnaboy	642208	729533	0.06	4.62	5.55	0.93	Gone
OF010-152---	OF-BBY 0078	WWIS	Barnaboy	642147	729434	0	4.32	4.67	0.35	Gone
OF010-153---	OF-BBY 0079	WWIS	Barnaboy	642153	729448	0.06	4.49	5.03	0.54	Gone
OF010-154---	OF-BBY 0080	UWWIS	Barnaboy	642141	729428	0	3.97	5.03	1.05	Gone
OF010-155---	OF-BBY 0081	WWIS	Barnaboy	642130	729433	0	3.54	4.54	1.00	Gone
OF010-156---	OF-BBY 0082	WWIS	Barnaboy	642138	729452	0	4.23	5.44	1.20	Gone
OF010-157---	OF-BBY 0083	UWWIS	Barnaboy	642191	729572	0	4.74	5.98	1.25	Gone
OF010-158---	OF-BBY 0084	WWIS	Barnaboy	642128	729469	0.26	4.54	5.21	0.67	Gone
OF010-159---	OF-RDM 0001a	TOGHPRI	Rathdrum	643240	728323	0.05	0.00	0.00	No Data	Prob gone
	OF-RDM 0001e	TOGHPRI	Rathdrum			0.3	0.00	0.00	No Data	Prob gone
	OF-RDM 0001f	TOGHPRI	Rathdrum			0.52	0.00	0.00	No Data	Prob gone
	OF-RDM 0001g	TOGHPRI	Rathdrum			0.48	0.00	0.00	No Data	Prob gone
	OF-RDM 0001h	TOGHPRI	Rathdrum			0.37	0.00	0.00	No Data	Prob gone
	OF-RDM 0001i	TOGHPRI	Rathdrum			0.26	0.00	0.00	No Data	Prob gone
	OF-RDM 0001j	TOGHPRI	Rathdrum			0.34	0.00	0.00	No Data	Prob gone
	OF-RDM 0001k	TOGHPRI	Rathdrum			0.37	0.00	0.00	No Data	Prob gone
	OF-RDM 0001l	TOGHPRI	Rathdrum			0.22	0.00	0.00	No Data	Prob gone
	OF-RDM 0001m	TOGHPRI	Rathdrum			0.15	0.00	0.00	No Data	Prob gone
	OF-RDM 0001n	TOGHPRI	Rathdrum			0.3	0.00	0.00	No Data	Prob gone
	OF-RDM 0001o	TOGHPRI	Rathdrum			0.37	0.00	0.00	No Data	Prob gone
	OF-RDM 0001p	TOGHPRI	Rathdrum			0.2	0.00	0.00	No Data	Prob gone
	OF-RDM 0001q	TOGHPRI	Rathdrum			0.32	0.00	0.00	No Data	Prob gone
	OF-RDM 0001r	TOGHPRI	Rathdrum			0.24	0.00	0.00	No Data	Prob gone
	OF-RDM 0001s	TOGHPRI	Rathdrum			0.38	0.00	0.00	No Data	Prob gone
	OF-RDM 0001t	TOGHPRI	Rathdrum			0.16	0.00	0.00	No Data	Prob gone
	OF-RDM 0001u	TOGHPRI	Rathdrum			0.28	0.00	0.00	No Data	Prob gone
	OF-RDM 0001v	TOGHPRI	Rathdrum			0.22	0.00	0.00	No Data	Prob gone
	OF-RDM 0001w	TOGHPRI	Rathdrum			0.05	0.00	0.00	No Data	Prob gone
	OF-RDM 0001x	TOGHPRI	Rathdrum			0.17	0.00	0.00	No Data	Prob gone
	OF-RDM 0001y	TOGHPRI	Rathdrum			0.38	0.00	0.00	No Data	Prob gone
	OF-RDM 0001z	TOGHPRI	Rathdrum			0.2	0.00	0.00	No Data	Prob gone
OF010-160---	OF-RDM 0002a	TOGHSEC	Rathdrum	643234	728466	0.71	0.00	0.00	No Data	Prob gone

	OF-RDM 0002b	TOGHSEC	Rathdrum			0.81	0.00	0.00	No Data	Prob gone
	OF-RDM 0002c	TOGHSEC	Rathdrum			0.96	0.00	0.00	No Data	Prob gone
	OF-RDM 0002d	TOGHSEC	Rathdrum			0.8	0.00	0.00	No Data	Prob gone
OF018-054---	OF-RDM 0003	WWIS	Rathdrum	643117	728192	0.19	0.00	0.00	No Data	Prob gone
OF010-161---	OF-RDM 0004a	TOGHPRI	Rathdrum	643029	728487	0	2.95	4.05	1.10	Gone
	OF-RDM 0004b	TOGHPRI	Rathdrum			0.01	0.00	0.00	No Data	Prob gone
	OF-RDM 0004c	TOGHPRI	Rathdrum			0.06	0.00	0.00	No Data	Prob gone
	OF-RDM 0004d	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0004e	TOGHPRI	Rathdrum			0.33	0.00	0.00	No Data	Prob gone
	OF-RDM 0004f	TOGHPRI	Rathdrum			0.08	0.00	0.00	No Data	Prob gone
	OF-RDM 0004g	TOGHPRI	Rathdrum			0.06	0.00	0.00	No Data	Prob gone
	OF-RDM 0004h	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0004i	TOGHPRI	Rathdrum			0.05	0.00	0.00	No Data	Prob gone
	OF-RDM 0004j	TOGHPRI	Rathdrum			0.23	0.00	0.00	No Data	Prob gone
	OF-RDM 0004k	TOGHPRI	Rathdrum			0.17	0.00	0.00	No Data	Prob gone
	OF-RDM 0004l	TOGHPRI	Rathdrum			0.18	0.00	0.00	No Data	Prob gone
	OF-RDM 0004m	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0004n	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0004o	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0004p	TOGHPRI	Rathdrum			0.18	0.00	0.00	No Data	Prob gone
	OF-RDM 0004q	TOGHPRI	Rathdrum			0.12	0.00	0.00	No Data	Prob gone
	OF-RDM 0004r	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0004s	TOGHPRI	Rathdrum			0.17	0.00	0.00	No Data	Prob gone
	OF-RDM 0004t	TOGHPRI	Rathdrum			0.18	0.00	0.00	No Data	Prob gone
	OF-RDM 0004u	TOGHPRI	Rathdrum			0.22	0.00	0.00	No Data	Prob gone
	OF-RDM 0004v	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0004w	TOGHPRI	Rathdrum			0.18	0.00	0.00	No Data	Prob gone
	OF-RDM 0004x	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0004y	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0004z	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
OF010-162---	OF-RDM 0005	WWIS	Rathdrum	643162	728361	0.35	3.57	4.10	0.53	Gone
OF010-163---	OF-RDM 0006	WWIS	Rathdrum	643186	728417	0.52	4.05	5.03	0.98	Gone
OF010-164---	OF-RDM 0007	UWWIS	Rathdrum	643205	728455	0.86	3.61	5.01	1.41	Gone
OF010-165---	OF-RDM 0008	WWIS	Rathdrum	643226	728500	0.29	4.13	5.02	0.89	Gone
OF010-166---	OF-RDM 0009a	TOGHPRI	Rathdrum	643090	728462	0	2.78	4.27	1.50	Gone
	OF-RDM 0009b	TOGHPRI	Rathdrum			0.26	0.00	0.00	No Data	Prob gone

	OF-RDM 0009c	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0009d	TOGHPRI	Rathdrum			0.1	0.00	0.00	No Data	Prob gone
	OF-RDM 0009e	TOGHPRI	Rathdrum			0.27	0.00	0.00	No Data	Prob gone
	OF-RDM 0009f	TOGHPRI	Rathdrum			0.48	0.00	0.00	No Data	Prob gone
	OF-RDM 0009g	TOGHPRI	Rathdrum			0.56	0.00	0.00	No Data	Prob gone
	OF-RDM 0009h	TOGHPRI	Rathdrum			0.68	0.00	0.00	No Data	Prob gone
	OF-RDM 0009i	TOGHPRI	Rathdrum			0.3	0.00	0.00	No Data	Prob gone
	OF-RDM 0009j	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
	OF-RDM 0009k	TOGHPRI	Rathdrum			0.4	0.00	0.00	No Data	Prob gone
	OF-RDM 0009l	TOGHPRI	Rathdrum			0.65	0.00	0.00	No Data	Prob gone
	OF-RDM 0009m	TOGHPRI	Rathdrum			0.33	0.00	0.00	No Data	Prob gone
	OF-RDM 0009n	TOGHPRI	Rathdrum			0	0.00	0.00	No Data	Prob gone
OF010-167---	OF-RDM 0010	WWIS	Rathdrum	643208	728498	0.18	4.16	5.09	0.93	Gone
OF010-168---	OF-RDM 0011	WWIS	Rathdrum	643212	728507	0.26	4.22	4.83	0.61	Gone
OF010-169---	OF-RDM 0012	WWIS	Rathdrum	643212	728507	0.45	4.22	4.83	0.61	Gone
OF010-170---	OF-RDM 0013	UWWIS	Rathdrum	643212	728508	0.77	4.13	4.89	0.76	Gone
OF010-171---	OF-RDM 0014	WWIS	Rathdrum	643208	728536	0.37	3.64	5.02	1.38	Gone
OF018-055---	OF-RDM 0015	WWIS	Rathdrum	643047	728224	0.14	2.84	4.05	1.21	Gone
OF018-056---	OF-RDM 0016	WWIS	Rathdrum	643053	728237	0.12	2.69	3.82	1.13	Gone
OF010-172---	OF-RDM 0017	UWWIS	Rathdrum	643180	728513	0.19	3.73	4.87	1.14	Gone
OF010-173---	OF-RDM 0018	WWIS	Rathdrum	643186	728528	0.52	3.89	4.96	1.07	Gone
OF018-057---	OF-RDM 0019	WWIS	Rathdrum	643035	728232	0.68	2.40	3.71	1.31	Gone
OF018-058---	OF-RDM 0020	WWIS	Rathdrum	643036	728234	0.24	2.66	3.46	0.80	Gone
OF018-059---	OF-RDM 0021	WWIS	Rathdrum	643045	728253	0.48	2.41	3.55	1.14	Gone
OF018-060---	OF-RDM 0022	WWIS	Rathdrum	643066	728299	0.29	2.29	3.07	0.78	Gone
OF010-174---	OF-RDM 0023	WWIS	Rathdrum	643105	728386	0.48	3.26	4.32	1.06	Gone
OF010-175---	OF-RDM 0024	WWIS	Rathdrum	643162	728507	0.7	3.67	4.24	0.57	Gone
OF010-176---	OF-RDM 0025	UWWIS	Rathdrum	643169	728523	0.17	3.53	4.75	1.23	Gone
OF010-177---	OF-RDM 0026	WWIS	Rathdrum	643176	728538	0.06	3.70	4.53	0.83	Gone
OF018-061---	OF-RDM 0027	UWWIS	Rathdrum	643023	728245	0.36	2.48	3.52	1.03	Gone
OF018-062---	OF-RDM 0028	WWIS	Rathdrum	643035	728270	0.08	2.12	3.52	1.40	Gone
OF018-063---	OF-RDM 0029	WWIS	Rathdrum	643036	728273	0.32	1.99	3.43	1.44	Gone
OF018-064---	OF-RDM 0030	TOGHTER	Rathdrum	643037	728273	0.43	1.99	3.40	1.41	Gone
OF018-065---	OF-RDM 0031	WWIS	Rathdrum	643042	728287	0.39	2.15	3.40	1.26	Gone
OF010-178---	OF-RDM 0032	WWIS	Rathdrum	643036	728309	0.42	1.74	3.09	1.35	Gone
OF010-179---	OF-RDM 0033	WWIS	Rathdrum	643056	728315	0.46	2.01	3.33	1.32	Gone

OF010-180---	OF-RDM 0034	UWWIS	Rathdrum	643057	728315	0.69	2.06	3.34	1.28	Gone
OF010-181---	OF-RDM 0035	WWIS	Rathdrum	643095	728400	0.57	3.22	4.48	1.26	Gone
OF010-182---	OF-RDM 0036	WWIS	Rathdrum	643162	728546	0.3	3.40	4.53	1.12	Gone
OF010-183---	OF-RDM 0037	TOGHTER	Rathdrum	643167	728557	0.46	3.62	4.46	0.84	Gone
OF010-184---	OF-RDM 0038	UWWIS	Rathdrum	643168	728560	0.43	3.51	4.49	0.97	Gone
OF010-185---	OF-RDM 0039	WWIS	Rathdrum	643158	728570	0.17	3.54	4.56	1.01	Gone
OF018-066---	OF-RDM 0040	WWIS	Rathdrum	642999	728228	0.18	2.50	3.56	1.07	Gone
OF018-067---	OF-RDM 0041	WWIS	Rathdrum	643015	728262	0.52	1.92	3.53	1.62	Gone
OF018-068---	OF-RDM 0042	WWIS	Rathdrum	643026	728287	0.7	1.79	3.17	1.37	Gone
OF018-069---	OF-RDM 0043	UWWIS	Rathdrum	643033	728303	0.62	2.07	3.18	1.11	Gone
OF010-186---	OF-RDM 0044	WWIS	Rathdrum	643034	728305	0	1.80	3.22	1.42	Gone
OF010-187---	OF-RDM 0045	WWIS	Rathdrum	643038	728312	0.38	2.13	3.09	0.96	Gone
OF010-188---	OF-RDM 0046	WWIS	Rathdrum	643046	728329	0.4	2.29	3.20	0.91	Gone
OF010-189---	OF-RDM 0047	TOGHSEC	Rathdrum	643018	728380	0.17	3.00	4.37	1.37	Gone
OF010-190---	OF-RDM 0048	WWIS	Rathdrum	643129	728512	0.58	3.36	4.46	1.09	Gone
OF010-191---	OF-RDM 0049	WWIS	Rathdrum	643152	728559	0.19	3.40	4.30	0.90	Gone
OF018-070---	OF-RDM 0050	UWWIS	Rathdrum	642997	728258	0.3	2.04	3.28	1.23	Gone
OF018-071---	OF-RDM 0051	UWWIS	Rathdrum	643014	728298	0.48	1.53	3.08	1.55	Gone
OF010-192---	OF-RDM 0052	UWWIS	Rathdrum	643017	728305	0.38	1.89	3.14	1.25	Gone
OF010-193---	OF-RDM 0053	WWIS	Rathdrum	643028	728329	0.55	2.14	3.46	1.32	Gone
OF010-194---	OF-RDM 0054	WWIS	Rathdrum	643072	728424	0.32	3.01	4.65	1.64	Gone
OF010-195---	OF-RDM 0055	UWWIS	Rathdrum	643077	728435	0.48	3.26	4.58	1.32	Gone
OF010-196---	OF-RDM 0056	UWWIS	Rathdrum	643077	728435	0.2	3.26	4.58	1.32	Gone
OF010-197---	OF-RDM 0057	UWWIS	Rathdrum	643119	728524	0.42	2.94	4.30	1.36	Gone
OF010-198---	OF-RDM 0058	UWWIS	Rathdrum	643120	728525	0.17	3.14	4.29	1.15	Gone
OF010-199---	OF-RDM 0059	WWIS	Rathdrum	643120	728526	0.52	3.10	4.23	1.14	Gone
OF010-200---	OF-RDM 0060	TOGHTER	Rathdrum	643120	728528	0.3	3.00	4.32	1.31	Gone
OF010-201---	OF-RDM 0061	WWIS	Rathdrum	643120	728529	0.21	3.22	4.40	1.18	Gone
OF018-072---	OF-RDM 0062	UWWIS	Rathdrum	642982	728265	0.24	1.94	3.29	1.35	Gone
OF018-073---	OF-RDM 0063	UWWIS	Rathdrum	642987	728276	0.22	1.94	3.08	1.14	Gone
OF018-074---	OF-RDM 0064	WWIS	Rathdrum	643000	728304	0.43	1.54	2.99	1.45	Gone
OF010-202---	OF-RDM 0065	UWWIS	Rathdrum	643004	728312	0.94	1.68	3.05	1.37	Gone
OF010-203---	OF-RDM 0066	TOGHTER	Rathdrum	643019	728343	0.64	2.27	3.76	1.49	Gone
OF010-204---	OF-RDM 0067	WWIS	Rathdrum	643019	728345	0.2	2.53	3.77	1.24	Gone
OF010-205---	OF-RDM 0068	WWIS	Rathdrum	643027	728362	0	2.74	4.05	1.31	Gone
OF010-206---	OF-RDM 0069	WWIS	Rathdrum	643030	728368	0.3	2.82	4.10	1.28	Gone

OF010-207---	OF-RDM 0070	UWWIS	Rathdrum	643031	728372	0.15	3.23	4.40	1.17	Gone
OF010-208---	OF-RDM 0071	UWWIS	Rathdrum	643045	728401	0.88	3.32	4.52	1.20	Gone
OF010-209---	OF-RDM 0072	WWIS	Rathdrum	643070	728456	0	2.79	4.33	1.54	Gone
OF010-210---	OF-RDM 0073	WWIS	Rathdrum	643102	728526	0.56	3.22	4.48	1.27	Gone
OF010-211---	OF-RDM 0074	UWWIS	Rathdrum	643106	728533	0.47	3.16	4.58	1.42	Gone
OF018-075---	OF-RDM 0075	TOGHTER	Rathdrum	642979	728295	0.36	1.85	2.93	1.09	Gone
OF010-212---	OF-RDM 0076	UWWIS	Rathdrum	642983	728304	0.67	1.75	2.92	1.17	Gone
OF010-213---	OF-RDM 0077	UWWIS	Rathdrum	642988	728313	0.66	2.05	2.77	0.72	Gone
OF010-214---	OF-RDM 0078	WWIS	Rathdrum	642992	728321	0.65	2.20	3.14	0.94	Gone
OF010-215---	OF-RDM 0079	WWIS	Rathdrum	643001	728343	0.52	2.57	3.82	1.25	Gone
OF010-216---	OF-RDM 0080	WWIS	Rathdrum	643011	728363	0.64	2.63	4.11	1.48	Gone
OF010-217---	OF-RDM 0081	WWIS	Rathdrum	643011	728366	0.24	3.23	4.18	0.94	Gone
OF010-218---	OF-RDM 0082	UWWIS	Rathdrum	643012	728367	0.04	2.82	4.05	1.23	Gone
OF010-219---	OF-RDM 0083	UWWIS	Rathdrum	643014	728370	0.62	3.03	4.04	1.01	Gone
OF010-220---	OF-RDM 0084	WWIS	Rathdrum	643018	728379	0.19	3.01	4.22	1.21	Gone
OF010-221---	OF-RDM 0085	WWIS	Rathdrum	643044	728438	0	3.14	4.60	1.46	Gone
OF018-076---	OF-RDM 0086	WWIS	Rathdrum	642922	728208	0.62	2.85	3.46	0.61	Gone
OF010-222---	OF-RDM 0087	WWIS	Rathdrum	642971	728316	0.23	2.49	3.31	0.82	Gone
OF010-223---	OF-RDM 0088	UWWIS	Rathdrum	642977	728326	0.07	2.67	3.49	0.82	Gone
OF010-224---	OF-RDM 0089	WWIS	Rathdrum	642986	728346	0.03	3.01	3.59	0.57	Gone
OF010-225---	OF-RDM 0090	UWWIS	Rathdrum	642987	728347	0.35	2.98	3.64	0.66	Gone
---	OF-RDM 0091	FIND	Rathdrum			0	0.00	0.00	No Data	Prob gone
OF010-226---	OF-RDM 0092	WWIS	Rathdrum	642990	728354	0.34	3.12	3.78	0.66	Gone
OF010-227---	OF-RDM 0093	UWWIS	Rathdrum	642993	728364	0.12	3.16	4.14	0.98	Gone
OF010-228---	OF-RDM 0094	UWWIS	Rathdrum	643000	728376	0.55	3.24	3.99	0.75	Gone
OF010-229---	OF-RDM 0095	WWIS	Rathdrum	643040	728463	0.42	3.05	4.11	1.06	Gone
OF010-230---	OF-RDM 0096	WWIS	Rathdrum	643080	728552	0.08	3.63	4.64	1.02	Gone
OF018-077---	OF-RDM 0097	WWIS	Rathdrum	642905	728213	0	0.00	0.00	No Data	Prob gone
OF010-231---	OF-RDM 0098	WWIS	Rathdrum	642956	728320	0.26	2.20	3.35	1.15	Gone
OF010-232---	OF-RDM 0099	UWWIS	Rathdrum	642959	728325	0.11	2.51	3.38	0.87	Gone
OF010-233---	OF-RDM 0100	WWIS	Rathdrum	642961	728332	0	2.50	3.59	1.09	Gone
OF010-234---	OF-RDM 0101	WWIS	Rathdrum	642965	728340	0.15	2.84	3.70	0.86	Gone
OF010-235---	OF-RDM 0102	WWIS	Rathdrum	642969	728350	0.12	2.87	3.92	1.05	Gone
OF010-236---	OF-RDM 0103	WWIS	Rathdrum	642974	728360	0.29	2.86	4.00	1.14	Gone
OF010-237---	OF-RDM 0104	WWIS	Rathdrum	642978	728368	0.34	2.85	4.05	1.20	Gone
OF010-238---	OF-RDM 0105	UWWIS	Rathdrum	642978	728369	0	3.01	4.17	1.16	Gone

OF010-239---	OF-RDM 0106	WWIS	Rathdrum	642983	728379	0.44	3.05	4.02	0.97	Gone
OF010-240---	OF-RDM 0107	WWIS	Rathdrum	642993	728397	0.9	3.14	3.70	0.56	Gone
OF010-241---	OF-RDM 0108	WWIS	Rathdrum	642995	728402	0	3.14	4.16	1.03	Gone
OF010-242---	OF-RDM 0109	WWIS	Rathdrum	643005	728425	0	3.06	4.22	1.16	Gone
OF010-243---	OF-RDM 0110	WWIS	Rathdrum	643006	728427	0.5	3.20	4.04	0.84	Gone
OF010-244---	OF-RDM 0111	WWIS	Rathdrum	643036	728493	0.18	2.74	3.63	0.89	Gone
OF010-245---	OF-RDM 0112	WWIS	Rathdrum	643039	728502	0.08	2.94	4.09	1.15	Gone
OF010-246---	OF-RDM 0113	WWIS	Rathdrum	643069	728566	0	3.34	4.43	1.10	Gone
OF018-078---	OF-RDM 0114	UWWIS	Rathdrum	642875	728179	0.24	0.00	0.00	No Data	Prob gone
OF010-247---	OF-RDM 0115	WWIS	Rathdrum	642947	728336	0.44	2.34	3.56	1.22	Gone
OF010-248---	OF-RDM 0116	WWIS	Rathdrum	642948	728337	0.13	2.62	3.55	0.93	Gone
OF010-249---	OF-RDM 0117	WWIS	Rathdrum	642950	728345	0.45	2.68	3.87	1.18	Gone
OF010-250---	OF-RDM 0118	WWIS	Rathdrum	642953	728349	0.15	2.58	3.93	1.35	Gone
OF010-251---	OF-RDM 0119	WWIS	Rathdrum	642958	728362	0.71	2.51	3.99	1.49	Gone
OF010-252---	OF-RDM 0120	WWIS	Rathdrum	642960	728364	0.19	2.76	3.87	1.10	Gone
OF010-253---	OF-RDM 0121	WWIS	Rathdrum	642961	728365	0.19	2.68	3.63	0.95	Gone
OF010-254---	OF-RDM 0122	UWWIS	Rathdrum	642963	728369	0.1	2.72	3.54	0.82	Gone
OF010-255---	OF-RDM 0123	WWIS	Rathdrum	642966	728376	0.2	2.94	3.76	0.82	Gone
OF010-256---	OF-RDM 0124	UWWIS	Rathdrum	642968	728380	0.51	2.86	4.02	1.16	Gone
OF010-257---	OF-RDM 0125	UWWIS	Rathdrum	642969	728385	0.56	2.74	3.92	1.18	Gone
OF010-258---	OF-RDM 0126	WWIS	Rathdrum	642954	728386	0.08	2.75	4.01	1.26	Gone
OF010-259---	OF-RDM 0127	WWIS	Rathdrum	642971	728390	0.38	2.81	3.98	1.17	Gone
OF010-260---	OF-RDM 0128	WWIS	Rathdrum	642994	728437	0.18	2.62	3.32	0.70	Gone
OF010-261---	OF-RDM 0129	WWIS	Rathdrum	643023	728502	0.1	2.73	3.72	1.00	Gone
OF010-262---	OF-RDM 0130	UWWIS	Rathdrum	643060	728582	0.76	2.83	4.02	1.19	Gone
OF010-263---	OF-RDM 0131	UWWIS	Rathdrum	642930	728332	0.58	2.51	3.66	1.15	Gone
OF010-264---	OF-RDM 0132	UWWIS	Rathdrum	642930	728335	0.42	2.42	3.66	1.24	Gone
OF010-265---	OF-RDM 0133	WWIS	Rathdrum	642932	728338	0.66	2.58	3.54	0.96	Gone
OF010-266---	OF-RDM 0134	TOGHTER	Rathdrum	642934	728342	0.76	2.60	3.60	1.01	Gone
OF010-267---	OF-RDM 0135	TOGHTER	Rathdrum	642939	728354	0.49	2.78	3.81	1.03	Gone
OF010-268---	OF-RDM 0136	WWIS	Rathdrum	642944	728362	0.07	2.73	4.01	1.28	Gone
OF010-269---	OF-RDM 0137	WWIS	Rathdrum	642933	728375	0.07	2.73	3.42	0.68	Gone
OF010-270---	OF-RDM 0138	WWIS	Rathdrum	642950	728376	0.23	2.79	3.95	1.17	Gone
OF010-271---	OF-RDM 0139	WWIS	Rathdrum	642933	728377	0.25	2.54	3.73	1.19	Gone
OF010-272---	OF-RDM 0140	WWIS	Rathdrum	642954	728387	0.53	2.61	4.11	1.50	Gone
OF010-273---	OF-RDM 0141	WWIS	Rathdrum	642964	728407	0.65	2.66	3.58	0.92	Gone

OF010-274---	OF-RDM 0142	WWIS	Rathdrum	642964	728408	0.43	2.61	3.65	1.03	Gone
OF010-275---	OF-RDM 0143	WWIS	Rathdrum	642977	728438	0	2.59	3.98	1.38	Gone
OF010-276---	OF-RDM 0144	WWIS	Rathdrum	642997	728480	0.38	2.38	3.66	1.27	Gone
OF010-277---	OF-RDM 0145	UWWIS	Rathdrum	643004	728495	0.62	2.62	3.48	0.85	Gone
OF010-278---	OF-RDM 0146	UWWIS	Rathdrum	642912	728331	0.68	2.49	3.48	0.99	Gone
OF010-279---	OF-RDM 0147	UWWIS	Rathdrum	642913	728333	0.37	2.29	3.47	1.18	Gone
OF010-280---	OF-RDM 0148	WWIS	Rathdrum	642924	728358	0.84	2.39	3.29	0.90	Gone
OF010-281---	OF-RDM 0149	UWWIS	Rathdrum	642924	728359	0.46	2.24	3.35	1.11	Gone
OF010-282---	OF-RDM 0150	WWIS	Rathdrum	642934	728379	0.54	2.59	3.86	1.27	Gone
OF010-283---	OF-RDM 0151	TOGHTER	Rathdrum	642938	728388	0.21	2.63	3.81	1.18	Gone
OF010-284---	OF-RDM 0152	WWIS	Rathdrum	642942	728399	0.06	2.46	3.78	1.32	Gone
OF010-285---	OF-RDM 0153	WWIS	Rathdrum	642955	728427	0.03	2.56	4.10	1.54	Gone
OF010-286---	OF-RDM 0154	UWWIS	Rathdrum	642963	728444	0.48	2.47	3.87	1.41	Gone
OF010-287---	OF-RDM 0155	UWWIS	Rathdrum	642992	728505	0.12	2.78	3.65	0.87	Gone
OF010-288---	OF-RDM 0156	UWWIS	Rathdrum	642907	728358	0.61	2.42	3.42	1.00	Gone
OF010-289---	OF-RDM 0157	UWWIS	Rathdrum	642909	728363	0.66	2.35	3.33	0.98	Gone
OF010-290---	OF-RDM 0158	UWWIS	Rathdrum	642911	728368	0.32	2.27	3.27	0.99	Gone
OF010-291---	OF-RDM 0159	WWIS	Rathdrum	642920	728386	0.21	2.28	3.27	0.99	Gone
OF010-292---	OF-RDM 0160	UWWIS	Rathdrum	642922	728389	0.43	2.31	3.05	0.74	Gone
OF010-293---	OF-RDM 0161	UWWIS	Rathdrum	642934	728417	0.11	2.69	3.70	1.01	Gone
OF010-294---	OF-RDM 0162	UWWIS	Rathdrum	642946	728442	0.47	2.56	3.84	1.28	Gone
OF010-295---	OF-RDM 0163	WWIS	Rathdrum	642954	728458	0.23	2.58	3.61	1.03	Gone
OF010-296---	OF-RDM 0164	UWWIS	Rathdrum	642907	728394	0	2.80	3.63	0.82	Gone
OF010-297---	OF-RDM 0165	UWWIS	Rathdrum	642908	728395	0.7	2.60	3.53	0.93	Gone
OF010-298---	OF-RDM 0166	WWIS	Rathdrum	642928	728441	0.15	3.13	4.10	0.97	Gone
OF010-299---	OF-RDM 0167	WWIS	Rathdrum	642929	728442	0.29	3.13	4.09	0.96	Gone
OF010-300---	OF-RDM 0168	WWIS	Rathdrum	642930	728444	0.14	3.11	4.16	1.05	Gone
OF010-301---	OF-RDM 0169	UWWIS	Rathdrum	642955	728500	0.66	3.46	4.51	1.05	Gone
OF010-302---	OF-RDM 0170	WWIS	Rathdrum	642924	728431	0.21	3.15	4.19	1.04	Gone
OF010-303---	OF-RDM 0171	UWWIS	Rathdrum	642907	728468	0.11	3.14	4.15	1.01	Gone
OF010-304---	OF-RDM 0172	WWIS	Rathdrum	642872	728433	0.04	2.52	3.82	1.30	Gone
OF010-305---	OF-RDM 0173	TOGHTER	Rathdrum	642881	728448	0.13	2.87	3.91	1.04	Gone
OF010-306---	OF-RDM 0174	WWIS	Rathdrum	642886	728462	0.7	2.67	4.06	1.40	Gone
OF010-307---	OF-RDM 0175	UWWIS	Rathdrum	642900	728492	0.2	2.63	3.84	1.21	Gone
OF010-308---	OF-RDM 0176	WWIS	Rathdrum	642858	728434	0.02	2.76	3.30	0.54	Gone
OF010-309---	OF-RDM 0177	WWIS	Rathdrum	642891	728508	0.15	3.24	4.42	1.18	Gone

OF010-310---	OF-RDM 0178	WWIS	Rathdrum	642895	728518	0.19	3.30	4.49	1.19	Gone
OF010-311---	OF-RDM 0179	WWIS	Rathdrum	642926	728583	0.31	2.30	3.62	1.32	Gone
OF010-312---	OF-RDM 0180	WWIS	Rathdrum	642867	728490	0.39	3.21	4.24	1.03	Gone
OF010-313---	OF-RDM 0181	UWWIS	Rathdrum	642888	728537	0.36	3.17	4.39	1.21	Gone
OF010-314---	OF-RDM 0182	UWWIS	Rathdrum	642853	728497	0.51	3.20	4.32	1.12	Gone
OF010-315---	OF-RDM 0183	WWIS	Rathdrum	642880	728553	0.54	3.06	3.57	0.51	Gone
OF010-316---	OF-RDM 0184	TOGHTER	Rathdrum	642842	728510	0.19	3.14	4.17	1.03	Gone
OF010-317---	OF-RDM 0185	WWIS	Rathdrum	642843	728512	0.57	3.24	4.20	0.96	Gone
OF010-318---	OF-RDM 0186	UWWIS	Rathdrum	642843	728513	0.28	3.30	4.32	1.02	Gone
OF010-319---	OF-RDM 0187	WWIS	Rathdrum	642831	728519	0.32	3.33	4.72	1.39	Gone
OF010-320---	OF-RDM 0188	WWIS	Rathdrum	642815	728525	0.29	3.29	4.69	1.39	Gone
---	OF-RDM 0189	FIND	Rathdrum			0.76	0.00	0.00	No Data	Prob gone
OF010-321---	OF-RDM 0190	UWWIS	Rathdrum	642829	728557	0.35	3.02	4.40	1.37	Gone
OF010-322---	OF-RDM 0191	WWIS	Rathdrum	642849	728597	0	1.89	2.63	0.75	Gone
OF010-323---	OF-RDM 0192	UWWIS	Rathdrum	642803	728533	0.22	3.28	4.73	1.46	Gone
OF010-324---	OF-RDM 0193	WWIS	Rathdrum	642791	728543	0.21	3.95	4.98	1.04	Gone
OF010-325---	OF-RDM 0194	WWIS	Rathdrum	642797	728594	0.36	2.18	3.68	1.50	Gone
OF010-326---	OF-RDM 0195	WWIS	Rathdrum	642797	728881	0.4	4.21	5.21	1.00	Gone
OF010-327---	OF-RDM 0196	UWWIS	Rathdrum	642705	728756	0.28	2.67	2.92	0.24	Gone
OF010-328---	OF-RDM 0197	WWIS	Rathdrum	642713	728775	0.09	2.78	3.26	0.48	Gone
OF010-329---	OF-RDM 0198	WWIS	Rathdrum	642683	728929	0.18	4.35	5.12	0.77	Gone
OF010-330---	OF-RDM 0199	UWWIS	Rathdrum	642242	729135	0.41	4.32	5.76	1.43	Gone
OF010-331---	OF-RDM 0200	WWIS	Rathdrum	642170	729157	0	4.75	5.54	0.79	Gone
OF010-332---	OF-RDM 0201	UWWIS	Rathdrum	642158	729170	0.08	4.74	5.88	1.14	Gone
OF010-333---	OF-RDM 0202	WWIS	Rathdrum	642180	729216	0.36	4.41	5.48	1.08	Gone
OF010-334---	OF-RDM 0203	WWIS	Rathdrum	642129	729139	0	5.18	5.91	0.73	Gone
OF010-335---	OF-RDM 0204	WWIS	Rathdrum	642145	729178	0.1	4.81	5.96	1.16	Gone
OF010-336---	OF-RDM 0205	WWIS	Rathdrum	642148	729184	0.36	4.99	5.95	0.96	Gone
OF010-337---	OF-RDM 0206	UWWIS	Rathdrum	642153	729195	0.35	4.85	5.94	1.09	Gone
OF010-338---	OF-RDM 0207	WWIS	Rathdrum	642163	729216	0.39	4.79	5.93	1.13	Gone
OF010-339---	OF-RDM 0208	WWIS	Rathdrum	642171	729234	0.25	4.76	5.90	1.13	Gone
OF010-340---	OF-RDM 0209	WWIS	Rathdrum	642120	729155	0	4.83	5.69	0.86	Gone
OF010-341---	OF-RDM 0210	UWWIS	Rathdrum	642137	729195	0.32	4.32	5.35	1.03	Gone
OF010-342---	OF-RDM 0211	WWIS	Rathdrum	642144	729212	0.37	4.43	5.39	0.97	Gone
OF010-343---	OF-RDM 0212	WWIS	Rathdrum	642127	729210	0.47	3.93	4.92	0.99	Gone
OF010-344---	OF-RDM 0213	WWIS	Rathdrum	642115	729221	0.29	3.43	4.32	0.89	Gone

OF010-345---	OF-RDM 0214	WWIS	Rathdrum	642125	729242	0	3.76	4.40	0.65	Gone
OF010-346---	OF-RDM 0215	UWWIS	Rathdrum	642130	729253	0.05	3.81	4.56	0.74	Gone
OF010-347---	OF-RDM 0216	WWIS	Rathdrum	642021	729055	0	3.35	4.57	1.22	Gone
OF010-348---	OF-RDM 0217	UWWIS	Rathdrum	642100	729225	0.23	3.34	3.77	0.43	Gone
OF010-349---	OF-RDM 0218	UWWIS	Rathdrum	642103	729230	0.34	3.34	3.91	0.57	Gone
OF010-350---	OF-RDM 0219	UWWIS	Rathdrum	642106	729237	0	3.18	3.79	0.61	Gone
OF010-351---	OF-RDM 0220	UWWIS	Rathdrum	642115	729257	0	3.46	4.36	0.91	Gone
OF010-352---	OF-RDM 0221	UWWIS	Rathdrum	642120	729271	0.19	3.89	4.93	1.04	Gone
OF010-353---	OF-RDM 0222	WWIS	Rathdrum	642102	729267	0.45	3.69	4.68	0.98	Gone
OF010-354---	OF-RDM 0223	WWIS	Rathdrum	642012	729105	0	3.94	4.68	0.74	Gone
OF010-355---	OF-RDM 0224	UWWIS	Rathdrum	642078	729249	0.49	3.34	3.85	0.51	Gone
OF010-356---	OF-RDM 0225	UWWIS	Rathdrum	642091	729277	0.09	3.73	4.49	0.76	Gone
OF010-357---	OF-RDM 0226	UWWIS	Rathdrum	641988	729092	0.13	3.94	4.32	0.38	Gone
---	OF-RDM 0227	FIND	Rathdrum			0	0.00	0.00	No Data	Prob gone
OF010-358---	OF-RDM 0228	WWIS	Rathdrum	641995	729107	0.11	3.62	4.24	0.62	Gone
OF010-359---	OF-RDM 0229	UWWIS	Rathdrum	642086	729303	0.32	3.72	4.22	0.50	Gone
OF010-360---	OF-RDM 0230	WWIS	Rathdrum	642089	729309	0.14	3.61	4.25	0.64	Gone
OF010-361---	OF-RDM 0231	WWIS	Rathdrum	641980	729113	0.35	3.45	4.71	1.26	Gone
OF010-362---	OF-RDM 0232	WWIS	Rathdrum	641988	729127	0	3.01	3.59	0.58	Gone
OF010-363---	OF-RDM 0233	UWWIS	Rathdrum	642050	729265	0.31	2.65	4.02	1.38	Gone
OF010-364---	OF-RDM 0234	WWIS	Rathdrum	642078	729324	0	3.13	4.15	1.02	Gone
OF010-365---	OF-RDM 0235	UWWIS	Rathdrum	642011	729214	0	2.49	3.03	0.55	Gone
OF010-366---	OF-RDM 0236	UWWIS	Rathdrum	642034	729263	0.31	2.60	3.54	0.94	Gone
OF010-367---	OF-RDM 0237	WWIS	Rathdrum	642036	729268	0	2.78	3.48	0.70	Gone
OF010-368---	OF-RDM 0238	UWWIS	Rathdrum	642038	729273	0.18	2.72	3.76	1.03	Gone
OF010-369---	OF-RDM 0239	WWIS	Rathdrum	642045	729288	0.04	3.05	4.13	1.08	Gone
OF010-370---	OF-RDM 0240	UWWIS	Rathdrum	641986	729195	0.11	3.06	3.99	0.93	Gone
OF010-371---	OF-RDM 0241	WWIS	Rathdrum	641989	729203	0	3.04	4.24	1.20	Gone
OF010-372---	OF-RDM 0242	WWIS	Rathdrum	642021	729274	0.23	2.11	3.51	1.40	Gone
OF010-373---	OF-RDM 0243	WWIS	Rathdrum	642033	729297	0	2.65	3.55	0.90	Gone
OF010-374---	OF-RDM 0244	UWWIS	Rathdrum	641898	729042	0.25	4.06	4.89	0.83	Gone
---	OF-RDM 0245	FIND	Rathdrum			0	0.00	0.00	No Data	Prob gone
OF010-375---	OF-RDM 0246	WWIS	Rathdrum	641979	729220	0.13	3.51	4.27	0.76	Gone
OF010-376---	OF-RDM 0247	UWWIS	Rathdrum	642023	729314	0.43	2.29	3.54	1.25	Gone
OF010-377---	OF-RDM 0248	WWIS	Rathdrum	642045	729363	0.2	3.08	3.82	0.74	Gone
OF010-378---	OF-RDM 0249	UWWIS	Rathdrum	641885	729054	0.53	4.67	5.29	0.63	Gone

OF010-379---	OF-RDM 0250	WWIS	Rathdrum	641872	729058	0.33	4.44	5.39	0.95	Gone
OF010-380---	OF-RDM 0251	WWIS	Rathdrum	641973	729276	0.15	2.43	3.40	0.98	Gone
OF010-381---	OF-RDM 0252	WWIS	Rathdrum	641962	729290	0	2.70	3.84	1.13	Gone
-	OF-DAS-001A	Road-gravel/stone	Ballylennon Rathdrum	643256.3	728594.9	0	4.35	4.97	0.62	Gone
-	OF-DAS-001B	Road-gravel/stone	Ballylennon Rathdrum	643235.3	728585.9	0	4.24	5.01	0.78	Gone
-	OF-DAS-001C	Road-gravel/stone	Ballylennon Rathdrum	643208.3	728571.9	0	3.82	4.60	0.79	Gone
-	OF-DAS-001D	Road-gravel/stone	Ballylennon Rathdrum	643209.3	728571.9	0.26	3.92	4.73	0.82	Gone
-	OF-DAS-001E	Road-gravel/stone	Ballylennon Rathdrum	643169.3	728556.9	0	3.78	4.50	0.72	Gone
-	OF-DAS-001F	Road-gravel/stone	Ballylennon Rathdrum	643147.3	728546.9	0	3.49	4.28	0.78	Gone
-	OF-DAS-001G	Road-gravel/stone	Ballylennon Rathdrum	643086.3	728521.9	0.04	3.59	4.46	0.87	Gone
-	OF-DAS-001H	Road-gravel/stone	Ballylennon Rathdrum	643064.3	728513.9	0	3.16	4.12	0.96	Gone
-	OF-DAS-001I	Road-gravel/stone	Ballylennon Rathdrum	643040.3	728502.9	0	2.86	3.92	1.06	Gone
-	OF-DAS-001J	Road-gravel/stone	Ballylennon Rathdrum	643018.3	728493.9	0	2.61	3.98	1.37	Gone
-	OF-DAS-001K	Road-gravel/stone	Ballylennon Rathdrum	642982.3	728477.9	0	2.94	3.94	1.00	Gone
-	OF-DAS-001L	Road-gravel/stone	Ballylennon Rathdrum	642975.3	728472.9	0	2.52	3.93	1.41	Gone
-	OF-DAS-001M	Road-gravel/stone	Ballylennon Rathdrum	642938.3	728457.9	0	3.05	3.79	0.74	Gone
-	OF-DAS-001N	Road-gravel/stone	Ballylennon Rathdrum	642935.3	728452.9	0	3.04	3.95	0.92	Gone
-	OF-DAS-001O	Road-gravel/stone	Ballylennon Rathdrum	642918.4	728448.9	0	3.37	4.18	0.81	Gone
-	OF-DAS-001P	Road-gravel/stone	Ballylennon Rathdrum	642895.4	728432.9	0	2.82	3.73	0.91	Gone
-	OF-DAS-001Q	Road-gravel/stone	Ballylennon Rathdrum	642848.4	728413.9	0	2.56	3.30	0.75	Gone
-	OF-DAS-001R	Road-gravel/stone	Ballylennon Rathdrum			0	0.00	0.00	No Data	Prob gone
-	OF-DAS-001S	Road-gravel/stone	Ballylennon Rathdrum			0	0.00	0.00	No Data	Prob gone
-	OF-DAS-001T	Road-gravel/stone	Ballylennon Rathdrum			0	0.00	0.00	No Data	Prob gone
-	OF-DAS-002	Structure-peatland	Rathdrum	643144.3	728392.9	0	3.27	4.49	1.22	Gone
OF010-496---	OF-DAS-003	Structure-peatland	Rathdrum	643044.3	728254	0.08	2.23	3.64	1.41	Gone
OF010-490---	OF-DAS-004	Structure-peatland	Rathdrum	643117.3	728489.9	0	3.55	4.75	1.20	Gone
-	OF-DAS-005	Platform	Rathdrum	643081.3	728555.9	0	3.60	4.58	0.98	Gone

-	OF-DAS-006	Structure-peatland	Rathdrum	643018.3	728412.9	0	3.69	4.46	0.77	Gone
-	OF-DAS-007	Platform	Rathdrum	643017.3	728406.9	0	3.82	4.65	0.82	Gone
-	OF-DAS-008A	Road- Class 2 togher	Rathdrum	642971.3	728343.9	0	3.22	4.04	0.82	Gone
OF010-493---	OF-DAS-008B	Road- Class 2 togher	Rathdrum	642944.3	728319.9	0	2.98	3.84	0.85	Gone
-	OF-DAS-009	Road- Class 3 togher	Rathdrum	642971.3	728376.9	0	3.30	4.35	1.04	Gone
-	OF-DAS-010	Platform	Rathdrum	643060.3	728580.9	0	2.93	3.45	0.51	Gone
-	OF-DAS-011	Road- Class 3 togher	Rathdrum	642939.3	728347.9	0	3.04	3.85	0.81	Gone
-	OF-DAS-012	Platform	Rathdrum	642967.3	728410.9	0	2.85	3.92	1.07	Gone
-	OF-DAS-013	Road- Class 3 togher	Rathdrum	642938.3	728412.9	0	3.10	4.10	1.00	Gone
-	OF-DAS-014	Structure-peatland	Rathdrum	642981.3	728551.9	0	3.44	4.53	1.10	Gone
-	OF-DAS-015	Platform	Rathdrum	642861.4	728428.9	0	3.14	4.08	0.94	Gone
-	OF-DAS-016A	Road- Class 2 togher	Rathdrum	642855.4	728494.9	0	3.58	4.51	0.93	Gone
-	OF-DAS-016B	Road- Class 2 togher	Rathdrum	642847.4	728508.9	0	3.67	4.74	1.07	Gone
-	OF-DAS-016C	Road- Class 2 togher	Rathdrum	642842.4	728517.9	0	3.75	4.95	1.20	Gone
-	OF-DAS-017A	Road- Class 3 togher	Rathdrum	642818.4	728449.9	0	3.32	4.27	0.95	Gone
OF010-492---	OF-DAS-017B	Road- Class 3 togher	Rathdrum	642808.4	728457.9	0	3.44	4.38	0.94	Gone
-	OF-DAS-018	Structure-peatland	Rathdrum	642798.4	728447.9	0	3.30	3.90	0.59	Gone
-	OF-DAS-019	Structure-peatland	Rathdrum	642797.4	728441.9	0	3.26	4.18	0.93	Gone
-	OF-DAS-020	Structure-peatland	Rathdrum	642815.4	728480.9	0	3.25	4.33	1.08	Gone
-	OF-DAS-021A	Road- Class 2 togher	Rathdrum	642833.4	728518.9	0	3.78	4.94	1.15	Gone
-	OF-DAS-021B	Road- Class 2 togher	Rathdrum	642828.4	728517.9	0	3.62	4.82	1.20	Gone
OF010-500---	OF-DAS-021C	Road- Class 2 togher	Rathdrum	642812.4	728530.9	0	3.82	4.94	1.12	Gone
-	OF-DAS-021D	Road- Class 2 togher	Rathdrum	642794.4	728543.9	0	4.22	4.83	0.61	Gone
-	OF-DAS-022	Structure-peatland	Rathdrum	642792.4	728498.9	0	3.59	4.75	1.16	Gone
OF010-498---	OF-DAS-023	Platform	Rathdrum	642825.4	728575.9	0	2.94	4.05	1.12	Gone
-	OF-DAS-024A	Road-gravel/stone	Rathdrum	643302.3	728665.9	0	1.75	1.99	0.25	Gone
-	OF-DAS-024B	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024C	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024D	Road-gravel/stone	Rathdrum	643250.3	728662.9		0.00	0.00	No Data	Prob gone
-	OF-DAS-024E	Road-gravel/stone	Rathdrum	643234.3	728660.9		0.00	0.00	No Data	Prob gone
-	OF-DAS-024FF	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024GG	Road-gravel/stone	Rathdrum				3.58	3.93	0.36	Gone
-	OF-DAS-024H	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024I	Road-gravel/stone	Rathdrum				3.84	4.31	0.47	Gone

-	OF-DAS-024J	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024K	Road-gravel/stone	Rathdrum	643130.3	728656.9		0.00	0.00	No Data	Prob gone
-	OF-DAS-024L	Road-gravel/stone	Rathdrum	643111.3	728652.9		1.55	1.98	0.43	Gone
-	OF-DAS-024M	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024N	Road-gravel/stone	Rathdrum				1.81	2.13	0.31	Gone
-	OF-DAS-024O	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024P	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024Q	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024R	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024S	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024T	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024U	Road-gravel/stone	Rathdrum	642954.3	728637.9		3.21	3.49	0.29	Gone
-	OF-DAS-024V	Road-gravel/stone	Rathdrum	642938.3	728639.9		0.00	0.00	No Data	Prob gone
-	OF-DAS-024W	Road-gravel/stone	Rathdrum				3.10	3.33	0.24	-0.24
-	OF-DAS-024X	Road-gravel/stone	Rathdrum				2.08	2.59	0.51	-0.51
-	OF-DAS-024Y	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024Z	Road-gravel/stone	Rathdrum				2.09	2.79	0.70	-0.70
-	OF-DAS-024AA	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024BB	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024CC	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024DD	Road-gravel/stone	Rathdrum				0.00	1.66	1.66	Gone
-	OF-DAS-024EE	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024FF	Road-gravel/stone	Rathdrum	642768.4	728634.9		0.00	0.00	No Data	Prob gone
-	OF-DAS-024GG	Road-gravel/stone	Rathdrum	642749.4	728630.9		0.00	0.00	No Data	Prob gone

-	OF-DAS-024HH	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024II	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024JJ	Road-gravel/stone	Rathdrum				2.15	2.62	0.47	Gone
-	OF-DAS-024KK	Road-gravel/stone	Rathdrum				2.03	2.43	0.40	Gone
-	OF-DAS-024LL	Road-gravel/stone	Rathdrum	642655.4	728610.9		0.00	0.00	No Data	Prob gone
-	OF-DAS-024MM	Road-gravel/stone	Rathdrum	642636.4	728610.9		0.00	0.00	No Data	Prob gone
-	OF-DAS-024NN	Road-gravel/stone	Rathdrum				0.00	0.00	No Data	Prob gone
-	OF-DAS-024OO	Road-gravel/stone	Rathdrum	642607.4	728615.9		0.00	0.00	No Data	Prob gone
OF010-495---	OF-DAS-025	Structure-peatland	Rathdrum	642830.4	728873.8	0	4.82	5.74	0.92	Gone
-	OF-DAS-026	Platform	Rathdrum	642677.4	728545.9	0	3.35	4.30	0.96	Gone
-	OF-DAS-027	Structure-peatland	Rathdrum	642697.4	728658.9	0	1.34	2.42	1.08	Gone
OF010-497---	OF-DAS-028	Structure-peatland	Barnaboy	642309.5	729352.7	0.13	5.12	5.78	0.66	Gone
OF010-491---	OF-DAS-029	Platform	Barnaboy	642283.5	729296.7	0	5.08	5.78	0.71	Gone
-	OF-DAS-030	Platform	Barnaboy	642315.5	729467.7	0	5.17	6.09	0.92	Gone
-	OF-DAS-031	Platform	Barnaboy	642304.5	729479.7	0	5.09	6.17	1.08	Gone
-	OF-DAS-032	Platform	Barnaboy	642284.5	729514.7	0	4.89	5.77	0.88	Gone
-	OF-DAS-033	Structure-peatland	Barnaboy	642263.5	729472.7	0	5.09	6.08	0.98	Gone
-	OF-DAS-034	Structure-peatland	Rathdrum	642136.5	729200.8	0	4.60	5.73	1.13	Gone
-	OF-DAS-035	Structure-peatland	Rathdrum	642142.5	729244.8	0	4.07	5.07	1.00	Gone
-	OF-DAS-036	Structure-peatland	Rathdrum	642132.5	729253.8	0	4.09	5.16	1.08	Gone
OF010-494---	OF-DAS-037	Structure-peatland	Rathdrum	642138.5	729272.7	0.12	3.59	4.74	1.15	Gone
-	OF-DAS-038	Structure-peatland	Barnaboy	642187.5	729385.7	0	4.49	5.58	1.09	Gone
-	OF-DAS-039	Structure-peatland	Barnaboy	642189.5	729453.7	0	4.84	5.67	0.83	Gone
-	OF-DAS-040	Road- Class 3 togher	Barnaboy	642241.5	729550.7	0	4.96	5.98	1.02	Gone
-	OF-DAS-041	Structure-peatland	Barnaboy	642239.5	729564.7	0	4.68	5.97	1.30	Gone
-	OF-DAS-042	Road-unclassified togher	Barnaboy	642271.5	729522.7	0	4.57	5.58	1.01	Gone
-	OF-DAS-043	Structure-peatland	Barnaboy	642273.5	729471.7	0	5.51	6.46	0.95	Gone
OF010-499---	OF-DAS-044	Platform	Barnaboy	642224.5	729424.7	0	4.45	5.71	1.26	Gone
-	OF-DAS-045	Structure-peatland	Barnaboy	642237.5	729403.7	0	5.31	6.27	0.95	Gone
-	OF-DAS-046	Structure-peatland	Barnaboy	642243.5	729397.7	0	5.30	6.29	0.99	Gone
-	OF-DAS-047	Platform	Barnaboy	642211.5	729421.7	0	5.06	5.99	0.93	Gone
-	OF-DAS-048	Structure-peatland	Barnaboy	642241.5	729493.7	0	4.87	5.57	0.70	Gone
-	OF-DAS-049	Structure-peatland	Barnaboy	642251.5	729517.7	0	4.58	5.65	1.07	Gone
-	OF-DAS-050	Structure-peatland	Barnaboy	642208.5	729465.7	0	4.96	5.97	1.01	Gone

-	OF-DAS-051A	Road- Class 2 togher	Barnaboy	642250.5	729695.7	0.06	3.58	4.40	0.82	Gone
OF010-501---	OF-DAS-051B	Road- Class 2 togher	Barnaboy	642222.5	729675.7	0.32	4.08	5.72	1.64	Gone

Table 6. Sightings of archaeological material in Daingean Rathdrum Bog. With depth of bog removed at each location since 2008.

Recommendations

Although there are 534 known sightings of archaeological material in the rehabilitation area, analysis of harvesting data indicates that none of the sightings survive *in situ*. Therefore, there are no known surviving archaeological sightings in the rehabilitation area. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also 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. Between 2001-2013 534 sightings of archaeological material were made in Daingean-Rathdrum Bog. Analysis of the depths of material harvested from the bog since 2008 indicates that 435 sightings have been removed and the remaining sightings have probably been removed. Therefore, there are no known surviving archaeological sightings in the rehabilitation area. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also 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 January2023

APPENDIX XIII. WATER QUALITY

These results cover the period from July to December 2022 and are from 3 the main surface water outlets from the sections of bog to be rehabilitated in 2023.

Monthly ammonia concentrations from both bogs from July to November 2022 had a range of 0.028 to 0.981 mg/l with an average of 0.251 mg/l. Results for suspended solids for the same period indicate a range of 2 to 4 mg/l with an average of 2.25 mg/l.

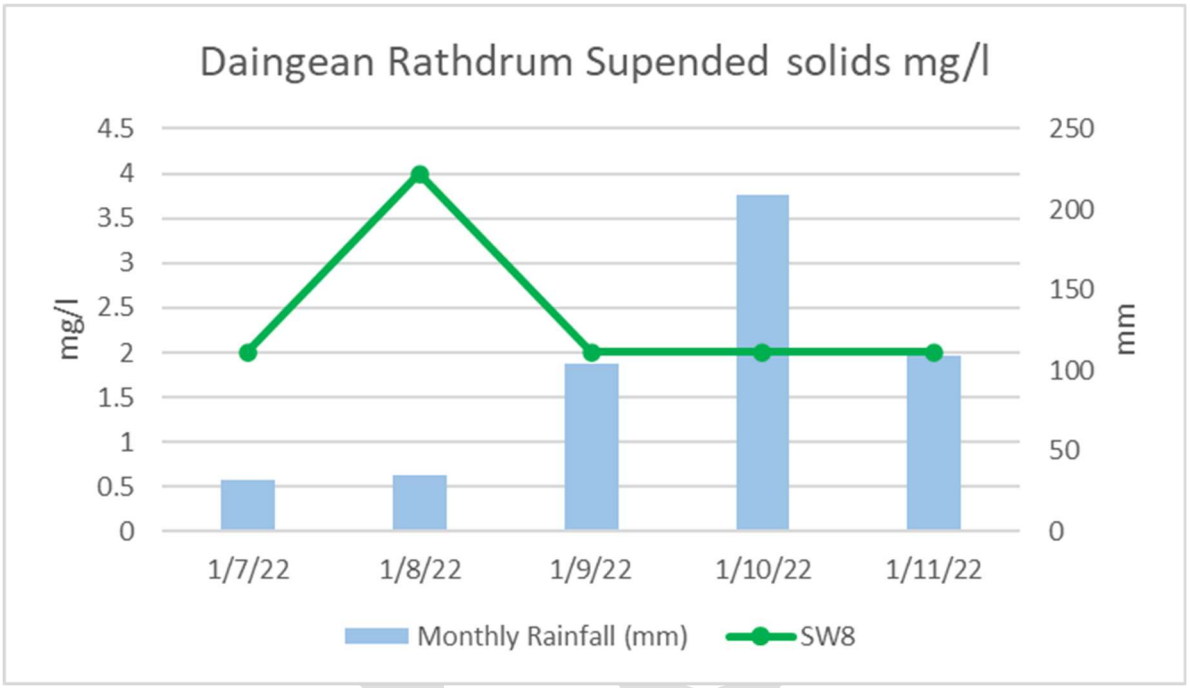

Figure AP13.1 Suspended solids in water sampling at Daingean Rathdrum from different discharge points.

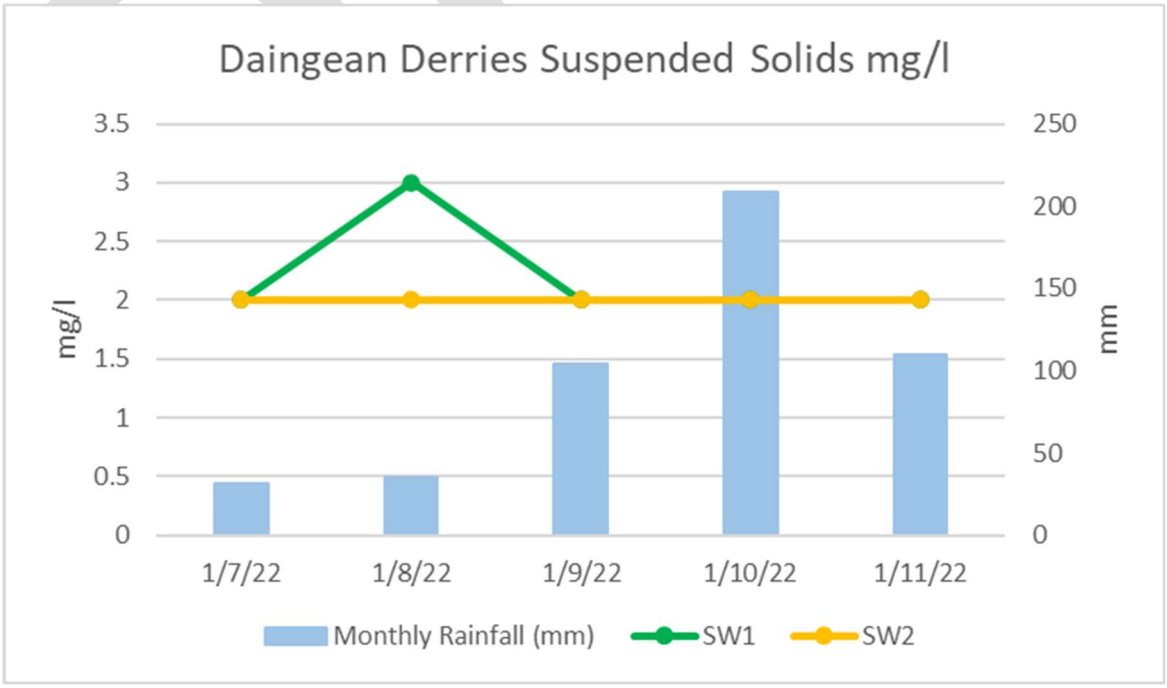

Figure AP13.2 Suspended solids in water sampling at Daingean Derries from different discharge points.

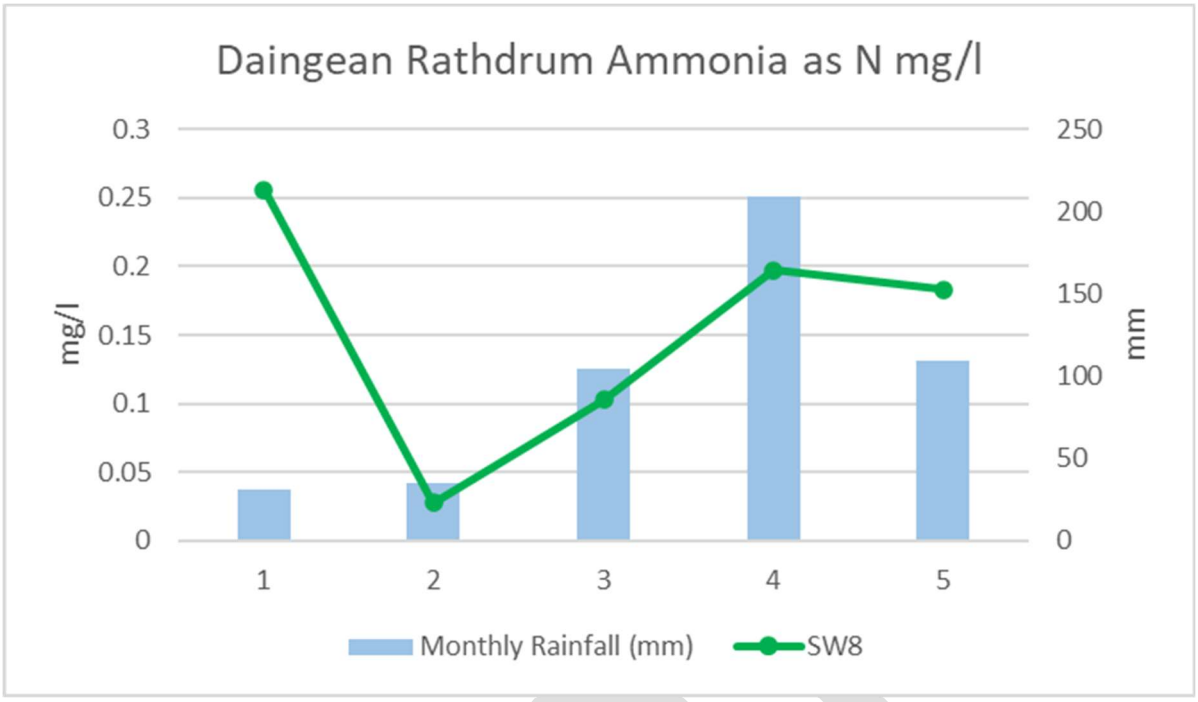

Figure AP13.3 Ammonia concentrations in water sampling from Daingean Rathdrum from different discharge points.

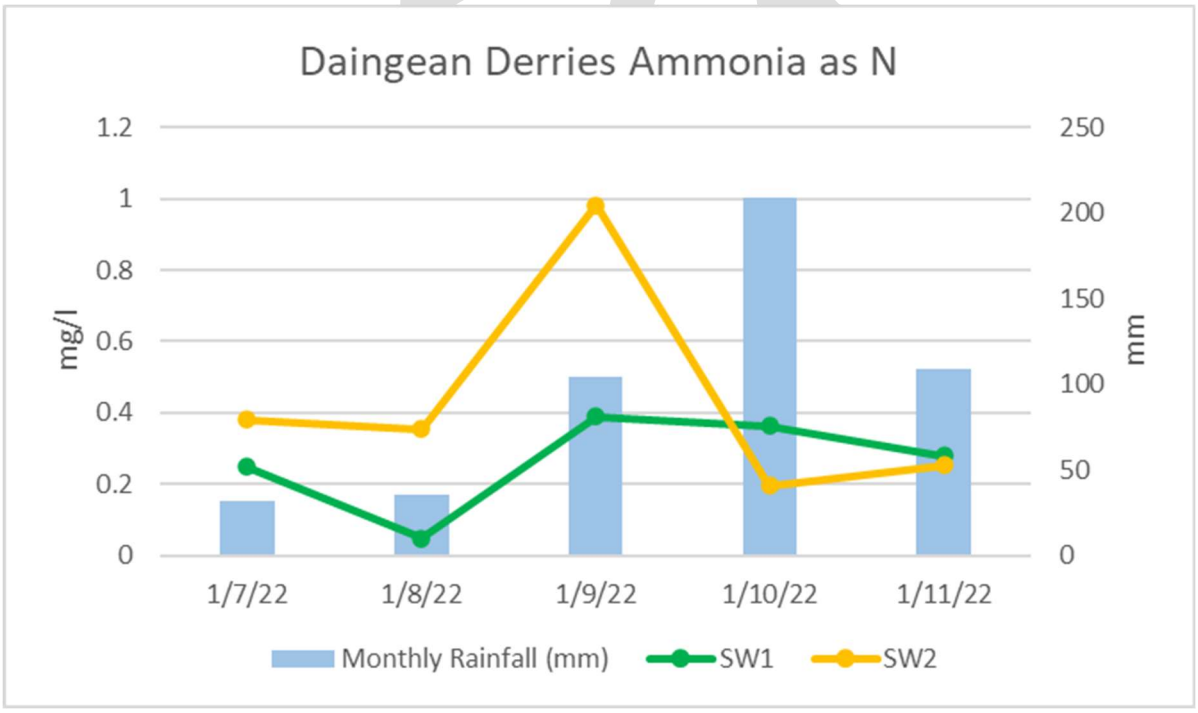

Figure AP13.4 Ammonia concentrations in water sampling from Daingean Derries from different discharge points.

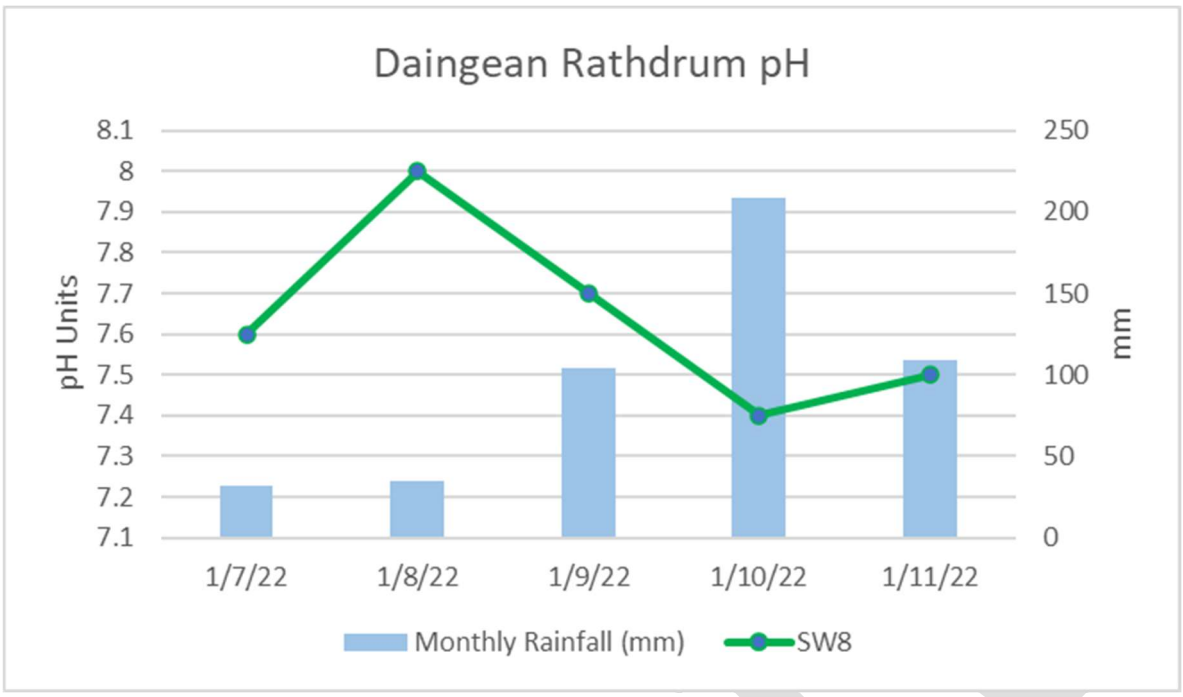

Figure AP13.2 pH in water sampling at Daingean Rathdrum from different discharge points.

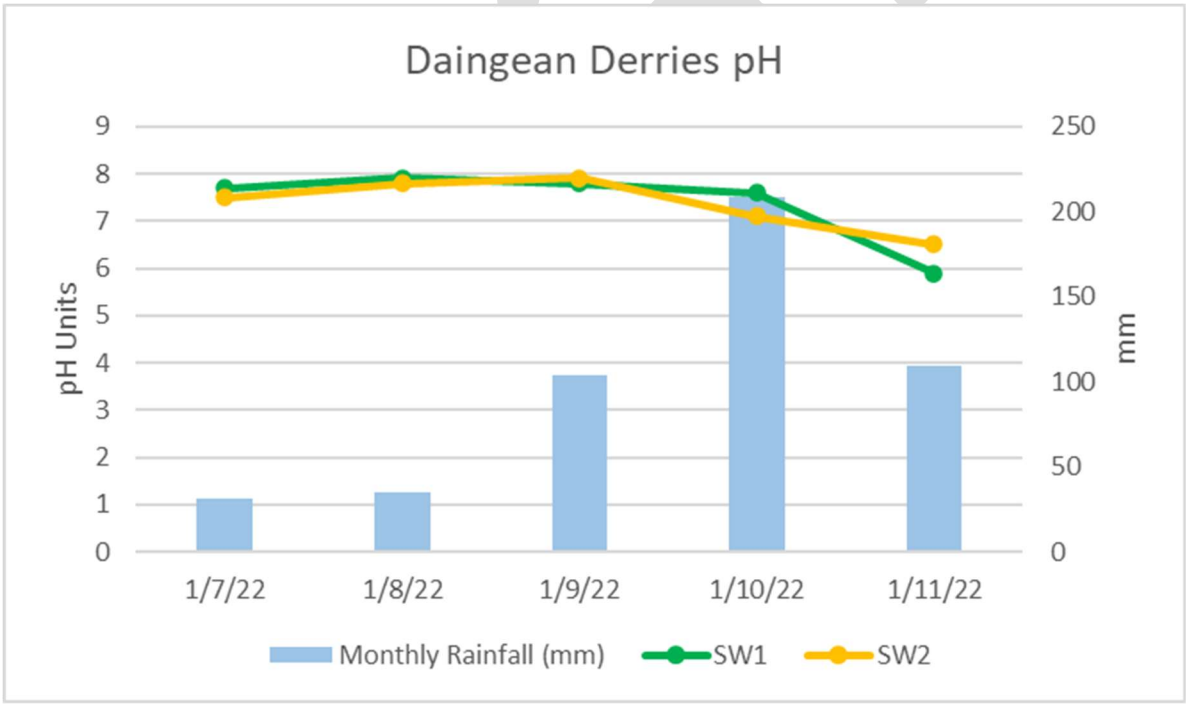

Figure AP13.2 pH in water sampling at Daingean Derries from different discharge points.

Table AP13.1. Water Quality Monitoring Results July to December 2022

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Rathdrum	SW8	2	4	2	2	2
			Monthly Rainfall (mm)	31.6	35.2	104.1	208.8	109.3
PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Rathdrum	SW8	123	80.6	188	232	151
PCAS SW Sampling Scheme				COD	COD	COD	COD	COD
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Rathdrum	SW8	31	32	59	46	47
PCAS SW Sampling Scheme				pH	pH	pH	pH	pH
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	pH Units	pH Units	pH Units	pH Units	pH Units
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Rathdrum	SW8	7.6	8	7.7	7.4	7.5
			Monthly Rainfall (mm)	31.6	35.2	104.1	208.8	109.3
PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Rathdrum	SW8	0.09	0.05	0.05	0.05	0.15
PCAS SW Sampling Scheme				TS	TS	TS	TS	TS
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Rathdrum	SW8	572	548	444	352	521
PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Rathdrum	SW8	0.256	0.028	0.103	0.197	0.183
			Monthly Rainfall (mm)	31.6	35.2	104.1	208.8	109.3
PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Rathdrum	SW8	14.7	12.8	21.2	20.1	17.3

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Derries	SW1	2	3	2	2	2
Allen Group	P0503-01	Daingean Derries	SW2	2	2	2	2	2
			Monthly Rainfall (mm)	31.6	35.2	104.1	208.8	109.3
PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Derries	SW1	202	125	153	220	281
Allen Group	P0503-01	Daingean Derries	SW2	376	144	260	377	313
PCAS SW Sampling Scheme				COD	COD	COD	COD	COD
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Derries	SW1	64	60	48	60	71
Allen Group	P0503-01	Daingean Derries	SW2	86	60	76	86	70
PCAS SW Sampling Scheme				pH	pH	pH	pH	pH
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	pH Units	pH Units	pH Units	pH Units	pH Units
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Derries	SW1	7.7	7.9	7.8	7.6	5.9
Allen Group	P0503-01	Daingean Derries	SW2	7.5	7.8	7.9	7.1	6.5
			Monthly Rainfall (mm)	31.6	35.2	104.1	208.8	109.3
PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Derries	SW1	0.05	0.05	0.05	0.05	0.05
Allen Group	P0503-01	Daingean Derries	SW2	0.05	0.05	0.05	0.05	0.05
PCAS SW Sampling Scheme				TS	TS	TS	TS	TS
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Derries	SW1	267	311	230	287	51
Allen Group	P0503-01	Daingean Derries	SW2	270	407	304	176	278
PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Derries	SW1	0.249	0.047	0.389	0.364	0.279
Allen Group	P0503-01	Daingean Derries	SW2	0.38	0.354	0.981	0.195	0.253
			Monthly Rainfall (mm)	31.6	35.2	104.1	208.8	109.3
PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC
Bog Group	**Licence No**	**Bog Name**	**SW Code -GIS**	mg/l	mg/l	mg/l	mg/l	mg/l
				1/7/22	1/8/22	1/9/22	1/10/22	1/11/22
Allen Group	P0503-01	Daingean Derries	SW1	24.5	21.7	20.3	23.3	25
Allen Group	P0503-01	Daingean Derries	SW2	32.3	23.2	27.2	35.1	25.9