4. PROJECT DESCRIPTION

4.1 Introduction

As described in Chapter 1, 1988 is taken as the baseline assessment year for this rEIAR as this is the latest date that the EIA Directive (Council Directive 85/337/EEC) was required to be transposed into Irish legislation. This approach has been taken on a precautionary basis and strictly without prejudice, as EIA may not have been a legal requirement at that time. The assessment period for the rEIAR is from July 1988 to the present day.

This chapter of the rEIAR provides a description of:

i. The activities employed at the Application Site from 1935 at the onset of preparation works up to July 1988 (described in Section 4.3);

ii. The baseline environment as of July 1988 (described in Section 4.4);

iii. Peat extraction and ancillary activities from July 1988 to the cessation of peat extraction in June 2020 (described in Section 4.5);

iv. The management of the Application Site since June 2020 (described in Section 4.8); and,

The activities intended to be carried out at the Application Site into the future (described in Section 4.9 and 4.10). The elements of the Project as described in this chapter are the baseline as of July 1988, the activities from July 1988 to the cessation of peat extraction in June 2020, the management of the Application Site since June 2020, and the activities relating to historic peat extraction intended to be carried out at the Application Site into the future (as described in Sections 4.4 to 4.10 inclusive).

Section 177E of the *Planning and Development Act 2000*, as amended, permits an application to be made for substitute consent in respect of development which has been carried out where an EIA, screening for EIA and/or AA was or is required.

Neither the EIA Directive (*Directive 85/337/EEC* repealed by *Directive 2011/92/EU* and codified by *Directive 2014/52/EU*) nor the Habitats Directive (*Directive 92/43/EEC*) has retrospective effect; neither Directive imposes legal requirements to have carried out prior assessments of projects which had already commenced or been completed. There was, therefore, no legal requirement for EIA, screening for EIA or AA in respect of *any* project prior to the latest dates for transposition of the Directives. In the case of the EIA Directive, the latest date for transposition was 3rd July 1988. In the case of the Habitats Directive, the latest date for transposition was 10th June 1994.

Accordingly, this application for substitute consent is, of necessity, confined to the development which took place after those dates. The baseline against which the environmental effects of the development required to be assessed has therefore been identified as being the position as of July 1988 (being the earlier of the transposition dates of the relevant Directives).

However, as the Project formed part of a project which commenced many years prior to those dates, in order to facilitate as complete an assessment as possible of the Project since July 1988, a description of the Application Site and the peat extraction and ancillary activities which took place there up to July 1988 are included in this chapter (see Section 4.4).

Although no EIA or AA can be required of development which took place prior to the latest date for the required transposition of the EIA Directive it is clear that in considering cumulative or in combination effects of development to which the EIA Directive does apply, it is necessary to consider the effects of that development cumulatively or in combination with existing development, even

development which took place before the EIA Directive came into force: see Case C-142/16, *Commission v Germany*. Moreover, where an application for consent relates to development which is functionally interdependent on another development such that they should be considered part of the same project, it is necessary to carry out a cumulative assessment of the separate parts of that project: see *O'Grianna v An Bord Pleanála* [2014] IEHC 632; *Fitzpatrick v An Bord Pleanála* [2019] 3 IR 617.

In this case, therefore, in carrying out any EIA or AA, it will be necessary to consider the cumulative or in-combination effects of the development which has taken place since July 1988 with that which had already taken place prior to that date in order to properly consider those cumulative or in-combination effects. The development which took place before and after that date are part of a single project. It is necessary and appropriate, therefore, that the development which took place before 3rd July 1988 is adequately described to enable that cumulative or in-combination assessment to be completed.

The historic activities described within this chapter include: the peat extraction processes, the construction, operation, and maintenance of supporting infrastructure, a description of ancillary activities undertaken and decommissioning works which have been carried out to date. Current onsite activities and infrastructure as well as the likely proposed future remedial measures (see Section 4.7, Section 4.8 and Section 4.9) which will be implemented at the Application Site in the form of Draft and one Final Cutaway Bog Decommissioning and Rehabilitation Plans, subject to the agreement of the EPA, required under Condition 10 of the IPC Licence for the Allen Bog Group (Reg. No. P0503-01), are also described. Please see Appendix 4-1 for a copy of the IPC Licence, including Amendments.

Peat extraction and ancillary activities are historic, with a considerable number of activities and site preparation works pre-dating both the commencement of the formal Irish planning system (i.e., were first carried out prior to the establishment of the *Planning & Development Act 1963* (which was enacted on 1st October 1964)) as well as the required transposition dates of the EIA and Habitats Directive in 1988 and 1994, respectively. Other infrastructure such as workshops and storage were also developed prior to the commencement of the formal planning system, while other ancillary services and infrastructure such as extensions to buildings, railway infrastructure and peat storage were previously granted their own respective planning consents, where required (refer to Section 4.2.3, which discusses the location of relevant ancillary structures and features in relation to the Application Site boundary, and Chapter 2: Background of the rEIAR for the full planning history associated with the Application Site). This infrastructure is included below and considered within the overall rEIAR assessment.

4.1.1 Statement of Authority

This section of the rEIAR has been prepared by Karen O'Neill and Robert Kennedy, and reviewed by Ellen Costello and Sean Creedon, of MKO.

Sean Creedon

Sean Creedon is an Associate Director in the Environmental department at MKO. He leads a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of wind farm project delivery. Sean's professional experience includes the development and management of a portfolio of wind farm developments to the consenting decision. He is a member of the MKO senior management team. Sean has over 23 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland. Sean holds the position of Project Director on all of MKO's wind farm projects since August 2023.

Ellen Costello

Ellen Costello is a Senior Environmental Scientist with MKO with over six years of experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Since joining MKO, Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs.

Robert Kennedy

Robert is a Project Environmental Scientist with MKO. Robert holds an MSc (Hons) in Environmental Policy, and a BSc (Hons) in Environmental Biology, both from University College Dublin. Robert joined MKO in June 2022 and has experience in the project management of large-scale renewable energy projects, including both onshore and offshore wind farms, alongside project management of an rEIAR for a wind farm substitute consent application in Co. Donegal.

Karen O'Neill

Karen O'Neill is a Project Environmental Scientist with MKO with over 5 years of experience in private consultancy. Karen holds a BA (Joint Hons) in Geography and Archaeology, and a MSc (Hons) in Environmental Science where she focused her studies on environmental and planning policy. Karen's key strengths and expertise are project management, report writing and review, and preparation of Environmental Impact Assessment Reports. Through previous roles, Karen has been involved as part of the project delivery team for a range of renewable energy infrastructure projects, including onshore and offshore wind energy developments, and multifaceted projects comprising wind energy, solar energy, battery storage and associated electrical infrastructure. Responsibilities for same included feasibility and constraints analysis, project management, draft and review of various EIAR chapters, mapping, and engagement with stakeholders. Karen has experience assisting in the co-ordination of rEIARs for a wind farm substitute consent application in Co. Donegal.

4.1.2 Project Description Information Sources

The following information sources were used in compiling this Chapter:

- Integrated Pollution Control (IPC) Licence Allen Bog Group (Reg. No. P0503-01) Environmental Protection Agency (included in Appendix 4-1);
- BnM Cutaway Bog Decommissioning and Rehabilitation Plans, (included in Appendix 4-2):
    - Ballydermot Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026;
    - Barnaran Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026;
    - Blackriver Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026;
    - Codd Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026;
    - Derrybrennan Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026;
    - Glashabaun Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026;
    - Killinagh Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026;
    - Lullybeg Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026;
    - Lullymore Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026;
    - Ticknevin Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026; and

- Lodge Bog Final Cutaway Bog Decommissioning and Rehabilitation Plan 2022;
- BnM Annual Reports 1946-2025 which contain information relevant to the Application Site;
- Clarke, Donal, *Brown Gold, A History of Bord na Móna and the peat industry in Ireland* (2010);
- IPC Licence (Ref. P0503-01) Annual Environmental Reports (AERs) 2000 to 2025 (included in Appendix 4-3) (AERs from 2018 to 2025 are also publicly available[1]);
- Inspection of production records from Ballydermot, Lullymore and Blackriver Works;
- IPC Licence P0503-01 Application 2000 (Available at EPA Headquarters on request);
- Aerial imagery for the years 1973, 1988, 1995, 2004 and 2020 (included in Appendix 4-4);
- Personal communications with former BnM Employees;
- BnM, *Bord na Móna Biodiversity Action Plan 2016-2021* (2016) Brosna Press, Ferbane (included in Appendix 4-13);
- Harkins, Jim, *Silt Control Report for Peat Energy Division* (Internal BnM Report) (1991) (Appendix 4-9);
- Silt Control Study No. 1 – Internal Bord na Móna Report 1983 (included in Appendix 4-14);
- Silt Committee, Interim Report Recommended Measures 1976 (included in Appendix 4-6);
- Silt Committee Meeting Records Derrygreenagh 1984 (included in Appendix 4-8);
- Silt Committee, Excavator records 1984 (included in Appendix 4-7);
- Drainage Study with Particular Reference to Pumping – Internal BnM Report 1984 (included in Appendix 4-15);
- BnM, *Environmental and Operational Procedures for the Protection of Surface Water* (included in Appendix 4-11);
- Industrial Cutaway Bog Land-Use Studies (Clonsast) – Internal BnM Report 1978 (included in Appendix 4-19);
- Peco Harvester Tests – Internal BnM Report 1986 (included in Appendix 4-16);
- Distribution and Nature of Ash Material in a Milled Peat Stockpile – Internal BnM Report 1982 (included in Appendix 4-17);
- Regional Administration in Relation to Milled Peat Operation – Internal BnM Report 1988 (included in Appendix 4-18);
- Irish Engineers Journal Supplement 1970 (p.13-15);
- BnM Living History website[2];
- BnM Peat Development in Ireland 1954 (included in Appendix 4-10);
- Planning Drawings; Site Layout Drawings (included as Appendix 4-12);
- BnM IPC Licence Training Programme (included as Appendix 4-5).

4.1.3 Information Required for the Description of the Project

Article 5(1) of Annex IV of Directive 2014/52/EU and amending Directive 2011/92/EU outlines the items that should be included in an EIAR when assessing the effects of certain public and private projects on the environment. Item 1 of Annex IV is reproduced in Table 4-1 and lists what should be included in the description of the Project. These items are described in detail in this chapter and associated appendices. They can also be found in more detail in their respective chapters.

[1] Annual Environmental Reports 2018-2025 available at: https://leap.epa.ie/licence-profile/P0503
[2] *Available at: https://www.bordnamonalivinghistory.ie/*

Table 4-1 Information referred to in Article 5(1) Annex IV of Directive 2014/52/EU, 2011/92/EU to be included in the description of the Project.

	Description of the Project, including in particular:	Relevance to application	Location In rEIAR
a)	*a description of the location of the project;*	The Application Site, forms part of the Allen Bog Group and is located north-east of Edenderry and surrounding townlands, Counties Kildare and Offaly. The Application Site is located approximately 2.2km southeast of Edenderry, 3.3km west of Allenwood, 2.4km north of Rathangan and 1.7km east of Clonbullogue Village in Co. Offaly and Kildare.	› Chapter 1 Introduction › Chapter 4 Project Description
b)	*a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;*	Site baseline description (as of July 1988), site preparation works pre-commencement of industrial peat extraction, drainage implementation, supporting infrastructure	› Chapter 4 Project Description › Chapters 5 to 15
c)	*a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;*	Peat extraction and ancillary activities from July 1988 – June 2020, including peat volumes extracted, peat extraction methods, machinery requirements, scale of operational areas, required peat extraction methods, supporting activities, vegetation clearance, habitat removal, peat volumes extracted, energy used	› Chapter 4 Project Description › Chapter 6 Biodiversity › Chapter 7 Land, Soils and Geology › Chapter 8 Hydrology and Hydrogeology › Chapter 9 Air Quality › Chapter 10 Climate › Chapter 14 Material Assets › Appendix 4-3 Annual Environment Reports
d)	*an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.*	Silt run off, waste management, noise and vibration emissions, dust and CO_2 emissions	› Chapter 4 Project Description › Chapter 7 Land Soil and Geology › Chapter 8 Hydrology and Hydrogeology › Chapter 9 Air Quality › Chapter 10 Climate › Chapter 11 Noise and Vibration › Chapter 14 Material Assets

	Description of the Project, including in particular:	Relevance to application	Location In rEIAR
			› Appendix 4-3 Annual Environment Reports

4.2 Project Description

This rEIAR is prepared in support of an application for substitute consent for peat extraction and ancillary activities carried out by BnM on lands at the Application Site since July 1988. The Application Site is comprised of 5,448 hectares across 14 no. bogs located within Counties Offaly and Kildare as outlined in Chapter 1 Figure 1-1.

Peat extraction and ancillary activities undertaken at the Application Site, which comprise the Project for which substitute consent is being sought and for which this rEIAR is prepared, consist of the following:

- Industrial scale peat extraction (milled peat, sod peat, sod moss and bin sod) at the Application Site from 1988 to June 2020;
- Installation, use and maintenance of surface water drainage infrastructure (drains, silt ponds, pumps) at the Application Site to facilitate peat extraction activity from 1988 to present day;
- Vegetation clearance to facilitate peat extraction activity from 1988 to June 2020;
- Provision of 1 no. welfare building, 1 no. handwashing facility, a toilet cubical building and an associated septic tank, 19 no. containers, 2 no. sheds, 8 no. vehicular bridges and 7 no. rail bridges;
- Use and maintenance of pre-existing railway infrastructure to facilitate peat extraction from 1988 to present day;
- Control Measures associated with the above, inclusive of the IPC Licence measures (Ref. P0503-01) which commenced from 2000 onwards to the present day; and,
- All associated site development and ancillary works.

4.2.1 Project Phases

As detailed in Section 1.1.1 of Chapter 1, for the purposes of this rEIAR, the Project is defined under three different timeframes termed 'phases':

- **'Peat Extraction Phase':** peat extraction activities and all ancillary works at the Application Site from July 1988 to the cessation of peat extraction in June 2020 (July 1988 – June 2020). The Peat Extraction Phase is described in detail in Section 4.4 to Section 4.7.
- **'Current Phase'**: the management of the Application Site since June 2020 (June 2020 to present). The Current Phase is described in detail in Section 4.7 to Section 4.8.
- **'Remedial Phase'**: the activities intended to be carried out at the Application Site into the future. The Remedial Phase is described in detail in Section 4.9.

4.2.2 General Overview of the Peat Extraction Process

4.2.2.1 Surveying and Drainage

A description of the surveying and drainage methodologies and machinery used across the BnM bogs, including at the Application Site, is outlined on the BnM Living History website[3] and in the Irish Engineers Journal Supplement, 1970, p.13-15.

The key approach and outputs of the surveying works were the following:

- The lateral extent of the bog deposit was determined using traditional surveying techniques.
- The peat types or the stratification to the bog floor (i.e., the degree of decomposition as expressed on an international scale of humification) was determined. This scale ranges from H.1 to H.10 (the higher the number the greater the degree of decomposition).
- Levels were taken at 100-yard (approx. 91m) intervals or closer along parallel section lines 250 yards (approx. 228m) apart on midland bogs (the Application Site comprises midlands bogs). The depth of the bog at each level point is determined by a Swedish-type tube borer coupled in lengths of one metre. The leading tube is provided with a special rotating head which enables a 0.5 sample from any particular depth to be carried to the surface.
- Midland virgin bogs such as the Application Site varied in depth from 10 feet (3m) to over 40 feet (12m) – the bulk of the soundings lying in the range 15 feet (4.5m) to 25 feet (7.5m).
- Apart from the survey of the bog deposit a detailed survey of all the minor streams and minor rivers carrying water from the bog to main rivers was also carried out.

Once the detailed survey work was completed, and the site deemed suitable for peat extraction, drainage works across the bogs were initiated. The development of the drainage for the site was carried out in stages using a range of machinery. Midland virgin bogs, of which the Application Site were typical, would have had a moisture content of over 94% and varied from 96-97% near the surface to 90% at the bog floor. The stages of drain development are outlined below:

- Initial opening of drains:
  - Drains were first opened by a plough pulled by a BnM tractor at a slow speed (approximately ½ to 1 mile per hour (0.8km/h – 1.6km/h)); and,
  - The drain depth at the plough stage was 20″ (0.51m). Drains had a trapezoidal section with a top width of approximately 30″ (0.76m) and a bottom width of 12″ (0.3m) bottom width.
- Deepening of drains:
  - Following their initial opening, drains were deepened by rotating disc machines operating at speeds of 200-600 yards per hour (approx. 180-550m/hour);
  - Rotating disc machines could deepen the drains to a maximum depth of approximately 60″ (approximately 1.5m), with a bottom width of approximately 12″ (approximately 0.3m);
  - Whether further deepening of drains was required depended on the purpose of the drain. This was achieved by smaller-type bucket excavators and peat cutting machinery, by drag lines specially tracked to BnM's design, by several other excavator types, or by hand where it was desired that the drain should conform to certain maximum dimensions.

Arterial drainage works were not always adequate to achieve the levels of drainage required to allow the extraction of peat deposits to the bog floor. Pumping of whole bog areas or certain portions of bog areas arose where gravity drainage was impossible or achievable only at a prohibitive cost. In these

[3] *Available at: Living History*

instances, the pumps favoured were the Archimedean screw type or the Axial flow type electrically powered, and electrode controlled.

Once drained, the upper acrotelm layer (which comprises the biologically active component of the bog) was removed to facilitate peat extraction and drying of peat. The acrotelm is one of two distinct layers in undisturbed peat bogs. It overlies the catotelm. The boundary between the two layers is defined by the transition from peat containing living plants (acrotelm) to peat containing dead plant material (catotelm).

The machinery involved in drainage work on the Application Site is described in Section 4.2.2.1.1

4.2.2.1.1 *Drainage and Bog Preparation Machinery*

Dragline/Shovel Excavator: Types 287 CU. Meters and 478 CU. Meters

These machines excavated the main outfalls for the bog drainage system in the early development stages and maintained main outfalls during the extraction life of the bog. While these excavators were generally of conventional design and were suitable to be mounted with dragline attachments, back and front acting shovels, and pile driving attachments, they were used mainly with the dragline attachment. The machines were powered by a diesel engine. All drives were mechanical with friction clutches and brake control of winches and turntables, while the track drives and steering were controlled by a claw clutch and brake arrangement.

In 1958, a new underframe for the dragline was designed to minimise surface pressure and eat compaction, thereby eliminating the need for the use of timber mats. The increased mobility and reliability of the machine resulting from the new underframe allowed the machines to move rapidly over the bog to do relatively small jobs which would earlier have been done by hand owing to the slowness and difficulty of moving the dragline over timber mats. Additionally, the elimination of the timber mats meant that groundsmen were no longer required to move the timber mats. This meant that draglines could be operated by the driver only, with no support staff required. The 287-model excavator had caterpillar-type tracks with timber sleepers, which provide the necessary bearing area for operation on bog, without using mats. The 478-model excavator, while equipped with caterpillar track chains, was not fitted with track sleepers but was supported on timber mats where necessary. When excavating bog these machines were fitted with a special dragline bucket of light design with a capacity of 750L. Plate 4-1 below is an image of this type of machinery operating on a BnM bog.

Plate 4-1 Dragline/Shovel excavator (Source: Living History)

Drainage Machine Type - Klassmann

The Klassmann drainage machine was designed and developed for operation on sod moss extraction bogs. The machine was supplied with a variety of attachments to suit specific duties. For BnM's applications it was fitted with a slit drainer, a drain cleaner and a levelling screw. The tractor was of light construction with the chassis fabricated from folded steel sections supported on two tracks each comprising two chains carrying steel swamp shoes, running on end sprockets and frictionless bearing mounted intermediate support rollers. The power unit was an air-cooled diesel engine and the transmission consisted of an over-centre single plate clutch, vee belt drive, specially designed four speed gearbox, and chain drives which powered both tracks and the power take off (PTO) for attachments. Additional sprockets were supplied to give a variety of forward speeds to suit specific attachments. Steering was assisted by coil clutch and brake bands. The machine was fitted with a hydraulic system to control the transmission of power to the various attachments. All controls were centralised in an enclosed cab.

The slit drainage attachment was used to open initial drains in virgin bog. It comprised a cutting boom of small buckets carried on special chains and sprockets. The content of the buckets was discharged mechanically into a vane-type spinner which threw the spoil clear of the drain. The drain cleaner attachment was similar to the slit drainer but cut a wider drain and was used to deepen and maintain drains after the first sod cut was made. The screw leveller attachment was used for the preparation of fields on moss peat bogs to remove the vegetation and level the surface to facilitate the performance of cutting machines and the stability of the sod walls formed by these machines. The attachment had the ability to camber surfaces if required.

Drainage Machine Type – M.P. Field Slitter

This machine was developed to cut slit drains in milled peat fields to accelerate drainage in the poorer quality areas. The drains cut to a definite pattern comprising three longitudinal slits, one central and one on either side, with cross drains giving exit to the ditches at regular intervals. The machine comprised a tractor on full tracks with a chain saw cutting attachment similar to the chain saw machine. The tractor had a special transmission to give the correct forward travel speeds in second, and third gear. The modification involved the replacement of the gearbox primary gear train and the differential crown wheel and pinion, in addition to the insertion of a special reduction gearbox. The tracks comprised flat metal cleats carried on two chains and run on the standard tractor tyre wheels with an additional jockey wheel. The attachment was carried at the rear of the tractor, pivoted on the centre of a standard power-take-off bevel box output shaft and is raised and lowered about this pivot by a hydraulic ram operated from the driving position. The cutting element was a standard transmission chain with cutting teeth secured to it by welding, running over top driving sprocket and a bottom driven sprocket, whose shaft carries a cutting impeller on either side outside the support bearings. These impellers, in conjunction with the cutting chain, excavated a tunnel of rectangular section at the bottom of the slit drain cut by the chain only. The machine had a cab with toughened glass windows, allowing good vision for manoeuvring and observing the behaviour of the attachment. Plate 4-2 below is an image of this type of machinery operating on a BnM bog.

Plate 4-2 Drainage Machine Type – M.P. Field Slitter (Source: Living History)

Ditching Attachment/Ditcher

The purpose of this attachment was to cut the drains separating the peat fields in development bogs and deepen existing drains in bogs subject to peat extraction. The attachment consisted of a rotating cutting disc set at an angle to the line of travel, carried on an arm from the tractor unit. The arm and disc were controlled and supported by wire ropes and a hydraulic ram passing over a mast on the tractor unit and anchored to a projecting ballast box on the other side of the tractor unit. The disc was driven by

the tractor main gearbox PTO shaft via a bevel gear reduction box and universal propeller shaft. On other machines, a chain drive reduction was inserted between the bevel gearbox and universal propeller shaft to achieve a slower disc speed. The disc had cutting blades and a stationary shield which deflected the flying spoil away from the machine and spread it evenly over the adjacent field. Plate 4-3 below is an image of this type of machinery.

Plate 4-3 Ditching Attachment/Ditcher

Drain Cutting Attachment – Cross Drain

The purpose of this attachment was to cut small drains in milled peat fields from the centre of the field to the ditches separating the fields. The attachment consisted of a cutting boom which was mounted on the rear of the H.D. Tractor Type II on radius arms, controlled for height and level by hydraulic rams. To cut the drain, the tractor stopped, and the cutting boom started, trimmed for level if necessary and lowered into the bog, discharging the spoil to the centre of the field. The boom was of light construction using standard steel sections. The chain was carried on sprockets at the ends of the boom while it ran in a guide with the aid of welded-on cleats along the bottom horizontal portion of the boom. The drive is taken from the P.T.O. shaft of the tractor main gearbox via chain drivers and universal jointed propeller shaft. Plate 4-4 below is an image of this type of machinery operating on a BnM bog.

Plate 4-4 Drain Cutting Attachment - Cross Drain (Source: Living History)

Drain Cleaner – Screw

This attachment was used to remove slurry from the bottom of milled peat field ditches and dispose of it by spreading it on the adjacent field. The attachment was a screw elevator with radial blades fitted at the top to eject the spoil through an outlet in the casing in a predetermined direction. The attachment was mounted on a cantilevered bracket from the tractor on a pivot arrangement so that the screw casing could be lifted and lowered as required by winch rope. In the working position the screw elevator is lowered into the ditch and scooped the slurry from the bottom of the ditch as the tractor advances. As the tractor progresses along the ditch or drain it accumulates the slurry; the screw elevated it into the discharge chamber and the radial blades ejected it through the outlet onto the peat field. Plate 4-5 below is an image of this type of machinery operating on a BnM bog.

Plate 4-5 Drain Cleaner Screw (Source: Living History)

Stripping Machine Type – I & II

The purpose of this machine was to cut away the top layer of bog from the section which was to be cut. This layer varied in depth from 305 mm to 762 mm and was deposited at the bottom of the face bank prior to reuse on the adjacent spread grounds. The machine had a lightly constructed main frame mounted on caterpillar type tracks and the spiral cutting/conveyor unit was carried in an off-set position at the rear. The spiral cutter/conveyor unit was pivoted to the main frame and suspended on an overhung mast on which it was raised or lowered as required. A separate trimming control, in the form of a hydraulic ram, was fitted at the cutting end.

The Type I machine was powered by a diesel engine and transmission of standard manufacture incorporating a differential brake/gear steering arrangement as used on a levelling machine. There were 8 forward speeds and 4 reverse speeds available through gearbox and change sprockets.

The Type II machine was powered by a diesel engine driving through an over-centre type clutch, a 'V' rope drive special worm and spur gear reduction box, and chain drives. The machine was steered by coil clutches on the track's final drives. There were 6 forward speeds available using change sprockets. Plate 4-6 below is an image of this type of machinery operating on a BnM bog.

Plate 4-6 Stripping Machine (Source: Living History)

Levelling Machine Type – Scraper

The purpose of this machine was to prepare the surface of the high bog and cutaway for the efficient operation of all other machines, by levelling it. The machine consisted of a large tractor unit carrying a leveller boom in front. As the machine advanced on its long tracks, the boom cut away the high areas, losing the spoil in the hollows. The tractor unit had a rigid main frame supported on caterpillar type power driven tracks and was powered by diesel engine and gear transmission of standard manufacture. The boom had a light framework made up of standard steel sections, around which was driven two conveyor-type chains running on sprockets at each end and in guides along the bottom and top. Across these two chains, arms were fitted, projecting beyond the front of the boom. The projecting portion of the arm had a cutting knife and scraper palm. The boom was controlled for height and level by hydraulic rams. Plate 4-7 below is an image of this type of machinery operating on a BnM bog.

Plate 4-7 Levelling Machine Type - Scraper (Source: Living History)

4.2.2.2 Peat Extraction Process

Multiple distinct peat products were extracted at the Application Site: sod peat, milled peat, sod moss and bin sod. The methods by which these products were extracted varied, and each process is described in detail in the sections below. A description of the machinery used for peat extraction at the Application Site is provided in Section 4.2.2.1.1.

4.2.2.2.1 *Sod Peat Extraction*

Sod peat was extracted at the Application Site from 1950 to 2000.

Sod peat, also sometimes referred to as 'machine turf' or 'turf', was extracted utilising technologies which were initially developed between 1910 and 1920. Once the drainage was installed and the bog sufficiently dry for machinery, the surface was prepared using levelling and stripping machines such as those described in Section 4.2.2.1.1. Sod peat extraction was subsequently carried out by a range of different bagger/sod peat excavator machines. The German word for both excavator and dredger are '*Bagger*' and this was the word adopted in Ireland for machines which mixed the peat from different depths of the bog and then macerated it. Baggers are shown in Plate 4-23 and Plate 4-24.

In the case of sod peat extraction, large open drainage ditches known as "trenches" were opened at widths of approximately every 240 metres across the entire width of the extraction area. These trenches served as the beginning of the face bank from which sod peat was ultimately extracted. Baggers cut a trench with a width of 2 meters and a depth of 3 to 4 meters. A chain of buckets on the bagger was then inserted into the trench which extracted peat from all strata of peat in the trench. The extracted

peat was then deposited into a macerator which pulped and mixed it. Maceration improved the quality of the sods of peat produced, as by thoroughly mixing peat from each strata of the bagger trench, the density and uniformity of the sod was increased. The macerated peat pulp was then extruded through a narrow double mouthpiece which formed it into two rows of continuous sods each of approximately 5 inches (approx. 13cm) wide x 3 ¾ inches (approx. 9.5cm) high. As they were extruded, the rows of peat were deposited on to a continuously moving chain of spreader plates, which when the spreader arm was fully loaded, tripped automatically and deposited the rows of turf onto the bog surface. Trailing discs then cut the rows into 15 inch (approx. 38cm) long sods. The standard length of the spread arm was 54 metres. The bagger/sod peat excavator machine spread the sod peat on the large area between the trenches which allowed sufficient room to dry the sod peat. A short video of the last bagger that was operational on BnM bogs can be viewed at:
https://www.youtube.com/watch?v=nNcitG0WKPs

After about two weeks on the surface of the bog, the sods were turned by a sod turning machine to allow the other side of the sod to dry. When the sods were fully dried, the density and uniform texture resulting from the maceration process made them very impervious to rewetting. The dried sod peat was then collected from the surface of the bog using a sod collector. This machine was used to collect the sod peat from the sod rows into stockpiles which were often referred to as 'ricks'. A permanent 3 ft. gauge railway serviced all bog areas and facilitated connectivity to the various works centres, workshops, and fuel depots across the BnM landbank. When it was decided to move a stockpile, a temporary railway track was laid alongside from the permanent railway line. On completion of loading, the temporary track was lifted and re-laid along another stockpile as required. Please see Figure 4-1 for a Flow Chart of the Sod Peat Extraction Process produced by BnM.

Typically, sod peat fields were between 800 to 2,000 yards long (approx. 700m to 1,800m) discharging normally to the end of the large drainage trenches. Small, piped outfalls were installed perpendicular to the drains where needed to drain low areas that formed along the sod peat field. The pipes used were either concrete or clay pipes with a small diameter of between 150mm to 460mm.

These bogs utilised pumps where levels did not allow for gravity drainage. As the sod peat machine (bagger) was electrically powered a power supply for the pumps was easily obtained from the existing internal distribution network.

The large drainage trenches were continuously developed and have a width of between 3 to 8 metres typically and a depth of around 2-5 metres. They were maintained using mechanical excavators or draglines and were continuously deepened as sod peat was extracted from the bog to lower the drainage level.

4.2.2.2.2 *Milled Peat Extraction*

Milled peat was extracted at the Application Site from 1935 to 2019. Between 1935 and 1950, milled peat was the only form of peat extracted from the Application Site, and this was transported to the nearby Lullymore Briquette Factory and later Edenderry Power Station via the bog railway. Milled peat was also extracted for use in horticultural products this peat was extracted in the same way as energy peat described below and was transported to Kilberry and Dublin Port for sale overseas. The methods by which milled peat was extracted are described in detail below. In the case of milled peat extraction, parallel open drains were cut at 50 ft. (approx. 15.2m) centres which divided the peat extraction area into fields 45 ft. (13.7m) wide. Typically, the field drains were from 800 to 2,000 yards (approx. 700 to 1,800m) long, discharging at either end into piped outfalls which ran at 90° to the open drains and which themselves discharged into the nearest natural outfall. Beyond the piped outfall was left a headland or turning ground 70 to 100 ft. (21 to 30m) wide which ran parallel to the piped outfall to enable extraction machines to turn from one field into another. When fully developed, the open field drains had a depth of approx. 4′ 6" (approx. 1.4m) and a top width of approx. 5′ 0" (approx. 1.52m). The field drains were excavated and initially maintained by machines called disc ditchers. The disc

ditcher consisted of a cutting disc which was mounted on an arm offset from a tractor unit. Tractors were powered by a diesel engine, and they were mounted with timber swamp shoes and front rollers.

Milled peat extracted from the Application Site supplied horticulture peat for the manufacture of growing media products for the professional and retail markets and energy peat for use in briquette factories and power stations. Milled peat extraction requires good solar/wind drying conditions and so commenced any time from mid-April onwards, and usually ran until mid-August, once suitable drying conditions prevailed. Following drainage, there were four stages to the extraction of milled peat outlined as follows:

1. **Milling** - During the milling process, the top 10-15mm of the surface of each field was broken into peat crumbs by powered milling drums towed behind agricultural tractors (Plate 4-8). This layer of crumbed or milled peat/moss is called a crop and would have had a moisture content of about 80% when milled;
2. **Harrowing** - After milling, the peat crop was dried. To assist in this drying, the loose peat was harrowed or turned over. The harrow consisted of a series of spoons which were towed behind an agricultural tractor (Plate 4-9). The spoons on the harrow were fitted with special base plates which prevented the scraping of wet particles from below the milled peat layer. Harrowing was usually required 2 to 5 times per peat crop, depending drying conditions, the water table level in the peat extraction fields, the initial moisture content of the peat at milling, and peat quality. If rain interrupted the drying process, more harrowing may have been needed.
3. **Ridging** - When the milled material was dried to a moisture content of between 45% and 55%, it was gathered into ridges in the centre of each peat extraction field. The ridger consisted of a pair of blades towed in an open V behind an agricultural tractor fitted with balloon tyres which allowed the tractor to travel over wet peat without contaminating the dry peat crop. The open V blades rest on the bog and channel the loose crop into a triangular ridge in the centre of each peat extraction field. (Plate 4-10 and Plate 4-11);
4. **Harvesting** - Harvesting was the final stage of the extraction process. Each individual ridge was lifted mechanically, by a machine called a harvester, transferred and dropped on top of the adjoining field's ridge, until five ridges had been accumulated into a single large ridge. This large ridge formed the final lift into the peat storage stockpile (Plate 4-12 and Plate 4-13).

Typically, every 11th field was used to stockpile the peat from the output of five fields either side; this is referred to as the 'Peco' method and the peat in these stockpiles was removed by rail. The Peco method was used on the Application Site. Weather permitting, the miller followed the harvester, and the production cycle recommenced in the emptied fields. The extraction-stockpiling cycle is referred to as a 'harvest' and each group of eleven fields generally produced 12 No. harvests per year.

Once stockpiles of milled peat were established, they were rolled and covered with polythene sheeting. The purpose of the polythene covering was to keep stock dry, to protect it against wind erosion, and to inhibit spontaneous combustion in certain types of peat by the exclusion of as much air as possible. A reel of polythene sheeting would be mounted on a single bale spike-type attachment on an excavator. The excavator would drive alongside the stockpile, and the polythene would be unrolled across it. There were generally 8 no. workers on the ground outside the excavator to undertake the work of unrolling the polythene and laying it across the stockpile (4 no. workers each side of the stockpile). Once the polythene sheet was laid in place, a layer of high-moisture-content milled peat was distributed over the polythene to fix it in place. This was done in four passes along a stockpile by a milled peat harvester; on the first and second pass, a milled peat harvester which was fitted with a split cowl at the end of the elevator distributed an even layer of peat across the top and sides of the stockpile (the split cowl allowed for both faces of the surface of the stockpile to be covered in the one pass). The third and fourth passes of the milled peat harvester facilitated the deposition of peat along the bottom edges of

the stockpile, effectively anchoring the polythene sheeting to the ground, preventing the lifting of the edges in the wind. (see Plate 4-14 and Plate 4-15 below).

When it was decided to move a milled peat stockpile, the polythene sheet covering the stockpile was removed. A trained staff member would walk along the apex of the milled peat stockpile and bisect the polythene sheet at the peak of the apex with a blade. Starting at the end of the stockpile, one side of the bisected polythene sheet was fed into the eye of an implement known as a polywrapper, which was mounted on the three-point linkage of a tractor. The drum and the polywrapper was fed through the eye of a pendulous swivel arm, which, as the tractor moved forward, oscillated from left to right to ensure that the polythene being collected was being dispensed evenly across a plastic sleeve fitted on a metal shaft on the polywrapper. This ensured an even spool of polythene was collected. Once the spool was at capacity, one side of the polywrapper was opened, which allowed the metal shaft to be removed from the plastic sleeve and replaced with a new plastic sleeve. The entire spool was then removed and sent for appropriate disposal/recycling. The metal shaft was reinserted into the polywrapper, the side closed, and the process began again until the stockpile was fully uncovered and all polythene collected.

A permanent 3 ft. gauge railway serviced all bog areas and facilitated connectivity to the various works centres, workshops, and fuel depots across the BnM landbank. As in the case of sod peat stockpiles, when it was decided to move a stockpile of milled peat, a temporary railway track was laid alongside from the permanent railway line. On completion of loading, the temporary track was lifted and re-laid along another stockpile as required.

Please see Figure 4-1 for a Flow Chart of the Sod and Milled Peat Extraction Process, produced by BnM.

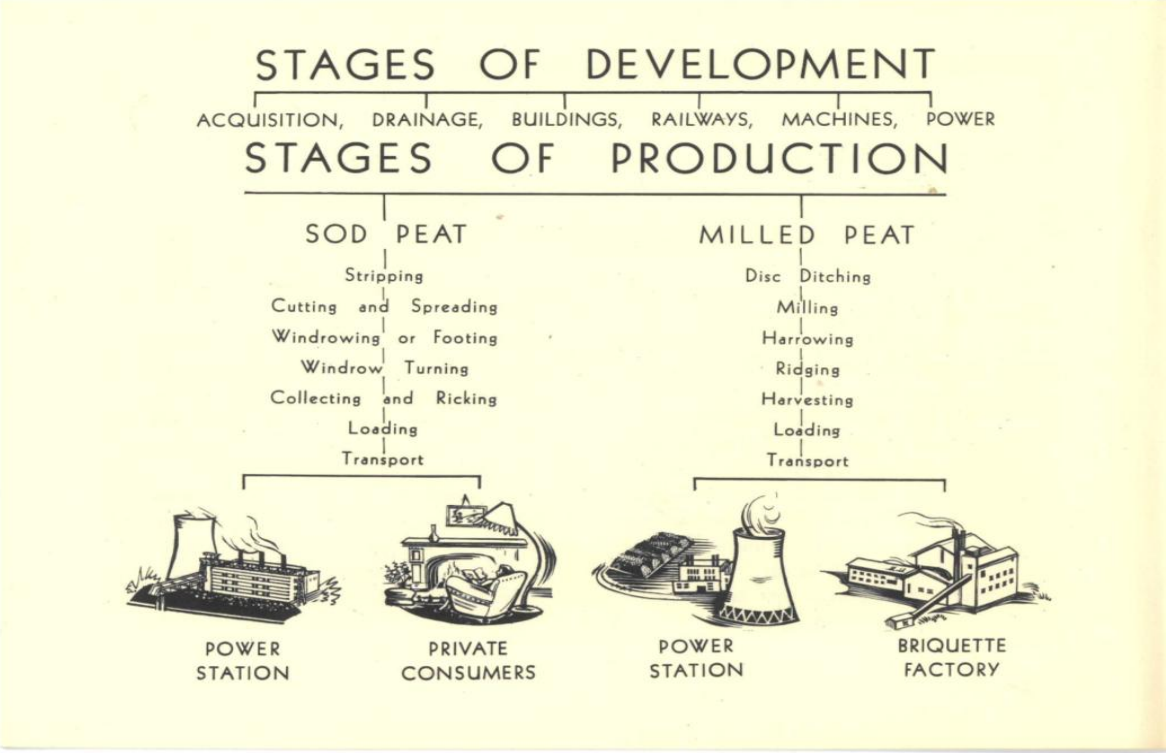

Figure 4-1 Flow chart of the sod and milled peat extraction process produced by BnM in 1954

Plate 4-8 Milling process (source: BnM)

Plate 4-9 Harrowing process (source: BnM)

Plate 4-10 Ridging process (source: BnM)

Plate 4-11 Ridging process (source: BnM)

Plate 4-12 Harvesting - Peco Method (source: BnM)

Plate 4-13 Harvesting - Peco method (source: BnM)

Plate 4-14 Polythene covering of stockpiles (source: BnM)

Plate 4-15 Process of Stock Protection, showing a layer of milled peat being spread over polythene sheeting to anchor the sheeting in place (source: BnM)

4.2.2.2.3 Sod Moss Extraction

'Sod moss' is the term used to describe peat produced in block form for horticultural use. Sod moss is made up of incompletely humified mossy or fibrous peat consisting mainly of sphagnum moss, cotton grass and other vegetable fibres. When dry, sod moss is very light and able to absorb and retain moisture to over ten times its dry weight. It is this characteristic which makes it ideally suitable for horticulture.

To facilitate the extraction of sod moss, bogs were drained using a system of longitudinal drains opened at intervals of approx. 7.5 metres. The drainage process was slow, and it took between five and seven years to prepare a bog before the extraction of sod moss could commence. The sod moss extraction season generally extended from June right through the winter and early spring. The peat was cut in sods but not macerated as was the case with sod peat as described in Section 4.2.2.2.1. Unlike both sod and milled peat, sod moss was left out in peat extraction fields over the winter, so that it could be subjected to the action of frost and rain. Sod moss which has been frozen in winter dries more quickly in the spring and it remains looser while doing so and it is, therefore, more easily disintegrated. It is also more absorptive than sod moss which has not been subject to frost. Rain helped to improve the quality of the sod moss by washing away humified particles of peat.

Following drainage, sod moss was extracted mechanically with specially equipped excavators. The sods were cut from mini face-banks or the margins of trenches that were gradually widened and left on the bog to dry for approx. 12 months, reducing moisture content from 90% to between 50% and 60%. Once the required moisture content was reached, the sod moss was stockpiled at the edge of the bog prior to transportation via rail for processing. One layer was typically cut at a time until the sod moss deposit was exhausted. Please see Plate 4-16 and Plate 4-17 for details.

Plate 4-16 Sod Moss Extraction (left) and Sod Moss Stockpiles (right). (source: BnM)

Plate 4-17 Sod Moss Drying (left), Sod Moss Stockpiles (right) (source: BnM)

4.2.2.2.4 Bin Sod Extraction

In the case of bin sod peat extraction, the peat was excavated and macerated as was the case with sod peat as described in Section 4.2.2.2.1. The extracted peat was then deposited into a macerator which pulped and mixed it. Maceration improved the quality of the sods of peat produced, as by thoroughly mixing peat from each strata, the density and uniformity of the sod was increased. The macerated peat pulp was then extruded into rows of continuous bin sods. As they were extruded, trailing discs then cut the rows into 8 long sods. The bin sod was spread on the large area between the trenches which allowed sufficient room to dry the peat.

After about two weeks on the surface of the bog, the sods were turned by a sod turning machine to allow the other side of the sod to dry. When the sods were fully dried, the density and uniform texture resulting from the maceration process made them very impervious to rewetting. The maceration process created larger fractions in the sod to facilitate root structure as a result, bin sod is exclusively used for horticulture. Please see Plate 4-18 for details.

Plate 4-18 Process of extracting bin sod. The peat is macerated, extruded into sods and cut with trailing discs (source: BnM).

4.2.2.3 Peat Extraction Machinery

The following machinery was used in the extraction process once the bogs had been cleared of vegetation and drains inserted. The type of machinery used at any given time would vary depending on machine availability, bog conditions, the type of peat being extracted (i.e. milled or sod) and operator preference.

4.2.2.3.1 *Tractors*

A variety of tractors have been used throughout the history of peat extraction activities and all ancillary works on the Application Site. As with all machinery used during peat extraction activities and all ancillary work, the choice of tractor used for any given activity would have been based on availability, bog conditions, and activity type (which would dictate the mechanical requirements of the tractor in terms of power output, drivetrain, weight, wheelbase dimensions, tyre type, PTO specifications, hydraulic requirements etc.). Throughout the decades as improvements in tractor design were made, newer more powerful and efficient tractors were employed on the Application Site. A non-exhaustive overview of the types of tractors used is provided below.

H.D. Tractor II

The H.D. Tractor II was a half-track tractor specially designed for harvesting and ditching operations in the Peco system of milled peat. The machine consisted of a robust main frame supported on caterpillar type tracks, which are exceptionally high to accommodate the attachments within them, and on large steering rollers in front. The tractor was powered by a diesel engine fitted with automotive-type clutch. The transmission consisted of a main gearbox, an auxiliary gearbox, a worm drive bevel gear differential unit and a spur gear reduction final drive contained within the back axle casting. The tracks comprised a special cast steel link type chain, with swamp shoes or sleepers bolted on, which ran on track rollers suitably spaced on the track frame. The driving sprockets were built up from steel plate discs with steel rollers between, to register with the track chain. The idler sprocket had the steel disc, with distance pieces, allowing the track link driving spuds to pass between them. Both the driver and

idler sprockets were fitted with wear resisting cast steel pads where the track link driving spuds make contact with the sprocket plates. The front rollers were steel rimmed with spokes from a central cast hub. A circumferential steel angle section was fitted to obtain steering adhesion. The rollers were mounted on a swinging axle. The steering was manual through a wormbox, operating winding drums with wire ropes to the axle. The driver's platform was spacious, located at a high level over the main gearbox. For ditching operations, a protective cab was fitted over this platform to protect the driver from ditching spray and the elements. On some tractors on ditching operation, a simple hydraulic steering system was fitted. Plate 4-19 is an image of this type of machinery operating on a BnM bog.

Plate 4-19 H.D. Tractor II (Source: Living History)

LHT Tractor II

This tractor was designed to operate miller and ridger attachments in accordance with the Peco system of winning milled peat. This machine consisted of a simple main frame with caterpillar-type tracks and front steering rollers. It was powered by a diesel engine fitted with an automotive type clutch. The transmission was a special speed change gearbox with P.T.O. shaft, and a worm-driven bevel gear differential unit housed in a conventional back axle. The half shafts from the differential unit are coupled to the track drive sprockets directly.

The main frame accommodated either of two engines, the size depending on the attachment to be used with the tractor. Steering was manual by hand wheel through a worm reduction gearbox, draglink and track rod. The front axle swung in the vertical plane to avoid undue distortion of the tractor frame. The front rollers were fitted with a circumferential ring of steel angle section to obtain steering adhesion. Plate 4-20 is an image of this type of machinery operating on a BnM bog.

Plate 4-20 LHT Tractor II (source: Living History)

LHT Tractor III

This tractor, fitted with attachment, was used for ridging the milled peat into the centre of the field. The tractor was the half-track type with front steering rollers. The main frame was fabricated from standard steel angle and channel sections. The tracks were single chain cast link type with timber swamp shoes bolted on and runs on cast sprockets and intermediate supporting rollers. The front steering rollers were spoked with fabricated steel rims and cast-iron hub and were mounted on stub axles on a pivoted axle beam which swings in the vertical plane. Steering was affected manually through a worm reduction gearbox, drag link and track rod. The tractor was powered by a water-cooled diesel engine fitted with automotive type clutch. The transmission consisted of a speed step-up primary gearbox of special design, a standard agricultural tractor changes speed gearbox and differential assembly with a chain reduction final drive between the standard transmission unit half shaft and the track sprockets.

Since this tractor was used only for ridging operations during daylight hours no electric generator was fitted and the engine was hand started. A hydraulic pump assembly was incorporated in the standard agricultural transmission unit, and this was used to actuate the attachment hydraulic system.

Ridger Tractor (LHT IV)

A tractor specially designed to perform the milled peat ridging operation at more than twice the speed of the L.H.T. II & III by covering the full width of the field in one pass. The chassis was fabricated from standard rolled steel sections mounted on half-tracks which incorporate manganese track links and sprockets with intermediate support rollers. Timber swamp shoes were bolted to the track links. The power unit was a diesel engine with automotive type clutch and it drove through a heavy-duty automotive type gear box and cardan shaft – the differential unit of a standard heavy duty truck back axle with epicyclic gear reduction between half shaft and wheel hubs. The track sprockets were bolted

directly to the axle hubs. The tractor was carried on front rollers of generous proportions carried on stub axles and steering is powered by hydraulics. The engine was fitted with two hydraulic pumps, one for power steering and the other for the attachment hydraulic system. The attachment consisted of double blades similar to the single ridger attachment, one blade on either side of the tractor converging at the rear. The blades were supported by sturdy spars which radiated from the tractor chassis. Adjustment of the sole-plate of the blade relative to these spars was provided. The attachment was lifted and lowered hydraulically through a multi-guy rope system over the top of a central mast on the tractor. Plate 4-21 is an image of this type of machinery operating on a BnM bog.

Plate 4-21 Ridger Tractor (source: Living History)

Massey Ferguson 35

The Massey Ferguson (MF) 35 would have been used from the 1960s and 1970s. It has a rated engine power of approximately 37 horsepower (hp). The MF 35 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It is commonly equipped with a 6-speed or 12-speed gearbox, depending on the model and design. It has a hydraulic system with a variable capacity. The tractor's weight is approximately 1,500kg.

Ford TW15

The Ford TW15 was used from the 1980s. It has a rated engine power of approximately 140hp, with a PTO output of approximately 120hp. The TW15 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is approximately 5,000kg.

Landini 5830

The Landini 5830 was used from the 1980s. It has a rated engine power of approximately 50hp, with a PTO output of approximately 42hp. The 5830 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is approximately 2,500kg.

Ford F4630

The Ford F4630 was used from the 1990s. It has a rated engine power of approximately 60hp, with a PTO output of approximately 56hp. The F4630 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 2,350kg and 2,750kg, depending on the drivetrain.

New Holland TL70/TL70a

The New Holland TL70 was used from the late 1990s. It has a rated engine power of approximately 65hp, with a PTO output of approximately 56hp. The TL70 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 2,700kg and 3,200kg, depending on the drivetrain and cab specifications.

The New Holland TL70a was a variation of the TL70 which was used from the early 2000s. It had a higher rated engine power than the TL70, of approximately 70hp. Powered by a diesel engine, it weighed between 3,550kg and 3,850kg, depending on the drivetrain.

New Holland TM150

The New Holland TM150 was used from the late 1990s/early 2000s. It has a rated engine power of approximately 150hp, with a PTO output of approximately 120hp. The TM150 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 4,750kg and 5,250kg, depending on the drivetrain.

New Holland TM165

The New Holland TM165 was used from the late 1990s/early 2000s. It has a rated engine power of approximately 165hp, with a PTO output of approximately 135hp. The TM165 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 5,000kg and 5,500kg, depending on the drivetrain.

New Holland TM140

The New Holland TM140 was used from the early 2000s. It has a rated engine power of approximately 140hp, with a PTO output of approximately 115hp. The TM140 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 5,150kg and 5,410kg, depending on the drivetrain.

John Deere 5070M

The John Deere 5070M has been used since approximately 2010. It has a rated engine power of approximately 140hp, with an independent PTO. The 5070M was available in both 2WD and 4WD

configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is approximately 3,700kg.

4.2.2.3.2 *Sod Peat Machinery*

Windrow Machine

The purpose of the machine was to pick up the partly dried sods from the spread ground and form them into windrows to accelerate drying. The machine consisted of a tractor unit propelling large diameter spiked drums in front of it and carrying chain/bar conveyors extending from the pick-up drums to the rear of the tractor unit. The tractor unit was supported on caterpillar-type, power driven tracks and steered by coil clutch and brake arrangement. The power unit was an air-cooled diesel engine. The pick-up drums were independently supported and free to follow the bog surface. As they passed over the spread, the spikes penetrated the sods and lifted them to the level of the conveyors, where fingers forced them off the spikes and carried them away by the conveyors. The sods were discharged at the rear of the machine in windrow form, ½ metres apart.

Sod Turning Machine

This machine does the same work as the Single Turning Machine but had greater output. The elevator mechanism was the same as the single machine and the components were interchangeable. These elevator units were located in front of the tractor tracks, and they discharged either into a cross conveyor, rubber belt type, or two return conveyors, rubber belt type, positioned over the tracks. The cross conveyor was reversible and moveable to either side of the machine. The tractor unit consisted of a strong main frame mounted on caterpillar-type tracks suitable for high idle travel speeds. It was powered by a standard diesel engine and transmission gearbox which is fitted with a proprietary clutch and brake steering equipment. A standard hydraulic pump was also built into this transmission and is used to operate the hydraulic lift of the elevators for idle travel. A special chain reduction drive was inserted between the half shaft of the standard tractor transmission and the track drive sprocket. The drive to the elevators and conveyors were taken off from the standard power take-off shaft of the transmission unit. Plate 4-22 is an image of this type of machinery operating on a BnM bog.

Plate 4-22 Sod turning machine (source: Living History)

Sod Peat Bagger/Excavator

The purpose of the machine, and the various versions of it, was to excavate, macerate and spread turf for the extraction of sod peat. This is necessary as the high spread ground area diminishes to the point where it will not take a full spread. The machine consists of a sturdy main frame, supported on power driven caterpillar tracks, which carries the various units and their transmission drives, and to which is attached a spreader arm. The turf is excavated by a multi-bucket type digger boom which is retractable to facilitate operation at varying depths and is pivoted on the main machine so that it can be stowed for idle travel. The boom cuts a face bank at 600 to the horizontal. The turf is discharged from boom buckets into a scraper conveyor, and in turn, into a screw conveyor and twin-screw macerator. The macerator extrudes the turf onto the spreader plate chain which carries the extrusion for a distance of 54 metres, when it is discharged to the bog surface. Cutting discs trailing behind the spreader arm, marks the extrusion into sods as the machine advances. The machine is powered by electricity, and friction clutches are fitted to all motor drives for starting up. All unit drives are protected by shear pins. The machine is fitted with lights for night work and equipped with a short-wave radio transmitting /receiving set. Plate 4-23 and Plate 4-24 is an image of this type of machinery operating on a BnM bog.

Plate 4-23 Sod Peat Bagger/Excavator (source: Living History)

Plate 4-24 Sod Peat Bagger/Excavator (source: Living History)

Cutaway Boom Attachment

The attachment comprised a short boom complete with a catchment conveyor overhung from the main machine by wishbone frames.

The boom had a lightweight framework fabricated in square hollow steel sections, within which the motor, gearbox, and chain drive, common to the original boom, were housed. The boom supporting wishbones were fabricated in square hollow steel sections of generous proportions, the pivots of which were arranged to maintain the same angle of the boom relative to the bank for various depths of cut. The upper wishbone frame was supported on a hydraulic ram from the side of the main machine, which was operated by a valve from the driver's cab, providing convenient control of cutting depths and lift for idle travel. The pivots of the lower wishbone frame were carried on arms from the main machine and were hydraulically adjustable to alter the slope of the bank cut.

The catchment conveyor, supported by the boom frame, was a rubber/canvas conveyor belt running on a conventional driver, end roller, and troughing idlers. The section of the belt receiving the turf from the buckets was supported on a series of slides of self-lubricating nylon to prevent deflection of the belt and ensure more efficient sealing. The conveyor had an independent motor/gearbox drive. The catchment conveyor discharged into the original scraper conveyor of the main machine. The attachment could be readily fitted to or removed from the machine by five pins. Plate 4-25 is an image of this type of machinery operating on a BnM bog.

Plate 4-25 Cutaway Boom Attachment (source: Living History)

Chain Saw Excavator

A machine of compact, sturdy construction with a high output for its size was used in BnM primarily for drainage with turf extraction as a secondary feature. The tractor unit was powered by a diesel engine, had proprietary transmission gearboxes, and final chain drive to caterpillar-type tracks.

The excavator, macerator, and spreading equipment were carried on the rear of the tractor unit, while a guide roller was carried on the front. All this equipment was lifted and lowered by hydraulics. The turf was excavated by a high-speed chain sword carrying cast steel teeth and discharged by centrifugal force at the upper sprocket into a screw/conveyor/macerator unit. This unit extruded the turf through a fan-tail spout, with an adjustable outlet, onto the spread ground. A series of cutting discs and a marking frame divided the layer of turf into the required sod size.

After the first cut was made, using the clutch and brake steering on the tractor unit, the front guide roller could be lowered into the excavation to steer the machine for subsequent cuts.

A pair of loaded rollers were trailed behind the cutting sword to close the top of the excavation just made, preparing the spread ground for the next run of the machine. In this way, all available bog could be covered with spread turf, leaving only nominal spaces between the extrusions. Plate 4-26 is an image of this type of machinery operating on a BnM bog.

Plate 4-26 Chain Saw Excavator (source: Living History)

Fóidín Machine

The fóidín machine originated from an experiment, the 'short cycle harvesting project' conducted at Oweninny bog Co. Mayo in 1965. The aim of the experiment was to produce fast drying peat sods from the surface of milled peat fields that were easy to crush in power stations, this led to the development of the fóidín machine in 1966. It came in two sections: the towing unit, which cut the peat, and the towed unit, which would macerate, extrude and spread the sods. Each of these sections was powered by its own diesel engine. It was steered by coil clutch and all other controls were operable from a cab which overlooked the working parts of the machine. The collection and stockpiling of the sods could be carried out with a combination of existing sod and milled peat machinery, modified in some cases. Fóidín extraction was suspended in most areas in 1972 and was abruptly terminated in 1973 due to several reasons, mainly that the yield from the fóidín system was small and insignificant compared to that of milled peat, complications arose burning crushed sods at ESB stations due to the higher calorific content of fóidín peat, and the cost of extraction was high relative to other peat extraction methods. Out of the 25 fóidín machines owned by BnM, one was sold to the Finnish State Fuel Supply Department, four were retained, and 20 were sold as scrap. Plate 4-27 is an image of this type of machinery operating on a BnM bog.

Plate 4-27 Fóidín Machine (source: Living History)

Sod Peat Loading Machine

The purpose of this machine was to load sod peat from bog ricks into railway wagons on one side of the rick only. The machine consisted of a lightly constructed mainframe mounted on caterpillar-type power driven tracks and carried a short scraper elevator in front, extending over the width of the tracks, and a low-level cross conveyor which elevated as it projected from the side of the machine. These loading machines were either diesel- or electric-powered and would be fitted with either a diesel engine or electric motor as required. Plate 4-28 is an image of this type of machinery operating on a BnM bog.

Plate 4-28 Sod Peat Loading Machine (source: Living History)

4.2.2.3.3 Milled Peat Machinery

Miller Attachments

Miller attachments were used to break the surface of the bog into fine, milled crumbs which were left on the surface of the bog to be dried by the wind and sun. Milling attachments initially comprised single or triple units. Both single and triple units worked in the same way, with the difference between the two being the number of milling drums, and thus the output (which was approximately 2.25 times higher with the triple unit). Miller attachments were mounted on the rear of tractors and drew power from the tractor's PTO.

Single Miller Attachment

Single miller attachments consisted of a simple but strong tubular steel frame, the main members of which extended to, and were pivoted, at the mid-position of the tractor tracks. Rigidly mounted on the underside of the frame was a pin-type milling drum which was driven from the tractor PTO shaft through a bevel gearbox and chain drive. The single miller attachment was supported by a ground roller, through springs, located immediately in front of the milling drum and by a depth control castor a few feet behind the milling drum. For idle travel, the single miller attachment was lifted by a hydraulic ram so that the pin milling drum is clear of the bog surface. This attachment, by virtue of the sprung main supporting roller, caused the milling drum to cut deeper on the hills and shallower in the hollows, thus having a levelling effect on the bog surface. The drive to the milling drum is protected by a tension bolt safety device. Plate 4-29 is an image of this type of machinery operating on a BnM bog.

Plate 4-29 Single miller attachment (source: Living History)

Triple Miller Attachment

As mentioned above, the triple miller attachment operated in much the same way as the single miller attachment, but with a higher output.

The triple miller attachment consisted of units similar to the single attachment, ganged together. The front centre unit was attached to the tractor drawbar, while the two side rear units were drawn by brackets from the side of the front centre unit frame. These brackets were pivoted, and the level of the front of the side unit frame was controlled by roller castors running on the bog surface. The drives to the three milling drums were by universal jointed propeller shafts with splined slip sleeves, two bevel gearboxes and final chain drives. The milling drum speed was lower than the single unit, but in all other respects, the behaviour of the individual units is the same as the single miller attachment. For idle travel, the units were lifted on hydraulic rams incorporated in the rear castor roller assemblies. Depth of cut was also adjusted by these rams from the driving seat. The drive to each of the three units was protected by a tension bolt safety device. Plate 4-30 is an image of this type of machinery operating on a BnM bog.

Plate 4-30 Boom Attachment (source: Living History) Triple miller attachment (source: Living History)

Offset Miller Attachment (Type-I)

This attachment was used to form a bevel on the edges of milled peat fields, to assist surface drainage. It maintained the camber of the production field and was only used after every 3 to 4 harvests. The attachment was a miller drum, projecting from the rear of the tractor unit on a casing arm which is pivoted at a central position on the rear of the tractor main frame and extended to carry a ballast weight. The drive was taken from the tractor PTO shaft, through a bevel gearbox which formed the pivot assembly of the arm, and a universally jointed propeller shaft extended to the actual milling drum. The milling drum was set backwards as it extended from the tractor so that the spoil was thrown back towards the centre of the milled peat field, where it could be harvested. A supporting trolley fixed to a projecting bracket at the centre of the tractor track and supported on a roller behind the drum, carried the drum arm on an adjustable suspension. The trolley, complete with an extension arm and drum could be lifted by a winch rope passing over a mast frame mounted on the tractor. For bogs in early development, a bladed drum was used, while a pin drum was used on extraction bogs. Plate 4-31 is an image of this type of machinery.

Plate 4-31 Offset Miller Attachment (source: BnM)

Harrow

The attachment was made up of four spoon frames, each supported on two twin rollers, and towed by a common frame, which was also supported on rollers and hitched to the tractor. The spoon frames were made of steel tubes and were triangular in shape, with two spars projecting at 45 degrees from the base of the triangle at the rear, each to carry a bank of spoons. The spoon was a curved plate, the base of which was a straight line, set at an angle to the line of travel, and while the front was curved back from its base, the rear was curved forward. The actual spoon was welded to an arm made of spring steel, which was pin jointed to the 45-degree spar to allow movement in the vertical plane. These spoons were pitched to ensure that all the peat was turned.

The four spoon frames were each free to follow the bog surface on their supporting rollers but were connected to each other by a pin-jointed link to facilitate turning. The supporting rollers of the towing frame were located in line with the towing points of the rear frames and were free to move laterally to facilitate turning.

The harrow was fitted with a spoon lifting gear. Each spoon arm was connected to a miniature beam over each bank of spoons. A wire rope from the centre of this beam passed over a supported pulley and secured to a special frame on the rear of the tractor. The standard tractor hydraulics actuated this frame to lift or lower the spoons as required. Plate 4-32 is an image of this type of machinery operating on a BnM bog.

Plate 4-32 Harrow (source: Living History)

Harvester

The purpose of this machine was to harvest milled peat from the bog fields in the same way as the Type II harvester attachment on the HD Tractor.

The tractor was a full track unit comprising a lightly constructed main frame mounted on caterpillar-type tracks; on one side of the tracks returned at a high level to accept the harvesting attachment. The track chain was the cast link type running on cast sprockets and intermediate rollers. It was powered by a diesel engine, and the transmission consisted of a primary gearbox of special design, with a PTO shaft, and increased the transmission RPM through a standard automobile change-speed gearbox and a standard agricultural tractor transmission unit. The final drive reduction between the rear transmission half shaft and track sprocket was by a special spur gear reduction box.

The tractor was steered by a clutch and brake system of proprietary manufacture, which was built into the rear transmission unit. A driver's cab of generous proportions was fitted, with sliding doors and safety glass panels all around. Some of these cabs were of fibreglass construction, and others were of steel. The attachment consisted of a single or double spiral unit and a single belt conveyor, articulated at two points.

The spiral unit was a steel sheet casing suitably stiffened with standard steel sections, capable of housing one or two spirals. The front and rear of the casing were open. The peat ridge was allowed to enter on the front side as the machine advanced, while the rear opening was blanked off by a trailing board, which was raised and lowered in guides as required, and when in the lowered position, was free to move in these guides as the surface of the bog demanded. The spiral or spirals were supported in this rigid casing by a bearing at each end of the shaft. The revolving spiral or spirals conveyed the peat

along the bog surface and trailing board and up a sloping plate of the casing, discharging it onto the belt conveyor.

The spiral unit was supported on two inner and two outer rollers, each pair arranged so that each roller was free to follow the surface of the bog while carrying its share of the load.

The drive to the spiral or spirals was by a double universally jointed propeller shaft, and the casing was pin-jointed to a structural frame, which in turn was pin-jointed to the tractor unit, allowing complete flexibility of the spiral unit to follow the contour of the bog.

The belt conveyor was partly constructed on the structural framework connecting the spiral unit and tractor unit, including the conveyor drive pulley, and partly on the tractor unit, and the remainder formed the jib, projecting from the machine. While flat carrying idlers were used for the receiving end of the belt, flexible shaft type troughing idlers were used over the articulated portion, and conventional type troughing idlers on the jib. At the discharge end of the jib, a moveable deflector was fitted to control the trajectory of the peat.

The attachment was carried on the tractor unit, and a mast on the tractor unit was braced back to the spiral casing by a wire rope, while a multiple rope system actuated by a hydraulic ram on the mast was passed over the top of the mast and connected to the projecting conveyor jib. The top of the mast was also controlled relative to the tractor unit by a wire rope and hydraulic ram.

The driver of the machine could raise or lower the jib and the trailing boards, raise the spiral casing completely off the bog surface by hydraulics, and control the jib deflector by a simple rope winch. Plate 4-33 is an image of this type of machinery operating on a BnM bog.

Plate 4-33 Harvester (source: Living History)

Milled Peat Loading Machine

The purpose of this machine was to load milled peat from peat stockpiles into railway wagons. The machine consisted of a tractor unit carrying a ground spiral on the front, extending either side of the bottom shaft was a bucket elevator which sloped back over the tractor unit. As the buckets overtopped the top sprockets of the elevator, they discharged onto a rubber belt conveyor which discharged into the railway wagons. Plate 4-34 is an image of this type of machinery operating on a BnM bog.

Plate 4-34 Milled Peat Loading Machine (source: Living History)

Polywrapper

As described in Section 4.4.3.2 above, a polywrapper was used in the uncovering of milled peat stockpiles. The polywrapper was mounted on the three-point linkage of a tractor (see Plate 4-35 and Plate 4-36 below). The eye of the polywrapper was attached to a pendulous swivel arm, which, as the tractor moved forward, oscillated from left to right to ensure that the polythene being collected was being dispensed evenly across a metal shaft on the polywrapper. This ensured an even spool of polythene was collected. Once the spool was at capacity, one side of the polywrapper was opened (see Plate 4-36 below), which allowed the metal shaft to be removed and replaced with a plastic one. The entire spool was then removed and sent for appropriate disposal/recycling. The metal shaft was reinserted into the polywrapper, the side closed, and the process began again until the stockpile was fully uncovered and all the polythene collected.

Plate 4-35 Polywrapper

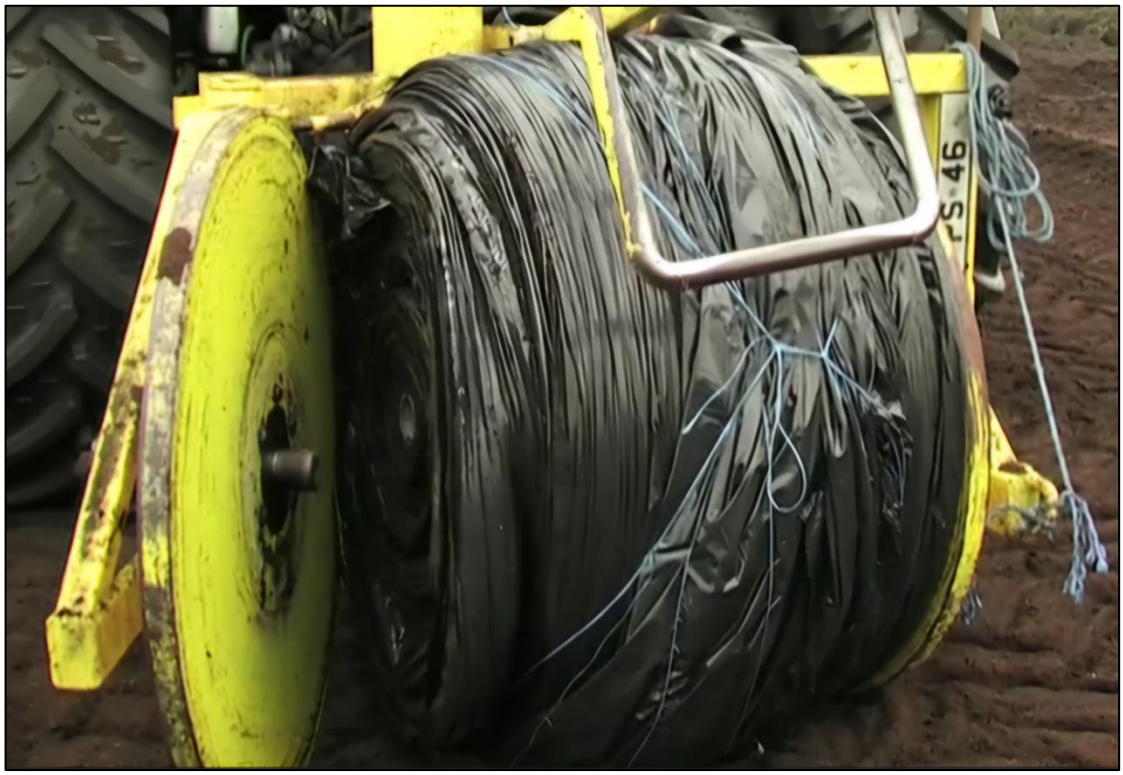

Plate 4-36 Polywrapper with the frame opened to allow access to the collected bale of polythene

4.2.2.4 Sod Moss Machinery

Sod Moss Cutting Attachment

Sod moss was cut with a special bucket attachment on a digger. The bucket attachment collected peat from the face bank of the bog and deposited the peat as 8 separate sods on the surface of the bog. Plate 4-37 and Plate 4-38 show this type of attachment extracting sod moss.

Plate 4-37 Sod Moss cutting attachment attached to a digger (source: BnM)

Plate 4-38 Sod moss cutting attachment (source: BnM)

4.2.2.5 Bin Sod

Bin Sod Tractor Attachment

The bin sod tractor attachment had a 5ft chainsaw type blade which extracted peat from the surface of the bog and deposited it into a macerator which pulped and mixed it. The macerated peat pulp was then extruded into rows of continuous bin sods. As they were extruded, trailing discs then cut the rows into 8 long sods. The bin sod was spread on the large area between the trenches which allowed sufficient room to dry the peat. Plate 4-39 show the bin sod attachment on a tractor.

Plate 4-39 Bin sod tractor attachment (source: BnM)

4.2.3 Ancillary Structures and Infrastructure

There are a number of ancillary structures and features associated with peat extraction and ancillary activities at the Application Site. These include:

- Workshops;
- Works offices;
- Welfare Facilities;
- Fuel Storage;
- Machine Storage Sheds;
- Storage Containers;
- Local holding areas;
- Tiphead;
- Vehicular bridges; and
- Railway Infrastructure.

It should be noted that the majority of the ancillary infrastructure has already received planning permission or were constructed before the commencement of the formal planning system, and as such, substitute consent is not being sought in respect of them. Nonetheless, they will be assessed within the relevant sections of the rEIAR and rNIS for completeness. The features that are the exceptions to this are the storage containers, local holding areas, machine storage sheds, vehicular bridges, welfare facilities, and some railway infrastructure, as detailed below, which are the infrastructure that forms part of the Project as described in Section 4.2.

4.2.3.1 Workshops

Ballydermot Works, provided a central location for support services to the Application Site and other adjacent bogs and comprises of workshops, offices, welfare facilities, storage sheds, maintenance buildings, staff carparks, HGVs storage area, a tiphead and a refuelling area. Ballydermot Works is located along the L3001 Rathangan to Edenderry Road, approximately 2.7 km northwest of Rathangan town.

Staff parking is provided at Ballydermot Works, and it remains the central location for management of the activities within the Application Site. The workshops and offices at Ballydermot Works were originally constructed between 1948 and 1949 prior to the enactment of the Planning and Development Act 1963 (i.e. 1st of October 1964) as described in Section 4.1 and Chapter 1 of this rEIAR and are not included as part of this substitute consent application.

During the Peat Extraction Phase, the majority of workers at the Application Site would arrive to Ballydermot Works prior to mobilising stored machinery and navigating to the required location within the Application Site. Machinery was parked at Ballydermot Works or at local holding areas when not in use and refuelling of machinery was carried out from dedicated refuelling areas at fixed fuel tanks located in the yards, although in some circumstances where machinery could not be tracked back to Ballydermot Works buildings, refuelling was also carried out on the bogs at the Application Site at designated areas, away from drains or rivers. Concrete bunds and oil interceptors were provided to prevent the release of fuels to the ground or surface water bodies. Tanks and drums were, and continue to be, stored in bunded areas at Ballydermot Works. These standard practices were in place prior to the implementation of the IPC Licence in 2000.

Other smaller satellite workshops and storage yards which were convenient for the workers on the bogs are also located across the Application Site. The workshops were mainly used to carry out repairs and maintenance on machinery which was brought in from the extraction areas. Satellite workshops were located at Blackriver, Lullymore and Glashabaun North Bogs. Lullymore workshop was built prior to the establishment of Bord na Móna by the Peat Fuel Company Ltd, the owners of the land at the time prior to 1945. Blackriver works buildings were completed between 1948 and 1949. The works buildings at Glashabaun North were completed between 1949 and 1950. Originally this works functioned as a bagger repair workshop, it was eventually converted to a rail workshop to make and upgrade the rail for Kilberry Bog in Co. Kildare until its closure in 1995. After 1995 these operations moved to Ballycon workshop in Co. Offaly however, in 2000 the workshop at Glashabaun North was used again for a very brief period of time to use up the stock that remained there from closure.

A machine and wheel wash facility are also located at the Ballydermot Works. Machine washings generated due to the cleaning of various plant machinery (using a power steam wash system when machinery left the bogs) at wash bays drained into the adjacent peatlands drainage system.

The location of the Ballydermot Works and satellite works in relation to the Application Site boundary can be seen in Figure 4-2.

4.2.3.2 Works Offices

The offices at Ballydermot Works provided an administration centre for the Application Site and the surrounding bogs. Permanent administration staff were employed throughout the Peat Extraction Phase from the time of construction of these buildings in the 1940s. The office buildings also provided welfare facilities such as toilets and a canteen to serve employees and staff within the Application Site.

4.2.3.3 Welfare Facilities

Welfare facilities were also provided across the Application Site. These took the form of small buildings and temporary structures to provide workers on peat extraction fields a clean area to take lunch/tea breaks and provide welfare facilities. While facilities were available at Ballydermot Works offices, these smaller outposts were situated across the Application Site to provide easier access to workers further away from the central buildings. Facilities are located to the north of Glashabaun North Bog and the northwest of Killina Bog. Any remaining welfare facilities will be decommissioned as required as part of the IPC Licence decommissioning plans, as outlined within the Bog Decommissioning and Rehabilitation Plans (refer to Appendix 4-2).

4.2.3.4 Fuel Storage

Fuel was stored within above ground bunded tanks at Ballydermot Works and northwest of Killina in compliance with Condition 9 of the IPC Licence. The fuel tanks are bunded to contain any potential fuel spills or leaks. The practice of bunding and for mobile refuelling units was introduced in the 1970s. Refuelling procedures were upgraded to standard bunding specifications to comply with IPC Licence requirements in 2000 (refer to Appendix 4-1 for details). The fixed fuel tank located to the northwest of Killina Bog was decommissioned in 2024, the tank has not been in use since prior to 2010, the bunded wall which surrounded the tank is still present today.

Refuelling of vehicles and machinery was primarily carried out at the main fixed fuel tanks at Ballydermot Works or northwest of Killina, but in some circumstances where machinery could not be tracked back to the fixed fuel tanks, refuelling was also carried out on the bogs at designated areas, away from drains or rivers, in compliance with Condition 9.1.13 of the IPC Licence. Service trains/railcars with a bunded fuel dispensing unit, travelled from Ballydermot Works to the designated bog area to refuel the machine in question. This occurred at a frequency of up to three times a week during peak times during the Peat Extraction Phase. This frequency was significantly reduced outside peak peat extraction.

4.2.3.5 Machine Storage Sheds

A machine storage shed was located to the northwest of Killina Bog, the installation date of the shed is not clear, but BnM records indicate that it was installed in the 1960s. Another storage shed is located to the northeast of Codd 1 Bog and was installed between 2011 and 2013. Both sheds are still currently present on the Application Site (see Appendix 4-12).

4.2.3.6 Storage Containers

A total of 40 no. storage containers were placed across the Application Site from 1995 to 2019. 3 no. different types were used; 20 ft containers, 40 ft containers and smaller 3m x 3m. These containers would have also provided employees with a clean area to take breaks and store materials. Currently 19 no. storage containers remain on the Application Site in Blackriver, Ballydermot North, Glashabaun North, Glashabaun South, Killina and Codd 1 bogs. Decommissioning of the containers began in 2012 and has continued across the Application Site in compliance with Condition 10.1 of the IPC Licence (see Appendix 4-1).

4.2.3.7 Local Holding Areas

There are 9 no. local holding areas associated with peat extraction and ancillary activities at the Application Site, located at Ballydermot North, Ballydermot South, Blackriver, Codd 1, Glashabaun North, Killina and Lodge bogs. The location of the local holding areas is presented in Figure 4-3 below.

Local holding areas were areas in which peat extraction machinery was parked at the end of the working day. Given the size of the Application Site, it wasn't necessarily sensical to track machinery back to Ballydermot Works or the Satellite Works each evening, and back to the active areas of peat extraction in the morning, as this would require significant time, given the speed of the machines, and result in unnecessary fuel use. As such, informal local holding areas were established by workers on the bog. These areas were proximate to road networks to allow staff easy and safe access without tracking over bog and essentially comprised of flat areas which were suitable for machines to park on.

4.2.3.8 Tipheads

Tipheads were specific types of infrastructure which facilitated the loading of sod peat into trucks and trailers. There is one tiphead directly adjacent to the L3001 Rathangan to Edenderry Road behind Ballydermot Works (see Figure 4-4 below). The tiphead at Ballydermot Works was used up until 2003 when sod peat sales ceased.

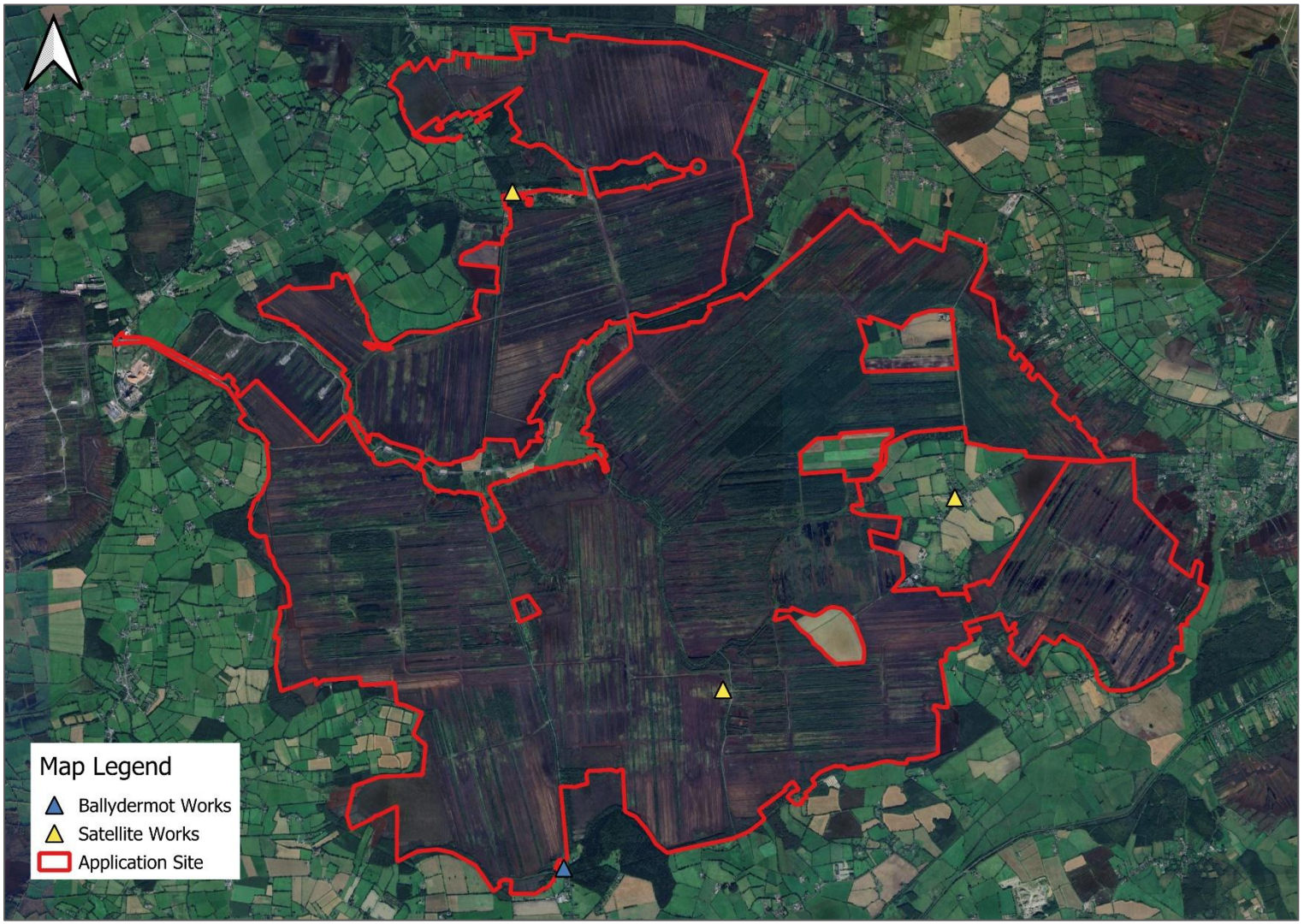

Figure 4-2 Location of Ballydermot Works and Satellite Works associated with the Application Site

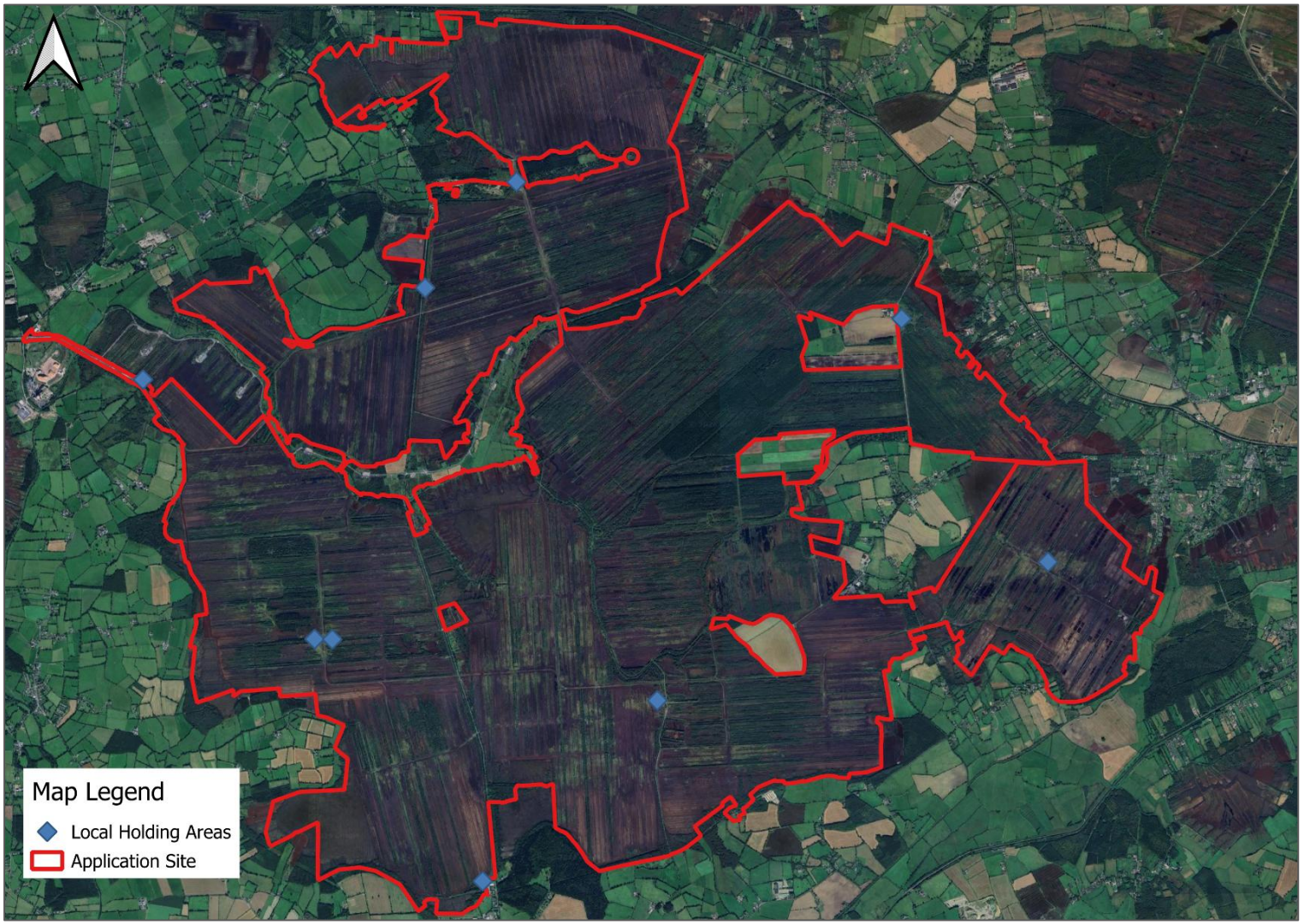

Figure 4-3 Location of Local Holding Areas within the Application Site

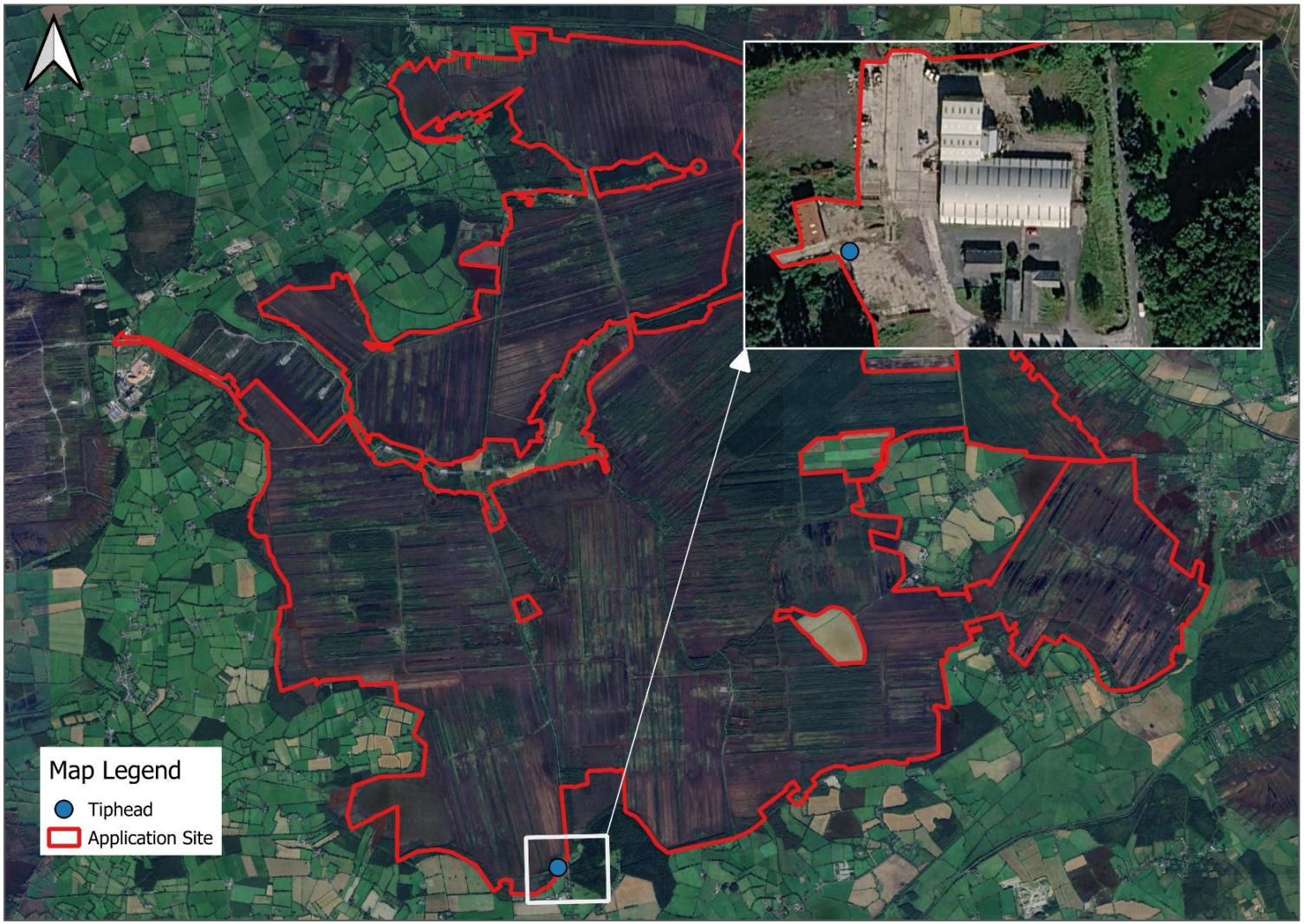

Figure 4-4 Location of tiphead in Ballydermot in relation to the redline boundary of the Application Site

4.2.3.9 Vehicular Bridges

8 no. vehicular bridges were installed within the Application Site to facilitate vehicular access to various areas of the site, including crossings of rivers and drainage channels where required. The installation date of the vehicle bridges is unknown in reality it is likely that the majority were in place prior to the commencement of the formal planning system however due to the lack of records confirming this, they have been included as part of the development for which substitute consent is being sought. The bridges comprised steel-framed structures supported on piled foundations consisting of timber piles with reinforced concrete capping beams. The bridge superstructure incorporated primary longitudinal steel beams, with intermediate transverse steel struts positioned perpendicular to the main beams at approximately quarter-span locations to provide additional structural support and load distribution (see the Application Planning Drawings for further details).

4.2.3.10 Railway Infrastructure

Peat extraction areas were served by a network of permanent and temporary narrow-gauge rail tracks (approximately 1m in width and with track lengths of approximately 9m), the majority of which were constructed in the 1950s and 1960s. During the early years of peat extraction and ancillary activities, the lifting and laying of rail was done by hand before equipment was designed for that purpose.

Annual Reports from 1947 and 1948 indicate that development works were underway at the Application Site, including the installation of railway infrastructure in Ballydermot, Blackriver, Lodge and Glashabaun Bogs. A main railway line four miles in length connecting Blackriver and Lodge Bogs to Allenwood Power Station was completed between 1951 and 1952, this involved the construction of a vertical lift bridge across the Grand Canal. A further railway link was constructed between Glashabaun and Blackriver between 1952 and 1953 necessitating the erection of a bridge over the River Figile.

Approximately 51 km of permanent track was located within the Application Site boundary and facilitated the movement of extracted peat within the Application Site from 1935 until October 2021 when stockpile removal finished (refer to Section 4.6.1). In addition, temporary track was also laid across the Application Site as required (i.e. it was lifted and laid up to 12 times in a year for transport of peat stockpiles). When it was decided to sell a stockpile, a temporary railway track was laid alongside the stockpile to connect to the permanent railway line and allow for ease of transport from the Application Site to the power stations, briquette factory or to Ballydermot Works. On completion of removal of a stockpile, the temporary track was lifted and re-laid along another stockpile.

The gauge of the track used was 36-inches (0.91m). The rail, in general, weighs 30lbs (13.6kg) or 35lbs (15.6kg) per yard, mounted on steel sleepers, 6-foot (1.8m) in length and 2.5-foot (0.76m) apart to which the rail is attached by steel clips. In certain positions, notably on lines external to the bogs, rail track of 45lbs to 60lbs (20kg to 27kg) per yard on creosoted pine or redwood sleepers was used. The length of a standard section of temporary track was 30-foot (9.2m) and the weight was approximately 1200lbs (544kg), when complete. The section was lifted and laid by a BnM tractors with special lifting equipment or by a dragline. The standard turnout also had a length of 30-foot (9.2m) and was in two sections for ease of movement.

Permanent rail bed construction on the bog surface depended primarily on good drainage. The rail bed was formed of dry milled peat or of mould and sods placed in position by machine to a depth of 2 to 3-foot (0.6 to 0.9m) and well rolled/compacted. Subsequently, the beds of permanent lines were ballasted, preferably with 9-inch (0.22m) depth of sand or fine gravel.

There are 4 no. rail underpasses located within the Application Site boundary.

There are 2 no. rail underpass located adjacent to the western boundary of the Application Site (Offaly Co. Co. Ref. 86/184 and Ref. 97/699). The underpasses are located at an existing site entrance along the R401 and facilitates the connection between the Application Site and Cloncreen Bog, which forms part of the Allen Bog Group (IPC Licence Ref P0503-01). The structure itself is a single underpass constructed using precast concrete arch sections.

There is 1 no. rail underpass located within the southwest of the Application Site (Kildare Co. Co. Ref. 97/1140). The underpass is located along the L3001 and facilitates the connection of Ballydermot North and South Bogs to Blackriver Bog within the Application Site itself. The structure is a single line precast concrete underpass.

There is 1 no. rail underpass located within the northwest of the Application Site (Offaly Co. Co. Ref. 97/520). This underpass is located along the L1001 and facilitated connection between Codd 2 and Glashabaun North Bog within the Application Site itself. The structure is a double line precast concrete underpass.

It should also be noted that the nearby Drehid Landfill is an EPA Licenced ash repository (Licence No. W0201-03) which is located to the northeast of the Application Site and is currently used for the disposal of ash from Edenderry Power Station since 2000. Edenderry Power Station relies upon BnM rail infrastructure to transport ash from the power station via rail carts, through the Application Site, and Timahoe South Bog towards Timahoe North Bog. The rail wagons pulled by BnM trains were covered with a lid to ensure that no spillage of ash or dust occurred (see Plate 4-40 below).

A map of the permanent railway network at its greatest extent within the Application Site is presented in Figure 4-3.

Plate 4-40 Example of railway locomotives pulling ash wagons

4.2.3.10.1 Level Crossings

2 no. guarded level crossings were installed along the R414 within the Application Site between 1951 and 1952, before the implementation of the Planning and Development Act (1963), which came into effect on October 1st 1964, and these structures are not part of this substitute consent application. They were constructed to facilitate the connection of Barnaran, Lodge and Killina Bogs to Lullymore Briquette Factory and Allenwood Power Station.

The gates at the guarded level crossings were of single leaf with spans varying from 25 to 40-foot (7.6 to 12.1m). Light mesh was suspended from a hollow top boom of steel. While standard level crossing lamps with light sensors that switched to light on when daylight faded were fitted across all BnM crossing gates, these were decommissioned when the removal of peat from the Application Site ceased in October 2021. Catch points are also fitted into railway tracks on either side of level crossing gates as a standard safety practice to de-rail any runaway trains before reaching the level crossing.

2 no. unguarded level crossings were installed between Blackriver and Barnaran bogs and between Codd 1 and Codd 2 bogs the installation date of these level crossings are unknown, therefore been included in this application. The level crossings are both positioned at private roads with no access to the general public. 2 no. standard warning signs and warning lights were placed on approach at each of the unguarded level crossings (see Appendix 4-12).

4.2.3.10.2 Railway Bridges

7 no. railway bridges were installed within the Application Site to facilitate the narrow-gauge railway network that provided access to various areas of the Application Site, crossing rivers and drainage channels where necessary. The installation date of the railway bridges is unknown in reality it is likely that the majority were in place prior to the commencement of the formal planning system however due to the lack of records confirming this, they have been included as part of the development for which substitute consent is being sought. The structures comprised steel-framed bridges supported on concrete abutments. The bridge decks carried the rail tracks, with the primary longitudinal steel beams positioned beneath the tracks and secondary cross beams spanning perpendicular to the main beams to provide structural support to the deck (see Appendix 4-12).

4.2.3.10.3 Railway Equipment

Extracted peat was transported from stockpiles on the Application Site via a series of permanent and temporary railway tracks. The railway transported peat from the Application Site to Lullymore Briquette Factory (from 1935 to 1992), Allenwood Power Station (from 1952 to 1991), Edenderry Power Station (from 2000 to 2020), or the tiphead at Ballydermot Works for sale to the public (sod peat only between 1950 and 2003). The equipment which facilitated the installation and maintenance of the railway tracks, as well as the equipment used to transport peat on the railway lines, are described below.

Rail Shifter

A rail shifter was an attachment fitted onto tractors which was used to lift temporary railway tracks in sections and build them onto bolster bogies for transport to a new area. The rail lifter consisted of a lightly constructed main frame supported on two bogies and an overhead latticework beam supported from the main frame to allow the passage of the rail sections through the machine. When seven sections were built on the bolster bogies, they were hauled away by a locomotive. Plate 4-41 is an image of this type of machinery operating on a BnM bog.

Plate 4-41 Rail Shifter (source: Living History)

Rail Moving Attachment

The purpose of the rail moving attachment was to lift and lay temporary railway tracks along sod peat ricks and milled peat piles. The attachment was fitted to a tractor and consisted of an A-frame jib pivoted on a bracket secured to the track frame of the tractor and braced back at the top by wire rope to a projected ballast box on the other side of the tractor. A short jib was used for sod peat operations while a longer jib was used for milled peat operations. Plate 4-42 is an image of this type of machinery operating on a BnM bog.

Plate 4-42 Rail Moving Attachment to lift and lay temporary track, along sod peat ricks and milled peat piles. (source: Living History)

Locomotive 80HP (Wagonmaster)

The locomotive hauled peat from the stockpiles across the Application Site to Ballydermot Works for processing. The locomotive was powered by a water-cooled diesel engine driving through a fluid coupling, automotive type clutch, standard automobile change speed gearbox, a special reversing bevel/spur reduction gearbox and drive and coupling rods to the wheels. The main frame was fabricated steel plate. The axles ran in self-aligning double row roller bearings in cast steel housings sliding in horn guides with manganese steel wearing faces. A cab of generous size was included, with a tumbling-type seat to facilitate driving in both directions. The clutch control pedal was duplicated for the two driving positions. The braking system was mechanical hand operated. The locomotive was fitted with beam lighting, electric windscreen wipers and driving mirrors for both directions of travel. Plate 4-43 is an image of this type of machinery operating on a BnM bog.

Plate 4-43 Locomotive with wagons (source: Living History)

Wagons

Wagons had a capacity of 16 cubic metres and were designed with two diamond bogies for sod and milled peat haulage. One bogie of each wagon was free to float 152mm in any direction to prevent derailment on uneven temporary tracks. The diamond bogie with its centre springs gave great flexibility and prevented axle failures. The wagon bearings were taper roller bearings which were grease-packed and fitted in the wheel hubs.

The use of aluminium to fabricate the sides and floor of milled peat wagons reduced the unladen weight of the wagon when compared to heavier materials such as wood and steel and therefore facilitated a greater payload (i.e. a greater amount of peat) to be transported per train. Furthermore, the use of aluminium resulted in considerable reduction in the maintenance and painting costs.

Rail Car

Rail cars were used by the Manager or authorised members of their staff, to make inspections and for tours of the bog. Rail cars were equipped with first-aid equipment and also worked as a bog ambulance if needed. Rail cars were fitted with a water-cooled petrol engine, the power from which was transferred through an automotive clutch to a gearbox and then transferred to each axle via a chain drive. Beam lights and electric windscreen wipers were fitted at each end of the rail car and a short-wave radio transmitting and receiving set enabled the occupants to keep contact with the Works and the larger machines that were fitted with radio units on the bog. Plate 4-44 is an image of this type of machinery operating on a BnM bog.

Plate 4-44 Rail Car (source: Living History)

4.2.4 Site Services

Water consumption across the Application Site is primarily from bored wells across the Application Site for domestic use. Well ID: IE_GSI_GW_Well_12220 supplied Ballydermot Works, Well ID: IE_GSI_GW_Well_12532 supplied Lullymore and Well ID: IE_GSI_GW_Well_27090 supplied Glashabaun and surrounding area.

Wastewater from the welfare facilities within the Application Site to the north of Glashabaun North is discharged to an on-site septic tank and another septic tank is positioned at the Ballydermot Works located adjacent to the Application Site boundary. The wastewater from these facilities is discharged to the septic tanks with the effluent discharged to a percolation system through peat before penetrating to ground. The septic tanks are inspected and de-sludged annually by a licenced waste permit holder to ensure the treatment system is working optimally.

Electricity supply to Ballydermot Works buildings and workshops, and also to the drainage pump stations, are powered by mains electricity from the national grid connected to overhead electrical power lines, within the Application Site. The existing Cushaling - Newbridge 110kV overhead power line crosses the Application Site to the south of Ballydermot Works. A number of private lines cross the Application Site, which provided electrical supply to some electrically powered peat extraction machinery, such as Baggers, as well as power to surface water pumps and welfare facilities.

Compressed air (oxygen and acetylene) was used mainly at the Ballydermot Works for welding and cutting purposes to maintain plant and equipment. Some tractors, known as ‘fitter’s tractors’ (named as such because they were equipped with tools which mechanical fitters used to repair or maintain machinery and/or infrastructure across the Application Site), were also fitted with oxygen and acetylene tanks to facilitate welding on a mobile basis if needed.

In addition to the above, other materials consumed as part of the peat extraction and ancillary activities would have been polythene sheeting for covering stockpiled peat, timber and steel for the rail lines, gravel for the rail beds, and sand for locomotives.

4.3 1935 to 1988 – Initial Development & Peat Extraction (Pre-EIA Directive)

4.3.1 Site Description 1935 (Pre-Extraction)

Prior to the commencement of drainage, which first occurred on the Application Site in 1935, the Application Site was covered by an active raised bog, with the surface being wet, acidic and deficient in plant nutrients, with open Sphagnum-dominated vegetation. Raised bogs are accumulations of deep acid peat where peat can range from 3-12m deep. The "raised bog" name is derived from the elevated dome which develops as the bog grows due to the accumulation of peat. Pre-development topographies would have been higher (in the ranges of 75m to 88mOD) than those observed today, with the remnant areas of high bog located around the perimeter of the Application Site resembling pre-development ground elevations more closely.

Water in a raised bog is continuously circulating, and pre-development, the Application Site would have been nutrient-poor and waterlogged on the surface. The principal supply of water to the Application Site would have been from rainfall. Water would have been lost from the Application Site from surface water runoff particularly during the winter months when the storage capacity of the bog would have been fulfilled due to higher levels of seasonal precipitation. Water may also have been lost through the lower levels of the peat deposits, especially where the bog is underlain by gravels or sands without underlying low permeability lacustrine deposits (i.e., clay layer). The pre-development water table at the Application Site was likely very stable with only minor fluctuations and remaining within a few centimetres of the bog's surface.

The primary land-use change associated with peat extraction and ancillary activities occurs during the initial drainage of the bog in advance of peat extraction. Constructed drainage ditches drain the upper surface of the bog by lowering the local peat water table. After the Application Site was drained, vegetation was removed from the bog surface, leaving only bare peat fields between the drains. Around this time and in the years that followed, ancillary features were also constructed including railway lines, workshops and welfare facilities. Historical mapping (Cassini 6" (1940s)) of the Application Site indicate entrances prior to the commencement of peat extraction were broadly located in the same locations as present day along the local road network.

4.3.2 Drainage and Peat Extraction

The timing of the installation of drainage and initiation of peat extraction varied across the Application Site (see Table 4-2 for the operational history for each individual bog on the Application Site). As outlined above, clearance and drainage commenced at the Application Site in 1935, and the Application Site would have experienced a relatively abrupt change in land cover with the commencement of peat extraction in that same year. The earliest aerial mapping available (1973) confirms that by this period, drains were already inserted at the Application Site, shown on Figure 4-5 below. The Application Site was mapped as a raised bog and fen in the Peatland Map of Ireland produced by the National Soil Survey in 1978[4]. Figure 4-5 below presents an overview of the peat extraction and ancillary activity on the Application Site in 1973, which has been deduced from the earliest available aerial mapping for the Application Site (1973 aerials included as Appendix 4-5).

As discussed above, drainage ditches to drain the upper surface of the bogs by lowering the local water table were inserted across the Application Site at different stages throughout the decades (please see Table 4-2 below and Section 4.2.2.1 for details on drainage construction methods practiced at the Application Site). As drainage was installed, vegetation clearance was undertaken. The earliest aerial

[4] https://teagasc.ie/wp-content/uploads/2025/05/Peatlands-of-Ireland-Map-1.pdf

imagery of the Application Site available was captured in 1973. It is estimated that at that point, approximately 4,510 ha across the Application Site was cleared, drained and subject to peat extraction, a total of 689 ha was drained, but not cleared of vegetation or subject to peat extraction and a total of 250 ha was neither drained nor subject to peat extraction. In 1988 this increased to 4,828 ha across the Application Site being cleared, drained, and subject to peat extraction, a total of 423 ha was drained but not subject to peat extraction and a total of 198 ha was neither drained nor subject to peat extraction.

The topography of the Application Site prior to the commencement of peat extraction and ancillary activities is estimated to have been 75m – 88mOD. This is deduced from the presence of benchmarks noted on historical 25" OSI mapping (1897-1913 and) Cassini 6" (1940s) of the area. It is assumed that prior to the installation of drainage to facilitate peat extraction, the Application Site was virgin bog and was therefore an active raised bog.

As previously stated, the primary and greatest land-use change associated with the peat extraction and ancillary activities on the Application Site occurred during the initial drainage and clearance of the bogs in advance of the commencement of peat extraction. This impact would have occurred in advance of 1988 at the Application Site, as drainage and clearance works were undertaken by 1988. A photographic accompaniment illustrating the types of activities described below can be found in Appendix 4-18 *Bord na Móna: Peat Development in Ireland 1954*.

Table 4-2 Operational History of the Application Site (source: Bord na Móna Annual Reports)

Bog Unit	Commencement of Site Preparation Works (vegetation clearance and drainage insertion)	Extraction Commenced	Extraction Ceased
Ballydermot North	1946	1950	2020
Ballydermot South	1946	1950	2020
Blackriver	1947	1950	2020
Barnaran	1954	1959	2020
Lullybeg	1935	1935	2004
Lullymore	1935	1935	1992
Lodge	1947	1953	2020
Killina	1935	1935	2020
Derrybrennan	1959	1969	2015
Glashabaun North	1947	1951	2020
Glashabaun South	1947	1951	2020

Bog Unit	Commencement of Site Preparation Works (vegetation clearance and drainage insertion)	Extraction Commenced	Extraction Ceased
Ticknevin	1973*	1981*	2019
Codd 1	1959*	1973*	2020
Codd 2	1973*	1981*	2019

*Estimated date indicated by available aerial imagery which are included in Appendix 4-5 of this rEIAR.

Table 4-3 describes the general activities within the Application Site over a calendar year during each of the four quarters from 1935, when peat extraction commenced, to June 1988. Some drain maintenance was carried out during the full year, but it was mainly restricted to outside the peat extraction season (i.e. undertaken between October and March, weather-dependent). Levels of fuel handling and refuelling would have increased significantly during the peat extraction season (i.e. between March and October, weather-dependent) due to the increased activity of the peat extraction machinery.

Table 4-3 Annual Peat Extraction activities at the Application Site 1935 - July 1988

Calendar Quarter	Activities
January to March	Drain/Machinery/Pump/Silt Pond maintenance, Stockpile removal, peat transportation.
April to June	Peat extraction, Stockpile development/removal, peat transportation.
July to September	Peat extraction, Stockpile development/removal, peat transportation.
October to December	Drain/Machinery/Pump/Silt Pond maintenance, Stockpile removal, peat transportation.

N

Legend

Substitute Consent Boundary

Application Boundary

Peat Production 1973

Drained - Not Subject to Peat Extraction

Neither Drained nor Subject to Peat Extraction

Subject to Peat Extraction

0 0.5 1 2 Kilometres

Figure 4-5 1973 Peat Extraction Activities

BnM

Ballydermot Substitute Consent
1973 Peat Extraction Activities

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-52	1:45,000	JL	10/07/2026

4.3.3 Peat Extraction Pre-1988

4.3.3.1 Background

Prior to the establishment of BnM in 1946, the Peat Fuel Company Ltd owned land at and surrounding Lullymore Bog and a briquette factory in the townland of Ticknevin now known as Lullymore Briquette Factory. Milled peat from Lullymore, Killina and Lullybeg Bogs began to be transported to Lullymore Briquette Factory in the Winter of 1935 and the factory started experimentally in the Summer of 1936. In 1939 Lullymore factory closed due to the project being in severe financial difficulty after failing to reach production targets for multiple years. However, the Turf Development Board took over Lullymore Briquette Factory from the Peat Fuel Company Ltd in 1940 to aid with the fuel shortage during the emergency.

In 1941 the Kildare Scheme was set up to supply Dublin with fuel from an area covering 250 square miles including the Application Site. Residential camps were set up and located at Killinthomas, Codd, Lullymore Lodge, Allenwood and Edenderry to provide labour for the scheme, each camp had the capacity to house 500 workers. Peat extraction continued to expand at the Application Site as part of the First Development Programme in 1947 which aimed to produce 1,000,000 tons of sod peat annually, improve the Lullymore Briquette Factory and establish the first generation of turf fired power stations. Between 1954 and 1957 Lullymore Briquette Factory was extended to allow for a greater capacity of briquettes and additional areas of bogs in the Application Site including the east of Killina, the south of Glashabaun South and the northwest of Barnaran were brought under development for milled peat extraction to supply the Briquette Factory.

Two areas above and below the west of Killina Bog were drained in 1935 and subject to milled peat extraction before they were leased for an afforestation experiment in 1955. In 1960, these areas were transferred to An Foras Talúntais to establish Derrybrennan Farm and in 1966, a Peatland Experimental Centre to develop a nursery for growing ornamental shrubs and trees on cutaway peatland. The milled peat cutaway in these areas was levelled, a drainage system installed, and a cutaway grassland established. The area in the north was used to support an 80 cow calf-breeding station. The nursery to the south of Killina was used to grow acid loving shrubs such as rhododendrons and azaleas for the export market and was extended in 1970. The first sales were made from the nursery in the Autumn of 1973 when 16,000 plants were exported for sale in Britain. BnM's shrub nursery and farms were sold in 1988.

4.3.3.2 Milled Peat Extraction 1935 to 1988

As noted in Section 4.3, peat extraction began at the Application Site in Lullymore, Lullybeg and the west of Killina in 1935 in the form of milled peat. These were the first bogs within the Application Site to introduce milled peat extraction, which later took over from hand-won and machine turf on the site. The milled peat produced was transported by rail to the Lullymore Briquette Factory to be used in briquettes from 1936. The briquettes were then transported by canal until a bridge was erected over the canal in 1948 allowing for transportation by road. Milled peat from the application site was also transported by road to Drogheda Cement Factory in 1945. The remainder of Killina and northwest of Barnaran were brought under development for milled peat by 1959 to ensure a supply to Lullymore Briquette Factory following its extension between 1954 and 1957. During the period from 1935 to 1950 milled peat was the predominant form of peat extraction ongoing throughout the Application Site. Due to further upgrades at Lullymore Briquette Factory in 1972 to 1973, additional milled peat production areas were required and as such, milled peat extraction commenced on Derrybrennan by 1969. Milled peat extraction commenced in Ballydermot North, the east and south of Ballydermot South, Blackriver, Glashabaun North, Glashabaun South, Codd 1 and Codd 2 Bogs in 1981 and Ballydermot Works produced milled peat for the first time in 1986. The processes and machinery associated with milled peat extraction are described in Section 4.2.2.2.2.

4.3.3.3 Sod Peat Extraction 1950 to 1988

Sod peat extraction commenced at the Application Site in 1950. Ballydermot North, Ballydermot South and Blackriver were the first bogs within the Application Site which were subject to sod peat extraction between 1950 and 1951. Glashabaun North and Glashabaun South bogs were next to be subject to sod peat extraction in 1951. Followed by Lodge bog in 1953, Barnaran Bog by 1959, Codd 1 by 1973 and a small area in the north of Codd 2 by 1988. Sod peat was extracted to supply Portarlington Power Station via trucks from its opening in 1950 to its closure in 1988 and Allenwood Power Station via rail from 1952 to 1991. Sod peat from the Application Site was also sent for domestic sale and supply to the public via the tiphead at Ballydermot Works from 1950 until 2003. The processes and machinery associated with sod peat extraction are described in Section 4.2.2.2.1.

4.3.3.4 Sod Moss Extraction 1976 to 1988

Sod moss extraction commenced at the Application Site at the end of 1976 to supply Kilberry Factory with 40,000 tons of sod moss annually. Sod Moss was extracted (using the method described in Section 4.2.2.2.3) from Killina, Lodge, Lullybeg, Lullymore and Barnaran Bogs. From 1981 sod moss was also extracted from Ticknevin bog.

Figure 4-5 shows a map of the peat extraction areas at the Application Site in 1973, illustrating areas that were in active extraction and areas where peat extraction had not yet commenced. Appendix 4-5 includes available aerial imagery from 1973, 1988, 1995, 2004 and 2020. Labels are added to the imagery to identify the fourteen bogs within the Application Site as well as neighbouring bogs.

4.3.4 Drainage Design

As part of the development of the Application Site for peat extraction, parallel surface water drains as per the methodology outlined in Sections 4.2.2.1 and 4.2.2.2 were created by machine excavators at specific intervals, depending on the type of peat was being extracted. The strips of bog between these drains were retained to form peat extraction 'fields'. By 1988 drainage channels, silt ponds, outfalls and pumps were extant at the Application Site. The Planning Drawing Pack which accompanies this application shows the detailed drainage across the Application Site.

Ballydermot North Bog

Drainage works first commenced in Ballydermot North for sod peat drainage in 1946 according to expenditure on BnM Annual Reports from that time. Aerial imagery dating from 1973 shows sod peat drainage inserted in the majority of Ballydermot North. By 1981, drainage infrastructure was converted from sod peat drainage (as described in Section 4.2.2.2.1) to milled peat drainage (as described in Section 4.2.2.2.2) with milled peat extraction ongoing. There were no silt ponds, pumps or surface water emission points located on Ballydermot North Bog before 1988.

Ballydermot South Bog

Drainage works first commenced in Ballydermot South in 1946 according to BnM Annual Reports from that time. The earliest available aerial imagery dating from 1973 shows sod peat drainage inserted at Ballydermot South, 98.2 ha of bog remained intact in the west of the bog. According to the BnM Annual Report from 1986 milled peat extraction had commenced in 1981 from Ballydermot South. It is not clear from records or aerial imagery where milled peat drainage commenced in the former sod peat extraction areas of Ballydermot South, but records indicate that by 1981, milled peat drainage had replaced sod peat drainage in the east of Ballydermot South, with sod peat extraction still underway in the northwest of the bog. There were no silt ponds, pumps or surface water emission points located on Ballydermot South before 1988.

Blackriver Bog

Drainage works began in Blackriver Bog between 1947 and sod peat extraction commenced in 1950 according to BnM Annual Reports. Aerial imagery from 1973 shows that drainage at Blackriver Bog consisted mostly of sod peat drainage, with 5.7 ha of remnant uncut raised bog remaining intact in the southwest of the bog. By 1981, drainage infrastructure was converted from sod peat drainage (as described in Section 4.2.2.2.1) to milled peat drainage (as described in Section 4.2.2.2.2) starting in the southeast of the bog which was inserted with milled peat drainage by 1973. There were no silt ponds, pumps or surface water emission points located on Ballydermot South before 1988.

Barnaran Bog

BnM Annual Reports indicate initial drainage commenced by 1954. By 1959 the centre of the bog had been inserted with sod peat drainage, a section in the northwest was drained for milled peat extraction, a section in the northeast was subject to initial drainage and two sections; one in the southwest and another in the southeast had no evidence of drainage at the time. By 1973 Barnaran Bog was fully inserted with milled peat drainage. By 1981 drainage was converted from milled peat drainage (as described in Section 4.2.2.2.2) to sod moss drainage (as described in Section 4.2.2.2.3) with sod moss drainage fully inserted in the bog by this time. In the 1980's 3 no. silt ponds and 2 no. surface water emission points were installed on the bog. There were no pumps on Barnaran Bog before 1988.

Lullybeg Bog

Drainage for milled peat extraction first commenced in 1935 in Lullybeg Bog by the Peat Fuel Company Ltd. Milled peat extraction also commenced in 1935 however the bog had not been sufficiently drained for extraction leading to multiple machine sinkages. The Turf Development Board Ltd. acquired the bog in 1940 and continued to extract milled peat according to BnM accounts from 1945. The earliest available aerial imagery from 1973 shows milled peat drainage inserted fully in Lullybeg Bog and milled peat extraction ongoing. By 1981 drainage was converted from milled peat drainage (as described in Section 4.2.2.2.2) to sod moss drainage (as described in Section 4.2.2.2.3) with sod moss drainage fully inserted in the bog by this time. There were no silt ponds, pumps or surface water emission points located on Lullybeg before 1988.

Lullymore Bog

Hand-cut drains were introduced to Lullymore Bog in 1935 by the Peat Fuel Company Ltd, the owners of the land at the time. They introduced the Peco milled peat harvesting method on the bog in 1935 leading to multiple machine sinkages since the bog had not been drained for a long enough period. Aerial imagery available from 1973 shows milled peat drainage fully inserted in Lullymore Bog with the full extent of the drained area subject to milled peat extraction. By 1981 drainage was converted from milled peat drainage (as described in Section 4.2.2.2.2) to sod moss drainage (as described in Section 4.2.2.2.3) with sod moss drainage fully inserted in the bog by this time. There were no silt ponds, pumps or surface water emission points located on Lullymore Bog before 1988.

Lodge Bog

Lodge Bog was first drained for sod peat in 1947 according to BnM Annual Reports. Sod peat extraction commenced on the bog in 1953. BnM documents from 1954 indicate sod drainage inserted in most areas of the bog and several areas of remnant uncut raised bog intact, predominantly in the north and southeast of the bog. Aerial imagery from 1973 shows that sod drainage had become more intensive, inserted across the majority of the bog. An area of 23.9 ha remained undrained and was not subject to peat extraction. By 1981 drainage was converted from sod peat drainage (as described in Section 4.2.2.2.1) to sod moss drainage (as described in Section 4.2.2.2.3) with sod moss drainage fully

inserted in the drained areas by this time. There were no silt ponds, pumps or surface water emission points located on Lodge Bog before 1988.

Killina Bog

Drainage works first commenced in the west of Killina Bog by 1935 by the Peat Fuel Company Ltd according to BnM records. Initial drainage works were in place on the remainder of the bog in the south by 1954. By 1959, drainage at Killina bog was fully inserted for milled peat. The areas above and below the west of Killina Bog were drained in 1935 and subject to milled peat extraction before they were leased for an afforestation experiment in 1955. In 1960, these areas were transferred to An Foras Talúntais to establish Derrybrennan Farm and in 1966, to develop a nursery for growing ornamental shrubs and trees on cutaway peatland. The milled peat cutaway was levelled, a drainage system installed, and a cutaway grassland established. By 1981 drainage was converted from milled peat drainage (as described in Section 4.2.2.2.2) to sod moss drainage (as described in Section 4.2.2.2.3) with sod moss drainage fully inserted in the bog by this time. There were no silt ponds, pumps or surface water emission points located on Killina Bog before 1988.

Derrybrennan Bog

BnM records indicate that initial drainage works had commenced on Derrybrennan Bog by 1959, and milled peat drainage was in place by 1969, with the full extent of the drained area subject to milled peat extraction by this time. Aerial imagery from 1973 shows that milled peat continued to be extracted from Derrybrennan Bog at this time. There were no silt ponds, pumps or surface water emission points located on Derrybrennan Bog before 1988.

Glashabaun North Bog

Drainage commenced on Glashabaun North by 1947 according to BnM Annual Reports from that time. BnM records show that drainage at Glashabaun North consisted of sod peat drainage. Sod peat extraction commenced in 1951. By 1981, drainage infrastructure was converted from sod peat drainage (as described in Section 4.2.2.2.1) to milled peat drainage (as described in Section 4.2.2.2.2). 16.2 ha in the northwest of the bog was never drained or subject to peat extraction. In the 1980's 2 no. silt ponds and 2 no. pumps were installed on the bog. There were no surface water emission points located on the bog before 1988.

Glashabaun South Bog

Drainage commenced on Glashabaun South by 1947. Sod peat extraction commenced in 1951 on Glashabaun South Bog. Due to the extension at Lullymore Briquette Factory in 1954 to 1957, additional milled peat production areas were required and as such, records from 1959 show milled drainage was inserted in the southern section of Glashabaun South. Aerial images from 1973 show sod peat drainage inserted in the north and milled peat drainage in the south of the bog. By 1981, any remaining sod peat drainage infrastructure was converted from sod peat drainage (as described in Section 4.2.2.2.1) to milled peat drainage (as described in Section 4.2.2.2.2) with milled peat drainage fully inserted in the bog by this time. By 1988 a total of 192.5ha in the south of the bog was no longer subject to peat extraction. There were no silt ponds, pumps or surface water emission points located on Glashabaun South Bog before 1988.

Ticknevin Bog

By 1973, Ticknevin was subject to initial drainage in a section in the west of the bog. It is not clear from records or aerial imagery when peat extraction commenced on the bog, but BnM records indicates that by 1981, sod moss drainage was fully inserted in the east of Ticknevin. An area of 38.2ha of raised bog

was never drained in the west of Ticknevin Bog. In the 1980s 2 no. silt pond were installed on the bog. There are 2 no. pumps on Ticknevin Bog. The installation date of the pumps is not clear, but BnM records indicate the pumps were installed by 1988. There were no surface water emission points located on the bog before 1988.

Codd 1 Bog

Initial drainage works commenced on Codd 1 in 1959. The earliest available aerial imagery from 1973 shows sod peat drainage inserted in Codd 1 Bog. By 1981, drainage infrastructure was converted from sod peat drainage (as described in Section 4.2.2.2.1) to milled peat drainage (as described in Section 4.2.2.2.2) with milled peat drainage fully inserted in the bog by this time. An area of 32.8ha was drained but not yet subject to peat extraction. There were 5 no. pumps, 4 no. silt ponds and 3 no. surface water emission points installed on Codd 1 in the 1980s.

Codd 2 Bog

The earliest available aerial imagery from 1973 shows initial drainage works commenced on Codd 2 by this time. It is not clear from records or aerial imagery when peat extraction commenced on the bog, but BnM records indicates that by 1981, milled peat drainage was fully inserted in the bog. An area in the northeast of the bog was subject to initial drainage between 1987 and 1988 for the production of Bin Sod. In the 1980s 4 no. silt ponds were installed on the bog. No pumps or surface water emission points were located on Codd 2 before 1988.

Figure 4-5 and Figure 4-8 through to Figure 4-11 below detail the peat extraction areas of the Application Site in key years between 1973 and 2020.

4.3.5 Peat Extraction Volumes 1935 – June 1988

Peat extraction commenced at the Application Site in 1935. An estimate of the volumes produced during that period was determined based on the number of bogs in production, the estimated area in production and an average of production tonnages over the 1935 to June 1988 period. Peat extraction volumes are not available for milled peat from 1935 to 1939 and 1946 to 1951 therefore an estimate based on the average peat extraction volumes at the Application Site in the 5-year period following each range was used in the absence of accurate data. Peat extraction volumes are not available for sod peat from 1955 to 1962 and milled peat from 1960 to 1962 therefore an estimate based on the average peat extraction volumes at the Application Site in the 10-year period between 1963 and 1973 was used in the absence of accurate data. The volumes of peat removed from the Application Site varied from year to year with a general and gradual increase with time as more of the Application Site was developed and became available for peat extraction activities and all ancillary works. Fluctuations in peat extraction volumes are generally attributable to weather conditions in any given year, with wetter weather resulting in lower volumes of peat extraction due to poorer ground conditions for operating machinery, and poorer peat drying conditions; conversely, dryer weather usually resulted in higher volumes of peat extraction due to better ground and drying conditions.

It is estimated from BnM production records that approximately 106,472 tonnes of milled peat was produced annually at the Application Site between 1935 and July 1988, the milled peat produced was transported by rail to the Lullymore Briquette factory to be used in briquettes from 1936, to Ballydermot Works from 1986 and to private customers such as Drogheda Cement Factory via road.

It is estimated that approximately 167,483 tonnes of sod peat were extracted annually from the Application Site between 1950 and 1988, which would have been predominantly delivered to Portarlington Power Station via trucks from its opening in 1950 to its closure in 1988, Allenwood Power Station via rail from its opening in 1952 and to Ballydermot Works for sale to the general public via the tiphead from 1950. Smaller volumes of sod peat were transported by trucks for public sale.

From 1976, 40,000 tons of sod moss was transported by road from the Application Site to Kilberry Factory annually. From Kilberry Factory the sod moss was distributed to the horticulture industry via road.

BnM production records indicate that approx. 12,595,201 tonnes (sod, milled and sod moss combined) were extracted from the Application Site for the period 1935 to June 1988 inclusive Figure 4-6 and Table 4-4 below outlines the peat extraction tonnages over the 1935 to June 1988 period.

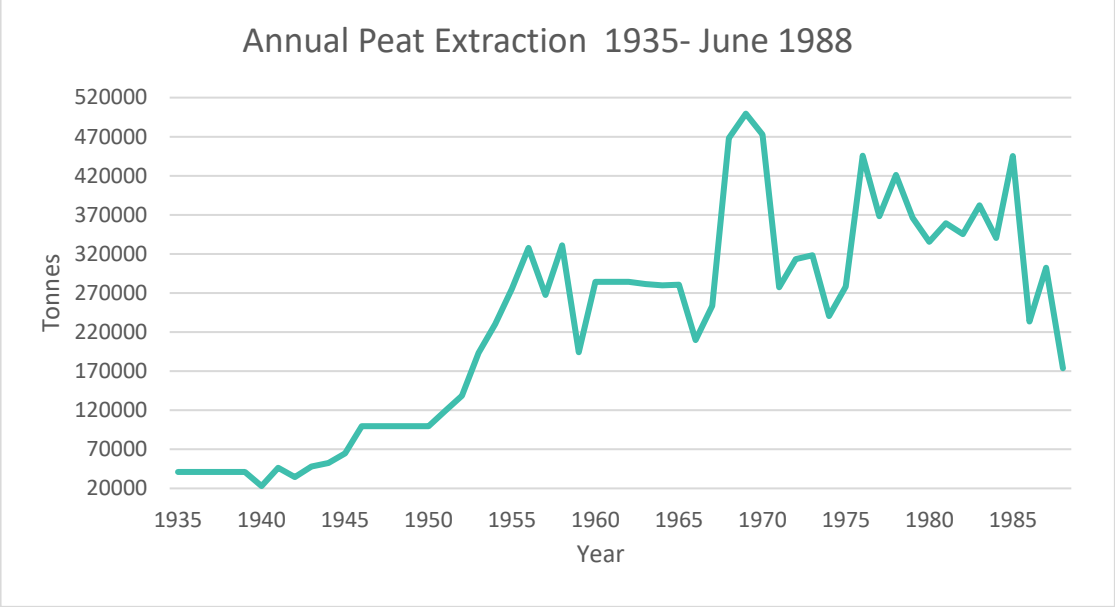

Figure 4-6 Annual Peat Extraction volumes (Tonnes) 1935 to June 1988

Table 4-4 Peat Extraction (Tonnes) 1935 to June 1988

Year	Tonnes
1935	40,870*
1936	40,870*
1937	40,870*
1938	40,870*
1939	40,870*
1940	23,000
1941	46,400
1942	34,560
1943	47,850
1944	52,540
1945	65,000
1946	99,780*
1947	99,780*
1948	99,780*
1949	99,780*
1950	99,780*
1951	119,180
1952	138,547
1953	193,287
1954	230,360
1955	275,333**
1956	327,670**
1957	267,377**
1958	331,032**
1959	194,020**

1960	284,335**
1961	284,335**
1962	284,335**
1963	281,258
1964	279,872
1965	280,651
1966	209,760
1967	253,642
1968	468,164
1969	499,502
1970	472,779
1971	277,299
1972	313,522
1973	318,180
1974	240,373
1975	278,284

1976	445,857
1977	368,401
1978	421,258
1979	366,387
1980	335,342
1981	359,321
1982	345,305
1983	382,254
1984	340,560
1985	445,156
1986	233,455
1987	302,414
January – June 1988	173,794
Total volume Extracted (Tonnes)	12,595,201

*Based on average peat extraction volumes at the Application Site in the 5-year period following this range of absent accurate data.

**Based on average peat extraction volumes at the Application Site in the 10-year period between 1963 and 1973 in the absence of accurate data.

The 1988 January to June peat extraction volume has been extrapolated by halving (i.e. due to the 6-month period) the total tonnes of peat extracted for 1988. The latter half of the year 1988 (i.e. July to December) is identified in Table 4-6 below.

4.3.6 Control Measures pre–July 1988

With the exception of silt control (which from 1974 was subject to a formal management program as discussed in Section 4.3.6.9 below), formal documentation outlining dedicated measures referred to as control measures practised on site are not available. However, based on personal communication with retired BnM personnel, the following measures below were enacted at all BnM bogs, and thus the Application Site, as part of daily, monthly, and annual bog management and operations and were outlined in the 2000 IPC Licence Application.

4.3.6.1 Peat Extraction Machinery – Maintenance Programmes and Storage

1. All peat extraction machinery listed in Section 4.2.2.3 were stored at the nearest Works or in a local holding area at the end of the workday;
2. All machinery was regularly inspected, serviced and maintained;
3. All machinery was regularly cleaned via power steam wash system at a wash bay which drained into a fuel/oil interceptor unit and associated gravel soak pit. The interceptor unit facilitated the removal of any oil/grease components. This was done to minimise dust and particle release; and,
4. A self-contained machine parts washer was located in the workshop at the Ballydermot Works.

4.3.6.2 Refuelling Facilities

As discusses above, refuelling and maintenance of all vehicles were undertaken at the Ballydermot Works. When machinery required refuelling on the Application Site, it was carried out by a mobile (rail or tractor-transported) fuelling unit which travelled out from Ballydermot Works to the bogs where the machinery was located. The following emergency action procedure was implemented at the Application Site prior to IPC licencing (pre-2000) and was recorded as part of the IPC Licence application process:

1. When a spill occurred, the General Manager was immediately informed of the incident;
2. The spill was required to be assessed by the General Manager for potential risk to the health and safety of employees and the potential environmental consequences;
3. If there was a risk of explosion, all personnel were required to be evacuated from the area;
4. The spill was sourced, isolated and contained with polystyrene booms or dry peat (moisture content of 10%);
5. All efforts were made to prevent the spill from entering a storm drain or nearest outfall;
6. Once the spill had been contained, a suitable absorbent (e.g., dry peat) was to be used to soak the spillage;
7. All possible ignition sources such as electoral equipment, naked lights, machinery were removed from the area. Any combustibles in the spill area were removed;
8. Follow up action measures taken includes the implementation of appropriate remedial work to prevent such a spillage recurring in the future; and,
9. In the event of a significant spillage, the General Manager was required to notify the local authority.

4.3.6.3 Fire Safety

With respect to Fire Safety, the following emergency action procedure was implemented at the Application Site prior to IPC Licencing (i.e., pre-2000):

1. Annual training provided for bog fires crew and factory personnel and all general staff was provided with a minimum of two hours training in fire prevention;
2. All fire exits were designated. These doors were required to be fitted with push-bar mechanisms only and lighted from independent sources. They were required to be unobstructed inside and outside at all times, and open outwards;
3. Each canteen/office were required to be equipped with a fire blanket and fire extinguisher;
4. There were required to be at least one fire point at all office premises;
5. Petrol and other oils were required to be stored in designated oil stores;
6. Batteries were not charged in working areas unless suitable protection was provided;

7. Training was provided for oxygen cylinder storage and use;
8. Fire Wagons: Designated rail wagons were provided for fire prevention which contained: hoses, shovels, fire beaters, baskets, buckets, breathing apparatus, first aid kit, drums of foam and foam making machine, extinguishers etc.
9. Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat. This prevented spontaneous combustion of certain peat types by excluding air as much as possible; and,
10. Fire Safety Audits were undertaken at six monthly intervals along with random audits. Yearly assessments were undertaken of all audits completed.

4.3.6.4 Dust Management at Bog boundaries and Headlands

Dust emissions were higher from the milled peat extraction process than the sod peat extraction process. Tree cover along the fringes of bogs minimised the amount of dust that would travel off-site. In 1976 BnM established a policy to preserve the vegetation and tree cover on all bog fringes and on any mineral islands[5]. In addition, the following measures were undertaken at a minimum to minimise dust emissions and later expanded under IPC Licence:

1. Stockpiles were compacted on either side by large rollers drawn by 65H.P tractors;
2. Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat;
3. Peat extraction during windy weather was to be avoided;
4. The headlands were to be kept clean and loose peat removed;
5. Drivers were required to drive slow along dusty headlands; and,
6. All road crossing points were to be maintained clean.

4.3.6.5 Internal Rail Network Maintenance

Railway tracks and railway locomotives underwent continuous inspection and maintenance to prevent derailments, fires, accidents and fuel leaks. The locomotives were fitted with beam lighting, electric windscreen wipers and driving mirrors for both directions of travel. Wagons were also designated as fire safety wagons and were stocked with various fire safety equipment including hoses, buckets, breathing apparatus, first aid kit, drums of foam and foam making machine, extinguishers.

4.3.6.6 Surface Water Management

1. Onsite water emission from workshop and hard standing areas drained via onsite surface water drainage systems implemented as part of building and hardstand construction over the decades, into adjacent peatlands surface water drainage network; and,
2. All machinery were regularly inspected, serviced. All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components. This was done to minimise dust and particle release.

Formal silt control measures adopted in 1974 are outlined in Section 4.3.6.9 below.

[5] *Brown Gold 'A History of Bord na Móna and the Irish Peat Industry', 2010 Clarke, Donal, Chapter 10 Pg 206*

4.3.6.7 Maintenance Programme for Internal Drains

1. Internal drains cleaned on a regular basis in suitable weather, mainly prior to and post the peat extraction season (i.e. between October and March). This was necessary to remove sludge from the bottom of milled peat field ditches and dispose of it by spreading it on the adjacent field.
2. Drain maintenance was carried out using ditchers.
3. These works were programmed to ensure that the drainage servicing the peat extraction areas were fit for purpose.
4. Drain maintenance was carried out mainly prior to and post the peat extraction season (i.e. between October and March).

4.3.6.8 Maintenance of Onsite Surface Water Pumps

The following procedure was followed with respect to ensuring that the onsite pumps were maintained in good working order:

1. Visual inspection of pumps daily;
2. Operational check of pumps biweekly; and,
3. Service of pumps monthly.

4.3.6.9 Silt Management

As part of the Third Development Programme in the 1970s, BnM decided in 1974 to control all effluent by means of specially designed and constructed silt ponds, thereby trapping more than 90% of the suspended solids present in the drainage water. A silt committee was set up in October 1975 to study the feasibility of removing silt from the bog effluents. Recommendations of an interim report prepared by the committee in 1975/1976 were as follows:

1. *Provision of silt ponds should be a basic feature of new bog development for milled peat and their construction should be planned for all outlet systems.*
2. *Ideally, silt ponds should be located in cutaway bog.*
3. *Sufficient area should be acquired at the initial stage to provide for silt ponds.*
4. *In production bogs, existing large catchments should be broken up into manageable proportions and ponds constructed to accord with local topography.*
5. *Revision of drainage techniques should be considered such as arranging flatter gradients in external and internal outfalls and extending their width and length in the lower reaches to encourage settlement of silt.*
6. *Initial drainage effluent should be allowed to spill over face banks (where practicable) until adequate silt ponds have been provided. This should be applied to all new bog development immediately. Similarly, growth and vegetation should not be removed from external outfalls until interference with drainage and/or complaints force us [Bord na Móna] to act.*
7. *It is recommended that catchments to be protected by silt ponds should not be greater than 500 acres.*
8. *Ponds should be designed for maximum run-off of 1 cubic foot per minute per acre and run-off controlled by provision of small diameter culverts, weirs or sluices.*
9. *For milled peat, 50 square foot of pond per acre of catchment. For 500 acres, 45-foot wide x 555-foot long x 7-foot deep, i.e., 6-foot maximum of silt and 1 foot minimum of water.*
10. *Ponds should be provided in pairs each sufficient for the catchment protected.*
11. *Ponds should be cleaned out at regular intervals as required but at least four times a year using dragline or Hymac retained permanently for this purpose. Investigations to be made into the suitability of pumping units.*

12. *Second parallel pond should be used during excessively large water flow (storm water).*
13. *The problem of discharging into the Clodiagh River at Monettia [County Offaly] has become difficult in view of ESBs requirement that the entire river be kept free of silt. Silt ponds will be essential and provision should be made in their layout to allow for further extension of the ponds if decantation needs to be improved further.*

A copy of the meeting minutes from the BnM Production Manager in March 1976 setting out the recommendations of the silt committee is included in Appendix 4-6, which directs that *"at all milled peat bogs in production, works should carry out surveys and select sites for silt ponds as recommended"*. Further BnM records show that silt pond measures were introduced across all BnM bogs in the early to mid-1980's in response to the 1977 *Water Pollution Act*.

Silt ponds were installed to trap and reduce the emission of suspended solids to surface water bodies originating from activities associated with peat extraction, such as suspended peat particles generated from the extraction fields and collected in the bog drainage network as well as run-off from workshop areas.

Silt ponds were designed and constructed, primarily, with a width of 8m, however, in some cases, silt ponds of up to 12m in width were constructed. The larger silt ponds up to 12m wide are only provided in areas where access is available to both sides of the silt ponds for cleaning. The length of the silt pond varies depending on the capacity required (i.e., the length is proportional to the area of catchment being drained). The silt pond design, as submitted to the EPA with the IPC Licence Application in 1999, is shown in Figure 4-7. In some locations, baffles (i.e., obstructing panels or vanes) have been installed within the ponds to reduce the energy in the flow and elongate the pond thereby increasing residence time and aiding settlement. Silt ponds are generally excavated to a depth of 1.5m below the pipe invert level, however in some locations, due to restricted space, the silt pond depth is greater than this. Low-velocity flow through the silt pond is generally controlled by inlet and outlet pipes at the silt ponds or upstream of the silt pond. These pipes control the velocity of the flow into and out of the silt ponds so that the velocity within the silt pond itself is less than 0.1 m/sec. This slow flow through the pond allows suspended sediment (mainly peat) particles to fall out of suspension and build up on the base of the pond, thereby reducing the sediment loading of the outflow from the pond. The principle behind the design of the silt ponds is an application of Stoke's Law. Stokes' Law describes how small solid particles move through a viscous fluid, stating that the drag force on these particles is directly proportional to their size, velocity, and the fluid's viscosity. The silt ponds are cleaned twice a year and are all located hydraulically upgradient of discharge/outfall points to the adjacent surface watercourse. Access to the silt ponds is via headlands and machine passes which were created to facilitate vehicle movements within the Application Site.

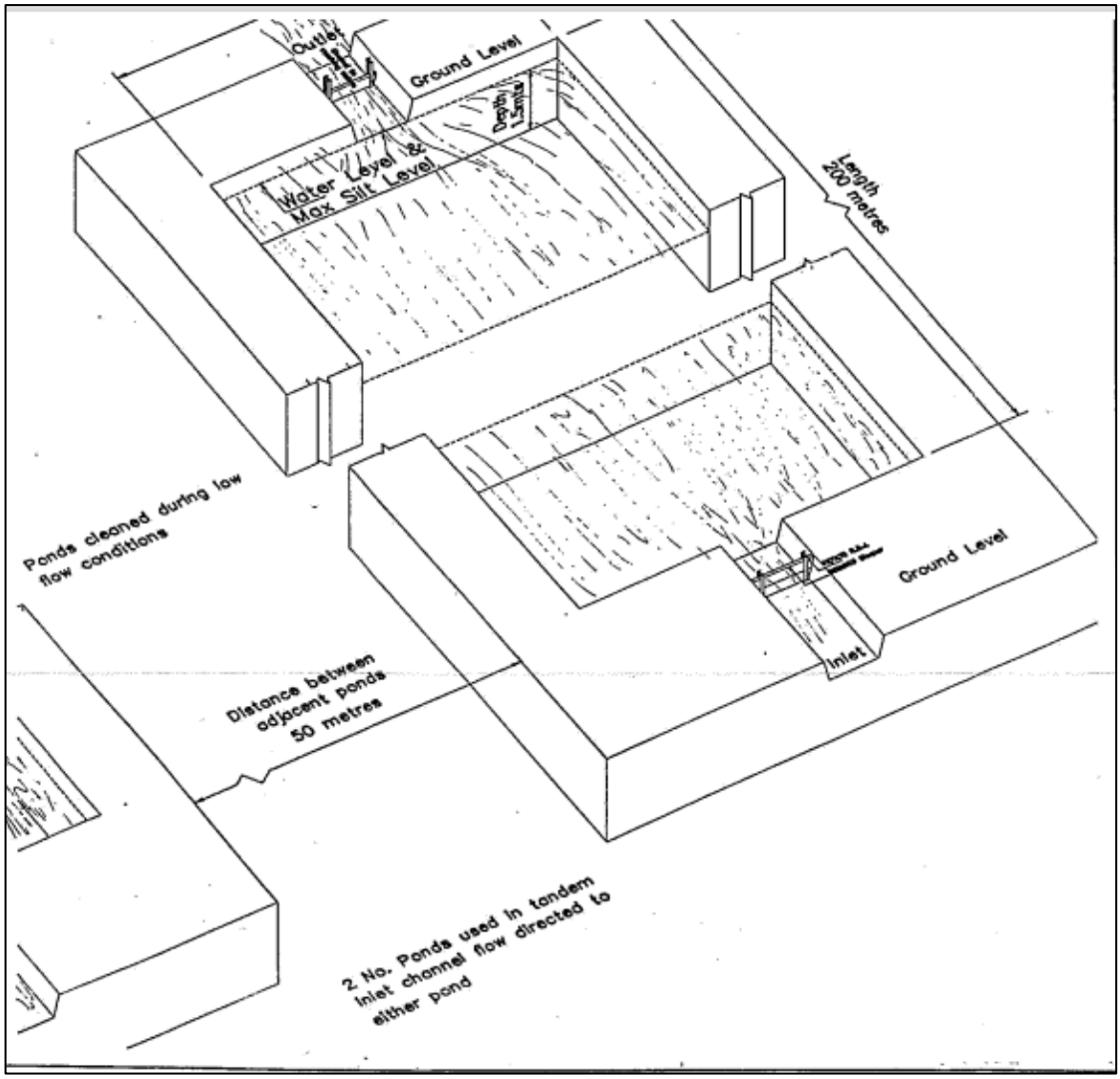

Figure 4-7 Typical Silt Pond Design Implemented at the Application Site. Source IPC Licence Application to EPA 1999

Other records of Silt Committee meetings in April 1984 (which are included in Appendix 4-8) set out acceptable standards of effluent and note that a decision from ABP on a licence for effluent from the Littleton Briquette Factory in County Tipperary set an upper limit of 100 mg/l for suspended solids. The records note *"although the legalities regarding obligation to treat bog effluent and briquette factory effluent may be dissimilar the waste involved is similar. It would, therefore, seem reasonable to assume that a target value of 100mg/l in the case of bog effluent would satisfy potential complainants whose complaints are based on genuine dissatisfaction with the present standard of our* [BnM] *effluents"*.

These records are evidence of early control measures implemented across the BnM landbank, including the Application Site, to control sediment levels in effluent.

4.3.6.10 Waste Management

The following measures were carried out with respect to management of waste:

1. Waste oils and brake fluids drained from machinery during servicing were collected in drums and emptied to a designated waste oil storage tank;
2. Waste oil storage tank contents were transported off-site by a licenced waste disposal contractor;
3. Oil and fuel filters were changed at vehicle service intervals;

4. Spent filters were collected and disposed of by a licensed waste disposal contractor;
5. Used batteries were collected by licensed battery collection contractor;
6. Off-washings from the self-contained machine parts washer were collected within a sludge tank at the workshops;
7. Anti-freeze was either evaporated or drained into an appropriate container if a machine breaks down on the bog and the coolant system needs to be drained. An appropriate waste contractor removed the anti-freeze waste from site.
8. Ash from the onsite boiler was stored in a skip onsite and collected by a licenced waste contractor and taken to a landfill for disposal;
9. Waste polythene removed from stockpiles was collected at the roadside by a plastic recycling company; and,
10. Workshop waste and general refuse from canteens/offices were historically burned on site or disposed of into waste disposal areas at the workshops. This practise changed to the use of skips which were then collected by licenced waste contractors.

4.3.6.11 Archaeological Disturbance

All BnM employees which worked on the bogs were required to read and adhere to the recommendations set out in the Department of Education publication entitled, 'Ancient Objects in Irish Bogs and Farmlands: A Guide for Finders' (1942).

All workers were required to stop all works and report to the Bog Manager if archaeological finds were encountered. If materials thought to be of archaeological interest were encountered, the Bog Manager was required to report the findings to the Garda Síochána within 7 days who were then required to contact the Commissioner of Public Works. A record of archaeological finds and observations within the Application Site can be found in Section 13.4 of Chapter 13: Cultural Heritage of this rEIAR.

4.4 July 1988 – rEIAR Baseline

As described in Chapter 1 and in Section 4.1, the application for substitute consent, and therefore this rEIAR, covers the period from July 1988[6], the timeframe for when the EIA Directive was required to be transposed into Irish Law, to present day.

As such the activities carried out as of July 1988 form the initial baseline date for the description of the existing Application Site and combined with the activities from July 1988 onwards, form the Project. The remedial impact assessments are presented in the subsequent specialist chapters.

Table 4-3 details the operations and activities carried out on the Application Site in each quarter of the 1988 calendar year.

Figure 4-8 below illustrates the areas drained, neither drained nor subject to peat extraction and undergoing peat extraction in 1988.

As detailed in 4.3.5 above, the 1988 July – December peat extraction volume has been extrapolated by halving (i.e. due to the 6-month period) the total tonnes of peat extracted for 1988. The first half of the year 1988 (i.e. January to June) is identified in

Table 4-4 above. The total tonnage of peat extracted at the Application Site from July-December 1988 was 234,160 tonnes. The total tonnage of peat extracted for January-December 1988 is 406,954 tonnes. For comparison, the following year (1989), a record level of 391,697 tonnes of peat was extracted at the Application Site. The estimated topography of the Application Site in July 1988 is 72 – 88mOD based

[6] *Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment*

on an average depth of milled peat extraction of 0.135m per year over a 32-year period, which has been worked back from the 2020 topography. As most of the Application Site was subject to milled peat extraction, this approach is considered to be the most robust in determining the peat height in 1988.

4.4.1 Application Site and Activity Description – 1988 rEIAR Baseline

By 1988, the land use at the Application Site was well established as industrial peat extraction. The Application Site was drained with milled, sod moss and sod peat extraction taking place across most of the Application Site in 1988. Peat production areas for the Application Site are shown below in

Figure 4-8. Railway infrastructure was also established throughout the Application Site by 1988. The main entrance points to the Application Site were at the Ballydermot Works entrance on the L-3001 road in the southwest of the Application Site, and from a local road (L-2506-3) which crosses the Grand Canal, passing the Lullymore Briquette Factory before cutting through Killina Bog in the northeast. Other access points include entrances off the L3001 Rathangan to Edenderry Road which cuts through the Application Site in a north to west direction and off the Allenwood to Rathangan Road (designated R414 in 1993) which cuts through the southeast of the Application Site. Ballydermot Works, which comprised welfare facilities, storage sheds, offices, maintenance buildings, staff carparks, HGVs storage area, a tiphead and a refuelling area is still in situ at present day. The following ancillary infrastructure was established at the Application Site by July 1988:

1. *Railway infrastructure;*
2. *Internal machine passes/tracks;*
3. *Silt ponds and drains;*
4. *Welfare facilities;*
5. *Local holding areas;*
6. *Tiphead; and*
7. *Pumping stations.*

N

Legend

Substitute Consent Boundary

Application Boundary

Peat Production 1988

Drained - Not Subject to Peat Extraction

Neither Drained nor Subject to Peat Extraction

Subject to Peat Extraction

Kilometres

0 0.5 1 2

Figure 4-8 Peat Extraction Areas in 1988

BnM

Ballydermot Substitute Consent 1988 Peat Extraction Activities

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-51	1:45,000	JL	10/07/2026

Tailte Éireann

CYAL50510154

4.4.1.1 Ballydermot North Bog

Aerial imagery indicates that by July 1988, approximately 456.4ha of the Application Site was subject to milled peat extraction. Thus, the main landcover type at this time was cutover peat. Drainage was already installed, predominantly in an east-west orientation. Railway infrastructure was established in the bog at this time. There were no silt ponds, pumps or surface water emission points located on Ballydermot North by 1988. The bog was accessed from several locations leading from the L3001 Edenderry to Rathangan Road along the eastern boundary. The topography of the Application Site is estimated to have been approximately 72 – 86mOD by 1988.

4.4.1.2 Ballydermot South Bog

Aerial imagery from 1988 indicates that drainage was in place and extraction of milled peat was underway on approx. 326.8ha of Ballydermot South Bog. A total of 98.2ha were not drained nor subject to peat extraction in the west and southeast of the bog. Ballydermot South bog was linked via railway infrastructure to Ballydermot Works in the southeast, to Ballydermot North to the north-west and Blackriver to the east of the bog. There were no silt ponds, pumps or surface water emission points located on Ballydermot South by 1988. The main access point to Ballydermot South Bog was to the south of the Application Site via the west of the L3001 Edenderry to Rathangan Road from Ballydermot Works. The topography of this bog is estimated to have been approx. 73 - 80mOD by 1988.

4.4.1.3 Blackriver Bog

By July 1988, peat extraction was underway across the majority of Blackriver Bog, (approx. 726.3ha). Areas of drained bog not yet subject to peat extraction were located in the northwest of the bog (approx. 15.7ha). Drainage for milled peat was already installed, and railway infrastructure, which was laid throughout the 1950s and 1960s, connected Blackriver Bog to Glashabaun South Bog (to the north) and Barnaran Bog (to the east). There were no silt ponds, pumps or surface water emission points located on Ballydermot South by 1988. The main access point to Blackriver Bog was off the L3001 Edenderry to Rathangan Road at the western boundary of the bog. The topography of Blackriver Bog is estimated to have been approx. 72 - 81mOD by 1988.

4.4.1.4 Lullybeg Bog

By July 1988 Lullybeg Bog had been drained and sod moss extraction was underway across 154 ha of the bog. An area of 113 ha in the north of the bog had ceased peat extraction by this time. Railway infrastructure established on the eastern boundary of the bog, connecting Lullybeg Bog to Killina Bog to the northeast and Blackriver Bog to the south. Access to the Lullybeg Bog in 1988 was via the L81371 Killyguire local road, and this remains the main access point at present day. There were no silt ponds, pumps or surface water emission points located on Lullybeg by 1988. The topography of Lullybeg Bog is estimated to have been approx. 72 - 78mOD by 1988.

4.4.1.5 Lullymore Bog

Drainage infrastructure was fully established for sod moss in 175ha of Lullymore Bog by 1988, as deduced from available aerial imagery. There were no silt ponds, pumps or surface water emission points located on Lullymore Bog by 1988. Access to Lullymore Bog was available via a local road which runs from the R414 and through the Lullymore Heritage & Discovery Park which opened in 1993. The topography of the bog is estimated to have been approx. 73 - 84mOD by 1988.

4.4.1.6 Lodge Bog

Satellite imagery and annual reports indicate that by July 1988, approx. 383.1ha of Lodge Bog were undergoing sod moss peat extraction. Thus, the main landcover type at this time was cutover peat. A small area measuring approx. 23.9ha of uncut raised bog was located in the southwest of the bog. Drainage was already installed, predominantly in a northeast-southwest orientation. Railway infrastructure was laid in the bog, connecting the bog to Barnaran Bog in the west and Allenwood Power Station in the northeast. There were no silt ponds, pumps or surface water emission points located on Lodge Bog by 1988. The main access point to Lodge Bog was off the Rathangan to Allenwood (R414) road. The topography of Lodge Bog is estimated to have been approx. 78 - 85mOD by 1988.

4.4.1.7 Killina Bog

Aerial imagery from 1988 indicates that drainage was fully established across Killina Bog. A total of 88.5ha were drained but not subject to peat extraction in 1988. Sod moss extraction was ongoing in 1988 across 168.5ha of Killina bog. The bog was linked via railway infrastructure to Lullymore Briquette Factory to the north and Allenwood Power Station to the southeast. There were 2 no. silt ponds on Killina Bog, both were installed between 1988 and 1995. There are 2 no. surface water emission points which were installed around 1988 and no pumps on the bog. The main access point to Killina Bog was to the north of the Rathangan to Allenwood (R414) road. The topography of this bog is estimated to have been approx. 78 - 88mOD by 1988.

4.4.1.8 Barnaran Bog

By July 1988, sod moss extraction was underway across all of Barnaran Bog, (approx. 486ha). Railway infrastructure connected Barnaran Bog to Blackriver Bog to the west and Lodge Bog to the east. There are 3 no. silt ponds located in Barnaran Bog; all of which were installed by 1988. There are 2 no. surface water emission points which were installed at the same time as the silt ponds. There are no pumps on Barnaran Bog. The main access to the eastern part of the Application Site was from the R414 road or through the Lullymore Heritage Park. Access to the western part was available from a track which runs along the western margin. The topography of Barnaran Bog is estimated to have been approx. 75 - 84mOD by 1988.

4.4.1.9 Derrybrennan Bog

By July 1988, Derrybrennan Bog had been drained and milled peat extraction was continuing across 132ha of the bog. Railway infrastructure was also in situ, connecting Derrybrennan Bog to Lullymore Briquette Factory to the east. Access to Derrybrennan Bog in 1988 was via a fourth-class road which runs northeast from the grand canal into the bog. There are 2 no. silt ponds, 2 no. surface water emission points and no pumps located on Derrybrennan Bog. Both of the silt ponds were installed between 1988 and 1995. The topography of Derrybrennan Bog is estimated to have been approx. 75 - 86mOD by 1988.

4.4.1.10 Glashabaun North Bog

Satellite imagery and annual reports indicate that by July 1988, the majority of Glashabaun North was subject to milled peat extraction, approx. 499ha. Thus, the main landcover type at this time was cutover peat. A small area measuring approx. 16.2ha of remnant uncut raised bog was located in the north at the edges of the bog. Drainage was already installed, predominantly in a west-east orientation. Railway infrastructure was laid in the bog connecting Glashabaun North to Glashabaun Works in the northwest and Glashabaun South in the south. There were 2 no. silt ponds located in Glashabaun North Bog, 2 no. of which was installed by 1988. There are 2 no. pumps located on the south of the bog. The

installation date of the pumps is not clear, but BnM records indicate the pumps were installed by 1988. There were no surface water emission points located on the bog. Access was available from the L1001 Edenderry to Rathangan or from the Glashabaun Works entrance to the north. The topography of Glashabaun North Bog is estimated to have been approx. 72 - 83mOD by 1988.

4.4.1.11 Glashabaun South Bog

Aerial imagery from 1988 indicates that drainage was in place and extraction of milled peat was underway on approx. 419 ha in the northern portion of Glashabaun South Bog. A total of 192.5ha were drained but not subject to peat extraction. Glashabaun South bog was linked via railway infrastructure to Glashabaun North Bog in the north, Killina Bog to the east and Blackriver Bog to the west. There were 6 no. silt ponds and 6 no. surface water emission points installed between 1988 and 1995 on Glashabaun South Bog. No pumps were installed on Glashabaun South Bog by 1988. The main access point to the bog was from the existing L81371 Cushaling to Killyguire Road which runs along the southwest margin of the Application Site or from an existing track which runs along the extreme northeast margin. The topography of this bog is estimated to have been approx. 73 - 81mOD by July 1988.

4.4.1.12 Ticknevin Bog

By 1988 sod moss extraction was underway across 417.8ha of Ticknevin bog. Approximately 38.2ha was neither drained nor subject to peat extraction. Access to the bog was possible via the L1001 Edenderry to Rathangan Road which runs northwest to southeast through the bog. There were 2 no. silt ponds, installed between 1988 and 1995. There are 2 no. pumps on Ticknevin Bog, the installation date of the pumps is not clear, but BnM records indicate the pumps were installed by 1988. There were no surface water emission points located on the bog by 1988. The topography of this bog is estimated to have been approx. 77 - 81mOD by 1988.

4.4.1.13 Codd 1 Bog

Drainage infrastructure was established for milled peat extraction in 217ha of Codd 1 Bog by 1988, and 32.9ha of the bog was drained but not yet subject to peat extraction. There were 5 no. pumps, 4 no. silt ponds and 3 no. surface water emission points installed by 1988. Access to the bog remains available from a track off of the L3001 Rathangan to Edenderry Road which runs along the eastern boundary. The topography of the bog is estimated to have been approx. 72 - 79mOD by July 1988.

4.4.1.14 Codd 2 Bog

Drainage infrastructure was established for milled peat extraction in 290ha of Codd 2 Bog by 1988, as deduced from available aerial imagery. There were 4 no. silt ponds installed by 1988 and there are no pumps located on Codd 2. Access is available from the public road L1001 along the eastern boundary and from an existing track which runs off of the L1001 close to the southern and western boundaries. The topography of the bog is estimated to have been approx. 72 - 80mOD by July 1988.

4.4.2 1988 Peat Extraction Activities

Table 4-5 below describes the general activities within the Application Site during each of the four quarters of the calendar year in 1988. Some drain maintenance was carried out during the full year, but it was mainly restricted to outside the peat extraction season (i.e. from October to March). Fuel handling and refuelling would have increased significantly during the peat extraction season due to the activity of the peat extraction machinery. Rail network maintenance continued in 1988 with temporary rail tracks added and removed alongside peat stockpiles as required.

Peat extraction activities at the Application Site took place between 08:00 and 21:00 during the summer months, with transportation of the peat between the hours of 06:00 and 11:00. Office hours and workshop hours remained as 08:00 to 16:30 all year round.

Table 4-5 1988 Peat Extraction Activities

Calendar Quarter	Activities
January to March	Drain/Machinery/Pump maintenance, Stockpile removal, peat transportation
April to June	Peat extraction, Stockpile creation/removal, peat transportation
July to September	Peat extraction, Stockpile creation/removal, peat transportation
October to December	Drain/Machinery/Pump maintenance, Stockpile removal, peat transportation

There are no detailed records for peat extraction volumes for 1988, therefore data for the years 1994 to 2004 (refer to Section 4.6.1 and Table 4-6 therein) have been selected as a representative sample from which an average value has been calculated to represent peat extraction volumes in 1988. This calculated average volume was then halved as the baseline year began in July 1988. Based on this methodology, it is estimated that approximately 234,160 tonnes of milled peat would have been extracted from the Application Site between July 1988 and December 1988.

4.5 Peat Extraction Phase July 1988 – June 2020 (Drainage, Peat Extraction & Associated Activities)

As demonstrated above, by July 1988 peat extraction was well established at the Application Site. Drainage was installed in all bogs and railway infrastructure was laid on all bogs as required Drainage construction methodologies are described above in Section 4.2.2.

All peat extraction had ceased at the Application Site by the end of June 2020, with all stockpiles removed from the Application Site by October 2021.

4.5.1 Drainage Systems 1988 - June 2020

After 1988, peat extraction well extraction well underway at the Application Site. The deepening and maintenance of drainage channels continued beyond 1988, up until the cessation of peat extraction in June 2020. As the areas subject to peat extraction from 1988 to June 2020 reduced in their extent (refer to

Figure 4-8 to Figure 4-11) and the depth of peat available was subsequently reducing after each harvest, the extent and number of drains requiring deepening and maintenance reduced accordingly. The current topography of the Application Site is relatively flat with an elevation range of between approximately 68 and 84mOD.

Machinery used for drainage works would have been largely the same as that described in Section 4.2.2 with ever-improving engine efficiency in tractors and excavators.

4.5.1.1 Ballydermot North Bog

Drainage was fully inserted in Ballydermot North Bog by 1988, with the full extent of the drained area subject to milled peat extraction. A section in the southwest of Ballydermot North Bog known as Clonbrown was converted in 2017 and further in 2018 to expand the area of sod moss production at the Application site. The production of sod moss had been taking place in the northwest of Ballydermot South Bog since 2001 and was expanded in 2017 and 2018 into Ballydermot North Bog. Peat extraction ceased by 2013 for milled peat in Ballydermot North Bog and sod moss extraction continued until 2020. There are no silt ponds, pumps or surface water emission points located on Ballydermot North.

4.5.1.2 Ballydermot South Bog

By 1988 Ballydermot South was drained for milled peat extraction. As previously discussed, a section in the northwest of Ballydermot South Bog known as Clonbrown was converted in 1996 to produce sod moss. This area was first harvested in 2001, and the area was expanded into the southwest of Ballydermot North Bog in 2017 and again in 2018. A portion of the bog approx. 78 ha in the southwest of Ballydermot South known as Clonroosk was drained in 2013 but was never subject to peat extraction, rehabilitation works to block the drains in Clonroosk were completed in 2014. All peat extraction ceased in June 2020 on Ballydermot South. There are 2 no. silt ponds, and 2 no. pumps located in Ballydermot South. Both silt ponds were installed between 1996 and 2000. The installation date of the pumps is not clear, but BnM records indicate the pumps were installed with the silt ponds between 1996 and 2000.

4.5.1.3 Blackriver Bog

In 1988 milled peat extraction continued on Blackriver Bog with the associated milled drainage fully established. Several small areas of turbary remained, predominantly at the edges of the bog. An area of 5.7ha to the southwest of Blackriver was never drained or subject to peat extraction. Peat extraction on the bog ceased in 2020. There are 4 no. silt ponds in Blackriver, all of which were installed between 1996 and 2000. 2 no. pumps are located on the bog, the installation date of the pumps is not clear, but BnM records indicate the pumps were installed with the silt ponds between 1996 and 2000. 2 no. surface water emission points are located on Blackriver bog.

4.5.1.4 Lullybeg Bog

In 1988, sod moss extraction was ongoing in Lullybeg Bog. Peat extraction ceased on most areas of the bog by 1995 except for the south which ceased extraction by 2004. There are 2 no. silt pond and 2 no. surface water emission points in Lullybeg Bog all of which were installed between 1996 and 2000. There are no pumps on Lullybeg bog.

4.5.1.5 Lullymore Bog

In 1988, sod moss extraction continued on Lullymore bog. Peat extraction ceased on Lullymore in 1992, aerial imagery from 1995 indicates that by that time revegetation was occurring. Between 2011 and 2013 infrastructure for the Lullymore Heritage and Discovery Park was placed on the east of the bog and 1 no. silt pond and 1 no. surface water emission point was installed during the same timeframe. There are no pumps located on Lullymore Bog.

4.5.1.6 Lodge Bog

By 1988, drainage had been inserted in Lodge Bog for sod moss extraction. A section of 23.9ha in the northwest was never drained or subject to peat extraction and remained intact as remnant raised bog. Peat extraction ceased on Lodge Bog by 2020. By the end of the Peat Extraction Phase in 2020, 5 no. silt ponds, 2 no. surface water emission points and 2 no. pump were in place. Of the 4 no. silt ponds installed at Lodge Bog, 2 no. were installed between 1995 and 1999, and 3 no. installed between 2001 and 2005. The installation date of the pumps is not clear, but BnM records indicate the pumps were installed with the silt ponds between 2001 and 2005.

4.5.1.7 Killina Bog

Drainage was fully inserted in Killina Bog in most areas by 1988, with the full extent of the drained area subject to sod moss extraction. It is not clear from records or aerial imagery when milled peat extraction ceased in the west of Killina, but aerial imagery indicates that by 1995, peat extraction had ceased in approx. 88.5 ha of the bog. Any remaining peat extraction ceased by 2020. There are 2 no. silt ponds on Killina Bog, both were installed between 1988 and 1995. There are 2 no. surface water emission points which were installed pre-1995 and no pumps on the bog.

4.5.1.8 Barnaran Bog

In 1988 sod moss extraction was continuing in across Barnaran Bog. There are 3 no. silt ponds located in Barnaran Bog; all of which were installed by 1988. There are 2 no. surface water emission points which were installed at the same time as the silt ponds. There are no pumps on Barnaran Bog.

4.5.1.9 Derrybrennan Bog

In 1988, Derrybrennan Bog continued to be subject to milled peat extraction until peat extraction ceased in 2015. There are 2 no. silt ponds, 2 no. surface water emission points and no pumps located on Derrybrennan Bog. Both of the silt ponds were installed between 1988 and 1995.

4.5.1.10 Glashabaun North Bog

By 1988 drainage for milled peat was inserted in the majority of Glashabaun North with the full extent of the drained area subject to peat extraction. A small area measuring approx. 16.2 ha of remnant uncut raised bog is located in the north at the edge of the bog. Peat extraction ceased in the bog in 2020. There are 3 no. silt ponds located in Glashabaun North Bog, 2 no. of which was installed by 1988 and the remaining 1 no. installed between 2011 and 2013. There are 2 no. pumps located on the south of the bog. The installation date of the pumps is not clear, but BnM records indicate the pumps were installed by 1988. There are no surface water emission points located on the bog.

4.5.1.11 Glashabaun South Bog

By 1988 Glashabaun South was drained for milled peat extraction. Peat extraction ceased in Glashabaun South by 2020. There are 11 no. silt ponds in Glashabaun South and 6 no. surface water emission points. Of the 11 no. silt ponds installed at Glashabaun South, 6 no. were installed by 1988, the remainder were installed between 1996 and 2000. There are no pumps located on the bog.

4.5.1.12 Ticknevin Bog

Aerial imagery indicates sod moss extraction was ongoing on the bog by 1988. There is a section of bog 38.2ha in the west that was never drained nor subject to extraction. Peat extraction ceased on Ticknevin Bog in 2019. There are 2 no. pumps on Ticknevin Bog. The installation date of the pumps is not clear,

but BnM records indicate the pumps were installed by 1988. There are 7 no. silt ponds, 2 no. of which was installed between 1988 and 1995, 4 no. installed between 2001 and 2005, and 1 no. installed between 2011 and 2013. There is 1 no. surface water emission points located on the bog. To the south of Ticknevin Bog between Glashabaun North, an area has been designated as the Long Derries Special Area of Conservation [000925] in 2016 due to the presence of good quality dry, orchid-rich calcareous grassland. The area comprises a gravel (esker) ridge) which is designated for orchid-rich calcareous grasslands and supports several species of conservation interest (refer to Chapter 6). The Long Derries was formerly used as a BnM gravel pit during the construction of the railway network at the Application Site. The railway infrastructure was well established at the Application Site by 1988 and the Peat Extraction Phase.

4.5.1.13 Codd 1 Bog

Drainage was inserted in Codd 1 Bog by 1988, with the full extent of the drained area subject to milled peat extraction. An area in the north of the bog known as Cushaling was drained by 1995 to produce sod moss which commenced in 2011, and the first harvest was taken between 2012 and 2013. Peat extraction ceased on the bog in 2020, the east was the last area to cease extraction at this time. There are 5 no. pumps located in Codd 1 Bog; 2 no. screw pumps were replaced with 2 no. submersible pumps in 2016 however, the 5 no. original pumps were installed by 1988. There are 5 no. silt ponds, 4 no. of which were installed by 1988 and 1 no. was installed between 2013 and 2018. There are 3 no. surface water emission points, all of which were installed by 1988.

4.5.1.14 Codd 2 Bog

By 1988, Codd 2 was subject to milled peat drainage. An area in the northeast of the bog was subject to initial drainage between 1987 and 1988 for the production of bin sod. The first harvest of bin sod from the north of the bog was taken in 2000. Extraction ceased on the bog in 2019. By the end of the Peat Extraction Phase, 11 no. silt ponds and 1 no. surface water emission point were in place, all of which remain in situ today. Of the 11 no. silt ponds installed at Codd 2 Bog, 4 no. were installed by 1988, 2 no. installed between 2001 and 2005, 2 no. installed between 2011 and 2013, and 3 no. installed between 2013 and 2017. There are no pumps located on Codd 2.

4.5.2 Silt Ponds

Upgrades to silt ponds were undertaken at the Application Site following a 1990 survey undertaken by BnM which involved a daily sampling and analysis programme at different locations in the BnM landholdings over a full calendar year to determine the quantity of silt within the run-off from bogs. The study (a copy of which is included in Appendix 4-14) determined that an average of 50m^3 of sludge per hectare (20m^3 per acre) was typically discharged. Following this, the silt ponds were designed to cater for the settling of sufficient amounts of silt providing the ponds were de-sludged at least twice per annum. A second pond was installed adjacent to the first to facilitate de-sludging (i.e., used as a backup when the first pond reached silt storage capacity and underwent de-sludging).

Condition 6 of the IPC Licence details the requirements for BnM to implement a programme to ensure all drainage water from all boglands is discharged via an appropriately designed silt pond treatment arrangement, that an operational procedure for de-silting was prepared, and that de-silting is carried out twice per year. Please see Appendix 4-1 for details. The silt arising from the de-silting operations was either stockpiled a distance from drains and the silt pond or placed back out onto the extraction fields. Up until the cessation of peat extraction, this material would then have been incorporated into the subsequent harvests.

4.6 Peat Extraction and Ancillary Activities

During the Peat Extraction Phase, extraction under the same processes described in Section 4.2.2.2.2, continued at the Application Site. Milled peat extraction continued on the Application Site from 1988 until 2019, sod peat extraction from 1988 to 2000, sod moss extraction from 1988 to 2019 and bin sod from 2000 to 2019 at which point peat extraction paused across the Application Site until June 2020 where extraction commenced again for 3 weeks before ceasing permanently. Improvements and modernisation of machinery occurred between 1988 and 2020 which increased the efficiency and speed of operations over this time period. There were significant developments in diesel-powered engines which would have resulted in the use of more fuel-efficient tractors on the Application Sites with significantly cleaner exhaust emissions compared to the baseline year of 1988 or pre-1988.

During the latter part of the 1988 to 2020 assessment period (i.e., from late 1990s/2000 onwards), peat extraction gradually slowed down and then ceased permanently in June 2020 across the Application Site, with a corresponding reduction in fuel handling/refuelling, machinery maintenance and stockpile development.

Peat extraction maps for the years 1988, 1995, 2004, and 2020 are presented in

Figure 4-8 to Figure 4-11 and illustrate the extent of extraction at the Application Site and increasing area which was no longer subject to peat extraction over time. Corresponding aerial images for the years 1988, 1995, 2004, and 2019 are included in Appendix 4-4.

N

Legend

Substitute Consent Boundary

Application Boundary

Peat Production 1995

Drained - Not Subject to Peat Extraction

Neither Drained nor Subject to Peat Extraction

Subject to Peat Extraction

0 0.5 1 2 Kilometres

Figure 4-9 Peat Extraction Areas in 1995

BnM

Ballydermot Substitute Consent 1995 Peat Extraction Activities

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-50	1:45,000	JL	10/07/2026

Tailte Éireann

CYAL50510154

N

Legend

Substitute Consent Boundary

Application Boundary

Peat Production 2004

Drained - Not Subject to Peat Extraction

Neither Drained nor Subject to Peat Extraction

Subject to Peat Extraction

0 0.5 1 2 Kilometres

Figure 4-10 Peat Extraction Areas in 2004

BnM

Ballydermot Substitute Consent 2004 Peat Extraction Activities

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-49	1:45,000	JL	10/07/2026

Tailte Éireann

CYAL50510154

N

Legend

Substitute Consent Boundary

Application Boundary

Peat Production 2020

Drained - Not Subject to Peat Extraction

Neither Drained nor Subject to Peat Extraction

Subject to Peat Extraction

0 0.5 1 2 Kilometres

Figure 4-11 Peat Extraction Areas in 2020

BnM

Ballydermot Substitute Consent 2020 Peat Extraction Activities

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-48	1:45,000	JL	10/07/2026

Tailte Éireann

CYAL50510154

4.6.1 Peat Extraction Volumes July 1988 to June 2020

The volumes of peat extracted at the Application Site varied from year to year and were influenced by weather conditions. The annual extraction quantities for the period from July 1988 to 2020 inclusive are set out in Figure 4-12 and Table 4-6. There are no detailed records for peat extraction volumes from 1988 to 1993 and 1996 to 1997, therefore data for the 10-year periods from 1994 to 2004 and 1998 to 2008 was selected as a representative sample from which an average value has been calculated to represent peat extraction volumes in the 1988 to 1993 and 1996 to 1997 periods. As detailed in Section 4.3.5 above, the 1988 July – December peat extraction volume has been estimated by halving (i.e. due to the 6-month period) the total tonnes of peat extracted for the year 1988.

Between July 1988 and June 2020, an average of 349,194 tonnes of peat were extracted each year, with a total of approximately 11,174,206 tonnes extracted between July 1988 and the cessation of peat extraction in June 2020. There was a closing stock of horticultural peat (sod moss and bin sod combined) recorded for the 2020 season of 2,321 tonnes at the point of the cessation of peat extraction. The milled peat supplied Lullymore Briquette Factory until its closure in 1992 by rail, then supplied Lanesboro Power Station from 1995 to 1999 mainly by road, Edenderry Power Station from 2000 to 2021 by rail and West Offaly Power Station from 2008 to 2020 by road. Small amounts of milled peat were also transported by road to Lough Ree Power Station in 2019 and Littleton in 2013, 2015 and 2016. The sod peat supplied Allenwood Power Station until 1991. The bin sod and sod moss from the Application Site was transported by road to Kilberry Works from 1976, Derrinlough from 2008, Cúil na Móna from 2016, Whitemoss from 2018, Ballivor from 2019, Westland from 2020 and Dublin Port from 2017, where it was shipped abroad to supply the horticulture industry. Small amounts of horticulture peat were also sold to other external customers transported by lorry from 2008.

During the Peat Extraction Phase, BnM implemented a stockpiling system whereby the aim was to have three years supply stockpiled at any time to ensure there was a supply available to the power stations in years of poor harvest due to weather conditions. Although peat extraction ceased in June 2020, the removal of stockpiled peat continued beyond this date and was completed in October 2021. The peat extraction volumes therefore do not directly relate to deliveries of peat to the power station over that extraction year.

From the recorded volumes in Table 4-6, the most productive extraction year was 2013 with 583,428 tonnes extracted this season. The least productive extraction year was 2019 with 71,352 tonnes. The year of 2020 doesn't represent a full year as peat extraction ceased after 3 weeks in June 2020.

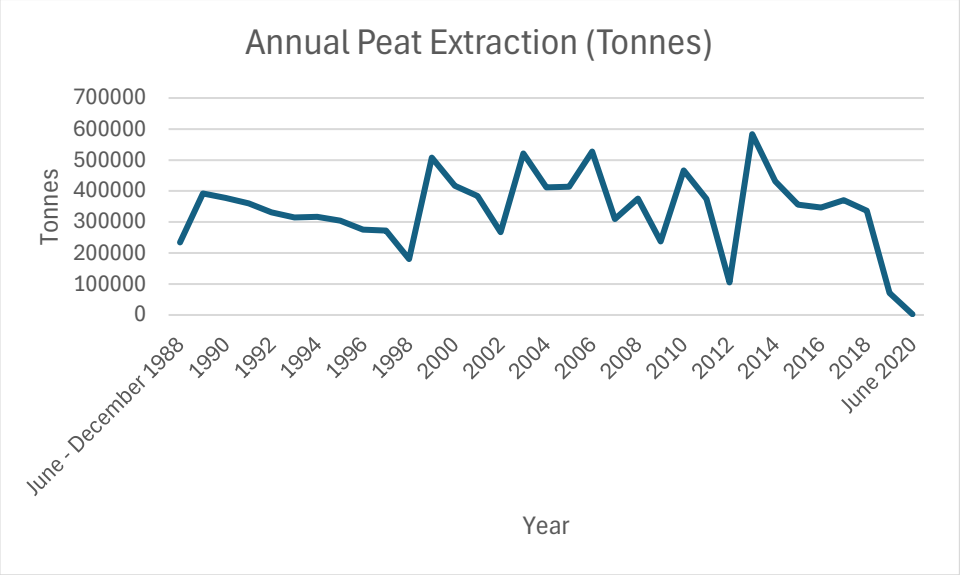

Figure 4-12 Annual Peat Extraction volumes July 1988 – June 2020

Table 4-6: Annual peat extraction quantities for the period 1988 to 2020

Year	Tonnes
June - December 1988*	234,160**
1989	391,697**
1990	377,498**
1991	360,497**
1992	331,097**
1993	314,597**
1994	316,235
1995	304,810
1996	275,297***
1997	272,497***
1998	180,800
1999	507,659
2000	416,772
2001	383,787
2002	26,481

2003	521,327
2004	411,387
2005	413,319
2006	527,185
2007	309,268
2008	375,433
2009	236,762
2010	466,231
2011	374,627
2012	105,369
2013	583,428
2014	431,814
2015	356,030
2016	346,540
2017	370,754
2018	336,175
2019	71,352
June 2020****	2321
Total volume Extracted (Tonnes)	**11,174,206**

**1988 Baseline peat extraction figures are for months July – December 1988 when Baseline period began as per Section 4.1*

***Based on average peat extraction volumes at the Application Site in the 10-year period between 1994 and 2004 in the absence of accurate data.*

****Based on average peat extraction volumes at the Application Site in the 10-year period between 1998 and 2008 in the absence of accurate data.*

*****Peat extraction at the Application Site was ongoing for 3 weeks in June in this year leading to a lower annual extraction volume compared to previous years.*

4.6.2 Third- Party Peat Extraction Activities

With the establishment of the Turf Development Act of 1981 (which amended and extended the rights of the Turf Development Act 1946-1980), BnM oversaw a private turf development scheme which provided grants to private bog developers. At the Application Site, minor third-party works occurred.

Third party extraction was undertaken on turbary plots within the periphery of the Application Site and as such exact locations and volumes are not available.

4.6.3 Ancillary Activities July 1988 to June 2020

As outlined in Section 4.2.3 there were various ancillary structures and features associated with peat extraction activities at the Application Site.

The Ballydermot Works served as the central location for support services, including workshops, offices, welfare facilities, storage sheds, maintenance buildings, staff carparks, HGVs storage areas, a tiphead and a refuelling area. These facilities were primarily used for the maintenance and repair of machinery associated with peat extraction and ancillary activities. The offices at Ballydermot Works provided administrative and welfare facilities, serving employees and staff on-site. The Works also played a central role in the administration of activities within the Application Site. As outlined in Section 4.2.3, the buildings that comprise Ballydermot Works were built by 1949, before the implementation of the Planning and Development Act (1963), which came into effect on October 1st 1964, and these structures are not part of this substitute consent application.

Welfare facilities were also provided across the Application Site to accommodate employees working further away from the central works buildings. Facilities to the north of Glashabaun North Bog comprise of 1 no. hand washing station, 1 no. toilet cubicle and an associated septic tank. The toilet cubicle and associated septic tank were installed in 1995 and the handwashing station was installed between 2006 and 2012. A welfare facility comprising of a small building was also located to the northwest of Killina Bog, providing employees with a clean area to take lunch and tea breaks.

As described in Section 4.2.3.6, a total of 40 no. storage containers were placed across the Application Site from 1995 to 2019. 3 different types were used; 20 ft containers, 40 ft containers and smaller 3m x 3m containers. These containers would have also provided employees with a clean area to take breaks and store materials. Currently 19 no. storage containers remain on the Application Site in Blackriver, Ballydermot North, Glashabaun North, Glashabaun South, Killina and Codd 1 bogs. Decommissioning of the containers began in 2012 and has continued across the Application Site in compliance with Condition 10.1 of the IPC Licence (see Appendix 4-1).

In addition to the shed installed to the northwest of Killina in the 1960s (described in Section 4.2.3.5), another storage shed is located to the northeast of Codd 1 Bog and was installed between 2011 and 2013. Both sheds are still currently present on the Application Site (see Appendix 4-12).

As discussed above, during the Peat Extraction Phase, a 36-inch gauge railway system was the exclusive means of transporting peat from the bogs of the Application Site. Milled peat was transported by rail to Lullymore Briquette Factory until 1992 and to Edenderry Power Station from 2000. Sod peat was transported by the internal rail network to Ballydermot Works and Allenwood Power Station until 1991.

Approximately 51km of permanent track existed within the Application Site during this period, and temporary railway infrastructure was moved around using the methods described in Section 4.2.3.10 as areas of bog came in and out of production. To date the permanent rail has been decommissioned and removed from the Application Site as part of the overall decommissioning programme for the IPC Licence.

As discussed in Section 4.2.3.10 there are 4 no. rail underpasses located within the Application Site boundary. There are 2 no. rail underpass located to the west of the Application Site (Offaly Co. Co. Pl. Ref. 86/184 and Ref. 97/699) and facilitates the connection between the Application Site and Cloncreen Bog, which forms part of the Allen Bog Group (IPC Licence Ref P0503-01). 1 no. rail underpass (Offaly Co. Co. Pl. Ref. 86/184) was constructed between 1988 and 1995 and the additional underpass at this location (Offaly Co. Co. Pl. Ref. 97/699) was constructed between 2001 and 2005.

There is 1 no. rail underpass located within the southwest of the Application Site (Kildare Co. Co. Pl. Ref. 97/1140) and facilitates the connection of Ballydermot North and South Bogs to Blackriver Bog within the Application Site. It was constructed between 2001 and 2005.

There is 1 no. rail underpass located within the northwest of the Application Site (Offaly Co. Co. Pl. Ref. 97/520) and facilitated connection between Codd 2 and Glashabaun North Bog within the Application Site. It was constructed between 2001 and 2005.

The use of 2 no. level crossings continued across the Peat Extraction Phase. They were installed along the R414 within the Application Site as described in Section 4.2.3.10.1. They were constructed to facilitate the connection of Barnaran, Lodge and Killina Bogs to Lullymore Briquette Factory and Allenwood Power Station. Standard level crossing lamps with light sensors were decommissioned when peat extraction ceased in June 2020.

Prior to the taking of effect of the IPC Licence in 2000, railway infrastructure was subject to regular inspection, with rail equipment maintained to ensure no damage, leaks, or flaws that could result in accidental fuel spillage. As discussed, the Application Site activities fell under IPC Licence from May 2000 onwards. Many of the management practices of railway infrastructure and equipment were carried through to the IPC Licence, with Condition 9.1.15 of same requiring biannual inspection and maintenance of the railcars to ensure no damage, leaks, or flaws in that could result in accidental fuel spillage.

The refuelling methods described in Section 4.3.6.2 continued throughout the Peat Extraction Phase. However, all tank and drum storage areas have been modernised, and bunds have been integrity tested bi-annually since 2000 in line with the IPC Licence requirements. These tanks are located at the Ballydermot Works and on the northwest of the Killina Bog boundary. The fuel tank near Killina was partially decommissioned in 2024. Please see Condition 9.1.15 of the IPC Licence for details.

4.6.4 Not-Peat Related Activities

4.6.4.1 Commercial Forestry Activities

BnM landholdings at the Application Site include approx. 244.1ha of conifer forestry located in Glashabaun South, Killina, Lullybeg, Lullymore and Barnaran bogs. This is managed exclusively by Coillte. These areas were used for peat extraction until approx. 1988 before they were leased to Coillte.

4.6.4.2 Lullymore Heritage and Discovery Park

BnM leased approx. 16.7 ha located in Lullymore Bog to the Lullymore Heritage and Discovery Park in 2011 to extend tourist amenity on the bog following its opening in 1993. This area was subject to peat extraction until 1992 when extraction ceased in all of Lullymore Bog.

4.6.4.3 Wind Monitoring Mast

The Applicant was granted a five-year permission for a 100-metre-tall guyed meteorological wind mast to be erected in Blackriver Bog within the Application Site in 2013 (Kildare Co. Co. Ref 12943) for the purposes of assessing the site for potential future wind energy development. An extension to that planning application was granted in 2017 for a further period of 3 years (Kildare Co. Co. Ref 17840). A three-year retention permission for the mast was granted by Kildare County Council in May of 2021 (Kildare Co. Co. Ref 201142). The mast was decommissioned at the beginning of 2026.

4.6.5 Control Measures July 1988 to June 2000

Post- July 1988, but prior to the implementation of the IPC Licence at the Application Site in 2000, the environmental management measures set out in Section 4.3.6, remained in place across the Application Site. In addition, as evidenced in the 1991 Harkins Report (see Appendix 4-9), silt control measures in the form of silt ponds were in place prior to 1988, with BnM carrying out further studies and surveys throughout the 1980s and 1990s to improve silt pond design and use such that suspended solids emissions in surface run-off were reduced. This included the construction of new ponds (as described in Section 4.3.6.9) to maintain treatment of run-off while cleaning of existing ponds was in progress.

4.6.5.1 Archaeological Code of Practice

BnM has a long history of co-operation with the National Museum of Ireland, the National Monuments Service and the relevant governmental departments overseeing heritage at the time, in relation to the cultural and archaeological importance of wetlands as well as the potential for, and handling of, archaeology discovered in bogs. After the discovery and subsequent preservation of trackways at Corlea Bog, Co. Longford by BnM employees in the 1980s, a new programme for peatland archaeology was established. Since 1991 an annual programme of archaeological survey, initially funded by the National Monuments Service, has been conducted in BnM Bogs, with the results being forwarded for inclusion in the Sites and Monuments Record.

Since 1998, BnM has a statutory duty under the Turf Development Act 1998 (Section 56) to afford appropriate protection for the environment and the archaeological heritage.

> Section 56.- *The Company and each subsidiary shall ensure that its activities are so conducted as to afford appropriate protection for the environment and the archaeological heritage.*

The 1998 Act was in accord with the development of an *Agreed Principles for the Protection of Wetlands Archaeology in Bord na Móna Bogs* (1998) between the Minister for Arts, Heritage and the Gaeltacht, the National Museum of Ireland and BnM. The Agreed Principles set out 10 standards within which archaeology in the BnM peatlands were managed. Five Archaeological Liaison Officers were spread across the BnM Bog Groups and received training on how to deal with and report finds. Since 1998, all archaeological surveys were funded by BnM. The surveys have been accompanied by an annual programme of selective archaeological excavation and paleo-environmental analysis. By 2013, 64,000 of the ca. 80,000-hectare land holdings of BnM had been subject to archaeological survey.[7]

A Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and BnM was established in 2012.[8] This Code superseded the Agreed Principles. The Code provided a framework within existing legislation, policy and practice to enable BnM to progress with peat extraction activities and all ancillary works and simultaneously ensure archaeological control measures is in place. The measures BnM are responsible for are listed below:

BnM will;

1. *Engage a Project Archaeologist.*
2. *Maintain the network of Archaeological Liaison Officers.*
3. *Disseminate a set of Archaeological Protection Procedures*

---

[7] *Department of the Arts, Heritage and the Gaeltacht 2013 Review of Archaeological Survey and Mitigation Policy relating to Bord na Móna Peatlands since 1990. https://www.archaeology.ie/sites/default/files/media/pdf/bnm-peatland-review-final-report-20-06-2013.pdf*

[8] *2012 Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Mónahttps://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf*

4. *Ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.*
5. *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.*
6. *Ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.*
7. *Prioritise monuments for investigation taking account of monument vulnerability, contractual obligations and peat production targets.*
8. *Prepare tenders for archaeological mitigation of impacts on monuments, to include excavation and recording, in consultation with the Project Archaeologist and the Minister.*
9. *Engage professional Consultant Archaeologists to carry out mitigation of monuments, including the required palaeo-environmental assessment and post-excavation studies.*
10. *Provide the necessary finance to fulfil the post-excavation requirements of the Minister and the Director including the conservation of archaeological objects and the provision of scientific analyses and dating, as well as the production of reports on all archaeological work, to a standard which will meet the approval of the Minister.*

4.7 Control Measures 2000 to Present Day (Post-IPC Licence)

4.7.1 Environmental Monitoring and Conditions under IPC Licence

BnM was granted an IPC Licence (Reg. No. P0503-01) for the Allen Bog Group (within which the Application Site is located) in May 2000. Following the grant of the IPC Licence, the control measures listed in Section 4.3.6 have been updated and expanded. A copy of the IPC Licence is provided in Appendix 4-1. The IPC Licence application is publicly available and can be viewed on request at EPA Headquarters PO Box 3000 Johnstown Castle Estate County Wexford Y35 W821.

Following the grant of the IPC Licence in 2000, BnM staff underwent an EPA IPC Licence Compliance training programme, which resulted in the development of an environmental management system. This system addresses emissions to water and air, noise, vibration and odour emissions, waste management, use of natural resources, visual effects and the natural environment and ecosystem. Please see Appendix 4-20 for the BnM IPC Licence Compliance training programme.

The conditions of the IPC Licence are intended for the protection of the environment and apply from the time of grant of the IPC Licence. The EPA has undertaken Technical Amendments of the IPC Licence for the purpose of aligning the conditions of the IPC Licence to the objectives of national and European environmental protection legislation enacted over the lifetime of the IPC Licence. In September 2012, the IPC Licence was subject to a Technical Amendment for the purpose of aligning with the European Communities Environmental Objectives (Surface Water) Regulations, 2009 and it now contains an objective to 'maintain' or 'restore' the water surface water quality to the defined 'Good Status'. With the implementation of conditions listed in the IPC Licence, the potential environmental effects of peat extraction activities and all ancillary works on water quality (such as the release of elevated concentrations of suspended sediments, and by association on aquatic ecosystems and protected species), have and continue to reduce through the implementation of IPC Licence conditions. Please see Chapter 8: Hydrology and Hydrogeology of this rEIAR and the Annual Environmental Reports (AERs) included as Appendix 4-3 for details.

The IPC Licence is subject to 14. no conditions pertaining to the ongoing monitoring and maintenance to ensure any emissions from site activities will comply with and not contravene, any of the requirements of Section 83(3) of the Environmental Protection Agency Act, 1992 outlined below:

(3) The Agency shall not grant a licence or revised licence for an activity unless it is satisfied that –

> *(a) any emissions from the activity will not result in the contravention of any relevant air quality standard specified under section 50 of the Air Pollution Act, 1987, and will comply with any relevant emission limit value specified under section 51 of the Air Pollution Act, 1987,*
>
> *(b) any emissions from the activity will comply with, or will not result in the contravention of, any relevant quality standard for waters, trade effluents and sewage effluents and standards in relation to treatment of such effluents prescribed under section 26 of the Local Government (Water Pollution) Act, 1977,*
>
> *(c) any emissions from the activity or any premises, plant, methods, processes, operating procedures or other factors which affect such emissions will comply with, or will not result in the contravention of, any relevant standard including any standard for an environmental medium prescribed under regulations made under the European Communities Act, 1972, or under any other enactment,*
>
> *(d) any noise from the activity will comply with, or will not result in the contravention of, any regulations under section 106,*
>
> *(e) any emissions from the activity will not cause significant environmental pollution, and*
>
> *(f) the best available technology not entailing excessive costs will be used to prevent or eliminate or, where that is not practicable, to limit, abate or reduce an emission from the activity,*

and, where appropriate, the Agency shall attach conditions relating to the matters specified in the foregoing paragraphs to the licence or revised licence.

Conditions 1 to 4 of the IPC Licence outlined the Scope, Management, Interpretation and Notification procedures required by the Applicant, respectively. Conditions 11 to 14 detail the Monitoring (equipment use), Recording and Reporting, Emergency Response and Financial Provisions duties of the Applicant. Conditions 5 to 10 pertain to environmental monitoring and management:

- Condition 5 Emissions to Atmosphere
- Condition 6 Emissions to Water
- Condition 7 Waste Management
- Condition 8 Noise
- Condition 9 Water Protection
- Condition 10 Cutaway Bog Rehabilitation

In compliance with Condition 5, the Applicant must undertake annual tests on boiler combustion efficiency and dust monitoring. Please see Chapter 9: Air Quality for further details. Condition 6 ensures the Applicant establishes a surface water discharge monitoring programme which is reviewed annually, and a report submitted to the EPA quarterly. The Applicant is also required to submit water sample results annually, implement and maintain silt ponds. Condition 9 pertains to the 'Water Protection' and outlines the daily, weekly, monthly, quarterly, and annual inspections BnM must carry out to provide for the protection of surface and groundwater. There are currently silt pond inspections and maintenance including quarterly grab sampling ongoing at the Application Site. Please see Chapter 8: Hydrology and Hydrogeology for further details. Condition 7 compels the Applicant to correctly

dispose of waste to licenced facilities. Please see Chapter 14: Material Assets for details. Condition 8 ensures that any on site activities do not give rise to noise exceedances at noise sensitive locations. Please see Chapter 11: Noise and Vibration for further details. Condition 10 pertains to site decommissioning followed by peatland rehabilitation and is detailed in Section 4.9 below which details the Remedial Phase, and Chapter 6: Biodiversity. It is the intention of the of the Applicant to continue implementing and practising the monitoring measures as listed in the Licence after the Application Site is decommissioned, where applicable.

4.7.1.1 Standard Operation Procedures

To facilitate the production of AERs, BnM produced an Environmental and Operational Procedures for Protection of Surface Water document which comprises a suite of Standard Operation Procedures (SOPs) which have the overall aim of promoting and maintaining environmental integrity throughout all BnM activities. The document includes SOPs for drainage planning and implementation, silt pond and outfall maintenance, waste management, peat extraction methods, and general bog housekeeping. The SOPs also set out emergency preparedness and response procedures, how to deal with complains, effective communication with BnM operatives, the local community and local authorities. Please see Appendix 4-11 Environmental and Operational Procedures for Protection of Surface Water for details.

4.8 Current Phase (June 2020 to Present Day)

4.8.1 Decommissioning Process

In January 2021, BnM formally announced that peat extraction across all bogs within its landholding had ceased, although peat extraction at the Application Site had ceased prior to this in June 2020. The Application Site still operates under the requirements of IPC Licence P0503-01, and any decommissioning works undertaken with respect to peat extraction and ancillary activities are in accordance with Condition 10 of the IPC Licence, which states that:

> *"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."*

In compliance with Condition 10.1 of the IPC Licence, it is a requirement of the licensee to decommission the Application Site by removing/disposing/recovering buildings, equipment, waste etc. from the Application Site. The main criteria pertaining to successfully complying with this condition is ensuring that the Application Site is not causing or likely to cause environmental pollution and the site of the activity is in a satisfactory state such that licenced lands can be deemed suitable for surrender of the IPC License under Section 95 of the EPA Acts. This is achieved by BnM identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and extraction operation at the Application 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. Ongoing decommissioning at the Application Site included removal of peat stockpiles which was completed in October 2021, as well as decommissioning of other infrastructure ongoing and planned, outlined in Table 4-7. As outlined in Section 4.6.3, approximately 51km of permanent rail track was located within the Application Site

boundary. To date all permanent rail has been decommissioned and removed from the Application Site.

Table 4-7 Future, ongoing and completed decommissioning items for the Application Site

Item	Description	Application Site Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Relevant to All Bogs
2	Clean silt ponds	Relevant to Lodge, Barnaran, Blackriver, Ballydermot South, Codd 1, Codd 2, Glashabaun South, Glashabaun North, Ticknevin, Lullybeg and Lullymore Bogs.
3	Decommission peat stockpiles	Relevant to All Bogs Completed October 2021
4	Decommission or remove buildings and compounds	Relevant to Ballydermot North, Ballydermot South, Blackriver and Glashabaun North
5	Decommission fuel tanks and associated facilities	Relevant to Ballydermot South and Killina Bogs.
6	Decommission and removal of septic tanks	Relevant to Ballydermot South and Glashabaun North Bogs
7	Decommissioning and removal of a number of existing bog pumps where suitable/necessary	Relevant to Ballydermot South, Codd 1, Glashabaun North, Ticknevin and Blackriver Bogs

In relation to waste management, Condition 7 of the IPC Licence requires these now defined waste items to be disposed of or recovered as follows:

"Condition 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.

Condition 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.

Condition 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 IPC Licence, waste items are and will continue to be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under Condition 7.2, and waste records are and will continue to be maintained as required under Condition 7.3.

Where possible, BnM will target preferred waste treatment methods from the waste hierarchy to identify waste that can reused or recycled in lieu of recovery or disposal.

The validation of the success of compliance with Condition 10.1 of the IPC Licence is carried out through an Independent Closure Audit (ICA) which is followed by an EPA Exit Audit (EA) and the eventual partial or full surrender of the IPC Licence.

4.8.2 Peatland Rehabilitation Plans

Following the conclusion of the decommissioning activities, BnM are required under Condition 10.2 of the IPC Licence to prepare (to the satisfaction of the EPA) and implement, a Cutaway Bog Rehabilitation Plan. Condition 10.2 of the Licence states:

"Condition 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.*

Condition 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.

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.

Reason: To make provision for the proper closure of the activity ensuring protection of the environment."

BnM have produced a Draft Cutaway Bog Decommissioning and Rehabilitation Plan for 10 of the bogs within the Application Site (i.e., Ballydermot, Blackriver, Barnaran, Killina, Lullymore, Lullybeg, Derrybrennan, Glashabaun, Codd and Ticknevin). The Draft Cutaway Bog Decommissioning and Rehabilitation Plans for Ballydermot North, Ballydermot South, Glashabaun North, Glashabaun South, Codd 1 and Codd 2 have been combined into the respective Ballydermot, Glashabaun and Codd Draft Cutaway Bog Decommissioning and Rehabilitation Plans. BnM have produced a Final Cutaway Bog Decommissioning and Rehabilitation Plan for Lodge Bog. Please see Appendix 4-2 for details. It is the intention of BnM to rehabilitate the bogs in a phased approach under the requirements of the IPC Licence.

Decommissioning and rehabilitation plans have been developed from a combination of the following:

- 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[9]);
- Significant international engagement during this period with other countries 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);
- Ongoing consultation and engagement with internal and external stakeholders regarding rehabilitation, biodiversity and other general issues over the years about the Allen Bog Group;
- Geographical Information System (GIS) Mapping;
- BnM drainage surveys;
- Bog topography and LIDAR data;
- Previous research studies on the Application Site; and,
- Hydrological modelling.

The current plans also take cognisance of the EPA Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan (2020). Each plan contains within a detailed ecological report and GIS mapping pack. The key objective of BnM peatland rehabilitation is environmental stabilisation. The rehabilitation of the bogs will support biodiversity e.g., plants, insects, bird and mammals, and the formation of wetland habitats. In addition, peatland rehabilitation will bring a range of benefits to the local community via improvements in the local landscape and it is also complying with national policies and strategies regarding the reduction of carbon emissions, supporting biodiversity and enhancing water quality. It is anticipated it will take up to 30 years for naturally functioning wetland and peatland ecosystems to fully re-establish.

To inform the final rehabilitation plan for each bog, both national and local stakeholders, including neighbours whose land adjoins the relevant bog units 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

[9] *Bord na Móna. 2016. Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane.* BioDiversity Plan final artwork:Layout 1

invited to submit their comments or observations in relation to the proposed rehabilitation. All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed and the final draft of plans will contain a review of the consultation.

Prior to the submission of the rehabilitation plans to the EPA for agreement, a baseline ecology survey will be carried out to determine the status of natural colonisation, the potential for targeted revegetation and/or rewetting and the future development at the Application Site to ensure stabilisation of the future cutaway.

Rehabilitation measures at Lodge Bog within the Application Site commenced in 2022 and are now complete. From June 2022 to November 2022 there were 11 BnM employees working on the rehabilitation of Lodge Bog. This dropped to 4 people from mid-November 2022 to the end February 2023. There were 6 employees working on Lodge from March 2023 to mid-June 2023 with the majority of the rehabilitation completed at this stage. Occasional employees worked on Lodge Bog after this date however there was no significant employment after mid-June 2023. Table 4-8 outlines a high-level overview of the standard rehabilitation actions that were proposed to be completed at Lodge Bog in the Final Decommissioning and Rehabilitation Plan.

Table 4-8: Types of and areas for standard rehabilitation measures at Lodge Bog

Decommissioning and Rehabilitation Plan Status	Bog	Type	Description of Works Required*	Area (Ha)
Final	Lodge	Additional Land	Minimal/targeted works required	26.24
		Dry Cutaway	Blocking outfalls and managing water levels with overflow pipes	55.66
		Deep Peat	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	96.92
		Deep Peat Marginal Land (MLT1)	No work required	35.4
		Silt Ponds Wetland (WLT2)	No work required	1.59
		Wetland (WLT4)	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	150.83

Decommissioning and Rehabilitation Plan Status	Bog	Type	Description of Works Required*	Area (Ha)
		Constraint	Other constraints	41.68
		Total Area		408.3

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

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

4.9 Remedial Phase

4.9.1 Peatland Rehabilitation Plans

Draft rehabilitation plans for each bog which outline the proposed rehabilitation for the Application Site have been prepared and are detailed below. Table 4-9 outlines a high-level overview of the actions proposed for each bog, Table 4-10 outlines the completed and ongoing actions and Table 4-11 gives timeline for when the remaining measures will be undertaken. Further details can be found in the plans in Appendix 4-2.

Table 4-9 Types of and areas proposed for rehabilitation measures at areas within the Application Site

Decommissioning and Rehabilitation Plan Status	Bog	Type	Description of Works Required*	Area (Ha)
Draft	Ballydermot	Deep Peat Cutover Bog	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	156.57
		Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	207.16

Decommissioning and Rehabilitation Plan Status	Bog	Type	Description of Works Required*	Area (Ha)
		Wetland Cutaway	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	386.70
		Marginal Land	No work required	38.26
		Rehab Complete	Rehab Complete	68.12
		Silt Ponds	Silt Ponds	2.69
		Constraints	Constraints	20.17
		Total Area		879.67
Draft	Barnaran	Deep Peat Cutover Bog	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	89.28
		Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	45.10
		Wetland Cutaway	Modifying outfalls and managing water levels with overflow pipes within low lying areas and depressions on shallow peat.	295.16
		Marginal Land	No work required	39.00
		Silt Ponds	Silt Ponds	1.57
		Constraints	Constraints	17.24
		Total Area		487.35
Draft	Blackriver	Deep Peat Cutover Bog	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	79.29

Decommissioning and Rehabilitation Plan Status	Bog	Type	Description of Works Required*	Area (Ha)
		Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	54.91
		Wetland Cutaway	Modifying outfalls and managing water levels with overflow pipes within low lying areas and depressions on shallow peat.	405.15
		Marginal Land	No work required	29.58
		Silt Ponds	Silt Ponds	3.71
		Constraints	Constraints	155.04
		Total Area		727.68
Draft	Codd	Deep Peat Cutover Bog	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	224.60
		Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	113.86
		Wetland Cutaway	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	99.21
		Marginal Land	No work required	8.79
		Silt Ponds	Silt Ponds	6.10
		Constraints	Constraints	104.37
		Total Area		556.92

Decommissioning and Rehabilitation Plan Status	Bog	Type	Description of Works Required*	Area (Ha)
Draft	Derrybrennan	Deep Peat Cutover Bog	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	2.95
		Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	29.41
		Wetland Cutaway	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	79.72
		Marginal Land	No work required	17.72
		Constraints	Constraint	52.36
		Total Area		182.16
Draft	Glashabaun	Deep Peat Cutover Bog	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	128.72
		Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	297.99
		Wetland Cutaway	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	392.80
		Completed Rehab	Rehabilitation Complete	15.32
		Marginal Land	No work required	37.20
		Silt Ponds	Silt Ponds	189.80

Decommissioning and Rehabilitation Plan Status	Bog	Type	Description of Works Required*	Area (Ha)
		Total Area		1065.40
Draft	Killinagh	Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	66.69
		Wetland Cutaway	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	12.41
		Marginal Land	No work required	7.96
		Constraints	Constraint	155.27
		Total Area		242.33
Draft	Lullybeg	Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	30.10
		Wetland Cutaway	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	216.40
		Constraints	Constraint Silt Pond	50.4
		Total Area		266.90
Draft	Lullymore	Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	5.14
		Wetland Cutaway	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	16.73

Decommissioning and Rehabilitation Plan Status	Bog	Type	Description of Works Required*	Area (Ha)
		Marginal Land	No work required	0.58
		Constraints	Constraint (lease, forestry)	38.53
		Total Area		174.47
Draft	Ticknevin	Deep Peat Cutover	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	149.56
		Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	3.16
		Wetland Cutaway	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	154.03
		Marginal Land	No work required	41.97
		Silt Ponds	Silt Ponds	0.73
		Constraints	Constraints	106.55
		Total Area		456.00

The completed and ongoing measures included in the Draft Cutaway Bog Decommissioning and Rehabilitation Plans is provided in Table 4-10 below.

Table 4-10 Completed and Ongoing Cutaway Bog Decommissioning and Rehabilitation Plan Actions

Bogs	Completed and ongoing
Ballydermot (2026 (Draft) Plan)	› The site is predominantly comprised of bare peat with colonisation of pioneer vegetation. Several sections have already developed vegetation cover and are developing a mosaic of typical cutaway peatland habitats. › A relatively large area of remnant raised bog, Cloonroosk Bog (~70 ha) in the south-west corner of Ballydermot South was rehabilitated in 2014 to block the drains. This bog was partially drained in error in 2013/14. ›
Lodge (2022 Plan)	› The rehabilitation measures outlined above are completed on Lodge Bog. › Pumping regime has been decommissioned. › Lodge Bog will continue to be monitored to determine the long-term impacts and outcomes of the completed rehabilitation.
Barnaran (2026 (Draft) Plan)	› The site is predominantly comprised of developed vegetation cover and are developing a mosaic of typical cutaway peatland habitats. Natural re-colonisation of the cutaway so far has been quite effective. › Bare peat areas within the cutaway parts of the site are shrinking as vegetation develops and consolidates.
Blackriver (2026 (Draft) Plan)	› Several sections have already developed pioneer vegetation cover and are developing a mosaic of typical cutaway peatland and wetland habitats. Natural re-colonisation of the cutaway so far has been quite effective. Bare peat areas within the cutaway parts of the site are shrinking with colonisation of pioneer vegetation as it develops and consolidates.
Codd (2026 (Draft) Plan)	› The site is predominantly comprised of bare peat with some pioneer vegetation maturing and developing a mosaic of typical cutaway peatland habitats.
Derrybrennan (2026 (Draft) Plan)	› A significant part of the site has already re-vegetated, with pioneer vegetation maturing and developing a mosaic of typical cutaway peatland habitats with Birch woodland predominating. Bare peat areas within the older cutaway areas are reducing. Natural re colonisation of the cutaway so far has been quite effective. Other parts of the site (younger cutaway) are naturally colonising for more than 10 years and are developing a mosaic of cutaway habitats. Natural re-colonisation of the cutaway so far has been quite effective. › Part of Derrybrennan bog was developed as a forestry trial. This forestry (mixed conifers and broad leaves) has established as immature woodland and is considered to be rehabilitated.

Bogs	Completed and ongoing
Glashabaun (2026 (Draft) Plan)	› Rehabilitation (drain blocking using peat dams) has taken place in one small section (10.94ha) of drained bog along the northwestern margins of Glashabaun North bog in 2018 (adjacent to the Long Derries, Edenderry SAC). › A significant part of the site has already re-vegetated, with colonisation of pioneer vegetation with Birch woodland now predominating. Bare peat areas within the older cutaway areas are reducing. Natural re-colonisation of the cutaway so far has been quite effective. Other parts of the site (younger cutaway) are naturally colonising for more than 10 years and are developing a mosaic of cutaway habitats. Natural re-colonisation of the cutaway so far has been quite effective.
Killinagh (2026 (Draft) Plan)	› Part of Killinagh bog was developed as a forestry trial (45 ha). This forestry (mixed conifers and broad-leaves) has established as immature woodland and is considered to be rehabilitated. › A significant portion of the site has already re-vegetated and is developing a mosaic of cutaway habitats including Birch woodland. Natural re-colonisation of the cutaway so far has been quite effective. Some areas remain bare peat – former headlands, travel paths and areas used for peat extraction until recently. These bare peat areas are shrinking as vegetation develops and consolidates.
Lullybeg (2026 (Draft) Plan)	› Part of Lullybeg bog was developed as conifer forestry by Coillte in the 1980's. This forestry (conifer plantation) has established and is considered to be rehabilitated. Issues of forestry management will be addressed during forestry operations in the forested sections of the site by Coillte, and under the appropriate Felling Licence as granted by the Forest Service. › As significant portion of the site has already re-vegetated and is developing a mosaic of cutaway habitats including Birch woodland and small wetlands. Natural re-colonisation of the cutaway so far has been quite effective. Some areas remain bare peat – former headlands, travel paths and areas used for peat extraction until recently. These bare peat areas are shrinking as vegetation develops and consolidates.
Lullymore (2026 (Draft) Plan)	› Part of Lullymore bog was developed as conifer forestry by Coillte in the 1980's. This forestry (conifer plantation) has established and is considered to be rehabilitated. Issues of forestry management will be addressed during forestry operations in the forested sections of the site by Coillte, and under the appropriate Felling Licence as granted by the Forest Service. › The majority of the remaining the cutaway has already re-vegetated and has developed wetlands, scrub and Birch-dominated woodland. › Some active rehabilitation was carried out in 2006/2007 to block a main outfall and enhance wetland cover. Some repair works were carried out in 2011. Additional works were carried out in 2016 to further maintain and raise water-levels in the wetlands. › BnM carried out some rehabilitation works in the area leased to Lullymore Heritage Park in 2012. This included drain blocking, lake and island creation and re-location of the main outfall through the

Bogs	Completed and ongoing
	site. This area of the bog will be managed by Lullymore Heritage Park into the future under terms of a lease signed in November 2011. › An area formerly used as a spread ground for sod turf by licensed contractors was fertilised in June 2014 to increase vegetation establishment. This area is now re-vegetating quite rapidly.
Ticknevin (2026 (Draft) Plan)	› There has been phased control of Japanese Knotweed at this site.

A timeline for the stages of the measures included in the Cutaway Bog Decommissioning and Rehabilitation Plans is provided in Table 4-11 below.

Table 4-11 Timeline for Cutaway Bog Decommissioning and Rehabilitation Plan Actions

	Ballydermot (2026 (Draft) Plan)	Lodge (2022 Plan)	Barnaran (2026 (Draft) Plan)	Blackriver (2026 (Draft) Plan)	Codd (2026 (Draft) Plan)	Derrybrennan (2026 (Draft) Plan)	Glashabaun (2026 (Draft) Plan)	Killinagh (2026 (Draft) Plan)	Lullybeg (2026 (Draft) Plan)	Lullymore (2026 (Draft) Plan)	Ticknevin (2026 (Draft) Plan)
Short-term Planning Actions (0-1 Years) [2026-2027]	• Seek formal approval of the plan. • A detailed site plan with engineering drawings outlining how the various rehabilitation methodologies will be applied to the bogs has been developed. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies). • A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation has been completed for Lodge Bog. The results of this appraisal have been incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible; • A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements has been carried out. • Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, such as the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) or marsh fritillary butterfly larval webs, etc. The scheduling of rehabilitation operations will be adapted, if needed. Surveys will be scoped and carried out based on the baseline ecological survey and previous knowledge of sites. • Ensure all activities comply with the environmental protection requirements of the IPC Licence. • An Appropriate Assessment of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site. • Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) (where required), and other environmental control measures during the implantation of the rehabilitation plan.										
Short-term Practical Actions (0-2 Years) [2026-2028]	• Carry out proposed measures as per the detailed rehabilitation plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III). • Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions. • Carry out the proposed monitoring, as outlined in section 9. • Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.										

Long-term Actions (>3 Years) [>2029]	• Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary. • Delivery of a monitoring, aftercare and maintenance programme. • Decommissioning of silt-ponds will be assessed and carried out, where required. • Reporting to the EPA will continue until the IPC License is surrendered.

4.9.2 Description of Proposed Rehabilitation Measures

Some rehabilitation has commenced on the Application Site already in the form of natural revegetation and re-colonisation (as described in the Draft Cutaway Bog Decommissioning and Rehabilitation Plans (Appendix 4-2)) and in Table 4-9 above. The Cutaway Bog Decommissioning and Rehabilitation Plans included provides a description of the bogs and their ecology. It also provides a framework and outlines the typical works that will be undertaken to achieve the aims of successful rehabilitation (the criteria for which are defined in the plan) and a timescale for when the various elements of the plan will likely be implemented.

The details necessary to achieve the aims set out in the Draft Cutaway Bog Decommissioning and Rehabilitation Plans will include the exact locations of the drains to be blocked and outfalls to be modified etc. These details are based on the existing habitats present and the topography of the Application Site. This level of detail will only be available once the rehabilitation plan is finalised. The remedial measures to be undertaken will follow proven and standard procedures that have been successfully applied by BnM and are known to be effective as detailed below.

4.9.2.1 Drain Blocking

Drains will be blocked using a number of methods depending on the size and type of drain. These methods will include the following:

- Peat dams within small drainage channels on the cutover bog;
- Removal or blocking of drainage pipes, or modification of drainage levels, where required.

These methods are fully described in the Irish Wildlife Manual, 'Best Practice in raised bog restoration in Ireland' (Mackin et al, 2017) and the Bord na Móna 'Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration of Bord na Móna Peatlands' (Bord na Móna, 2022).

4.9.2.2 Outfall and Pipe Modification

Outfalls and overflow pipes will be modified to control water levels at the Application Site over time, e.g. to increase water levels as the Application Site becomes increasingly vegetated. This will further slow the movement of water through and out of the bogs. Specifically in areas that have the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised.

4.9.2.3 Monitoring

As per the Draft Cutaway Bog Decommissioning and Rehabilitation Plans, a programme of monitoring, aftercare and maintenance will be implemented to validate the efficacy of the rehabilitation measures in achieving environmental stabilisation. Monitoring will initially involve quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbour's land, general land security, boundary management, dumping and littering. The number of these site visits will reduce after 2 years to bi-annually, and then after 5 years to annual visits. Monitoring visits will also consider any requirements for further practical rehabilitation measures.

The existing programme of water quality monitoring at the bog will be maintained. The main objective of this water quality monitoring is to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog. Monitoring results will be maintained, trended and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to Local Authority Water Programme (LAWPRO) and the EPA as required to inform progress

and national monitoring requirements under the WFD. These results will also be publicly available as a requirement of the Annual Environmental Report. The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, DOC and COD. This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.

If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.

If, after two years, key criteria for successful rehabilitation have not been achieved and key targets have not been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined based on scientific evidence and expert opinion.

4.10 Potential Future Land Use

4.10.1 Proposed Ballydermot Wind Farm

The Application Site is an important natural asset and has the potential to play a strategic role in meeting national climate action targets, which have become all the more significant in light of the Climate Action and Low Carbon Development (Amendment) Act 2021, the Climate Action Plan 2025, the Climate Change Performance Index 2024, and the Change Advisory Council's Annual Report 2024. These reports provide an updated assessment of both global climate change and climate change in the context of Ireland and identify the increasingly discernible impacts climate change is having on both the environment and society. In line with the Applicant's vision to assist in achieving a climate neutral Ireland by 2050, it is intended to utilise the Application Site for both peatland remediation and wind energy infrastructure and to facilitate environmental stabilisation of the Application Site and the optimisation of climate action benefits.

Bord na Móna Powergen Ltd. are proposing a wind energy development consisting of 47 no. turbines, 20 no. turbines will have a maximum blade tip height of 200 metres (m) above the top of the foundation and 27 no. turbines will have a maximum blade tip height of 220 metres (m) above the top of the foundation[10]. This application will be made directly to An Coimisiún Pleanála as 'Strategic Infrastructure Development' (SID) under the provisions of Section 37E of the Planning and Development Act 2000, as amended (the Act). At the time of writing, this position has not been confirmed by An Coimisiún Pleanála in correspondence to the Applicant though has been discussed in pre-application consultations with An Coimisiún Pleanála under Section 37B of the Act (ACP-310143-21). A separate EIAR and accompanying NIS are being undertaken for the proposed Ballydermot Wind Farm development. At the time of writing, the planning application for this development has not yet been submitted to An Coimisiún Pleanála, therefore a decision had not yet been made by An Coimisiún Pleanála with regards this application.

It is the intention of Bord na Móna Powergen Ltd. to integrate the peatland remedial measures with the proposed future wind farm should it receive a successful grant of permission. The key objectives of environmental stabilisation and re-wetting of the cutaway areas will occur between and surrounding the proposed windfarm infrastructure. The EIAR for the proposed Ballydermot Wind Farm will detail issues related to peat management during wind farm construction. This has proven successful during

[10] https://www.ballydermotwindfarm.ie/

construction of Mountlucas, Cloncreen and Derrinlough Wind Farms. In the event that natural re-vegetation was unsuccessful, then other measures such as re-seeding would be considered.

The Draft Cutaway Bog Decommissioning and Rehabilitation Plans, which will accompany the planning application for the proposed wind farm, detail how the Application Site will be rehabilitated alongside the construction and operation of the proposed wind farm, should the proposed wind farm development be consented. It should be noted that irrespective of the consenting or construction of the proposed Ballydermot Wind Farm, the measures outlined in the Draft BnM Cutaway Bog Decommissioning and Rehabilitation Plans will be implemented by BnM in agreement with the EPA, as per the IPC Licence obligations. Further details of this proposed Ballydermot Wind Farm can be obtained at the project website (https://www.ballydermotwindfarm.ie/).

4.10.2 Eastern and Midlands Region Water Supply Project

An application for the Eastern and Midlands Region Water Supply Project was submitted to An Coimisiún Pleanála (Case Ref: PA92.323980) on the 19th December 2025. The Water Supply Project includes a water pipeline from a new water treatment plant near Birdhill, Co. Tipperary to a termination point reservoir at Peamount, Co. Dublin. The Water Supply Project pipeline traverses the Application Site in an east- west direction across Codd 2, Glashabaun South and Derrybrennan bogs. The Water Supply Project has been considered in the Proposed Project and is considered in the relevant cumulative impact assessments in this EIAR.