TOBIN

BUILT ON KNOWLEDGE

Bord na Móna

Derryadd, Derryaroge and Lough Bannow Bogs – Application for Substitute Consent

Remedial Environmental Impact Assessment Report

Chapter 4 – Project Description

March 2025

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4.0 PROJECT DESCRIPTION

4.1 INTRODUCTION

As described in Chapter 1, the July 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 the July 1988 to the present day.

This chapter of the rEIAR provides a description of:

- The activities employed at the Application Site from 1949 at the onset of preparation works up to July 1988 (described in Section 4.5);
- The baseline environment as of July 1988 (described in Section 4.6);
- Peat extraction and related activities from July 1988 to the cessation of peat extraction in July of 2019 (described in Section 4.7);
- The management of the Application Site since July 2019 (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).

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 July 2019, the management of the Application Site since July 2019, and the activities relating to historic peat extraction intended to be carried out into the future (as described in Sections 4.5 to 4.9 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Neither the EIA Directive (*Directive 85/337/EEC* repealed by *Directive 2011/92/EU* and codified by *Directive 2014/52/EU*) nor the Habitats Directive (*Directive 92/43/EEC*) has retrospective effect; neither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 is possible of the project since July 1988, a description of the Application Site and the peat extraction activities and all ancillary works which took place there up to July 1988 are included in this chapter (see Section 4.5).

Although no EIA or AA can be required of development which took place prior to the latest date for transposition of the Directives, it is clear that in considering cumulative or in combination effects of development to which the Directives do 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 Directives 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. Since 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 4.8 and Section 4.9) which will be implemented at the Application Site in the form of draft and final Cutaway Bog Decommissioning and Rehabilitation Plans, subject to the agreement of the EPA, required under Condition 10 of the IPC Licence for the Mountdillon Bog Group (Reg. No. P0504-01), are also described. Please see Appendix 4.1 for a copy of the IPC Licence, including Amendments.

The peat extraction 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 establishment of the *Planning & Development Act 1963* (which was enacted on 1st October 1964)) as well as the EIA and Habitats Directive transposition dates in 1988 and 1994, respectively. Other infrastructure such as workshops, storage and loading facilities were also developed prior to the commencement of the formal planning system, while other ancillary services and infrastructure such as electricity distribution infrastructure, workshops, peat storage and loading facilities are located outside of the Application Site boundary and were previously granted their own respective planning consents, where required (refer to Section 4.4.5, which discusses the location of relevant ancillary structures and features in relation to the Application Site boundary, and the Planning Report (Appendix 4.2) 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 chapter of the EIAR has been prepared by Caroline Naughton. Caroline is a Senior Project Manager in TOBIN's Environmental & Planning Division. Caroline holds a BSC (Hons) in Environmental Science/Geology from University College Cork. Caroline has over 15 years' experience in environmental science and consultancy working with leading companies across a range of industries including construction, waste and pharmaceutical. She has extensive industry experience with a strong technical background and is experienced in the preparation of planning applications for a variety of environmental projects including Wind Farms, Solar Farms, Substations and Waste Facilities.

4.2 INFORMATION SOURCES

The following information sources were used in compiling this Chapter:

- Mountdillon Bog Group EPA IPC Licence (Reg. No. P0504-01) (included in Appendix 4.1);
- Appendix 4.2 - Planning Report
- Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plans, (included in Appendix 4.3):
    - Derryaroge Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2023;
    - Derryadd Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2025;
    - Derryaroge Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2025; and
    - Lough Bannow Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2025.
- Bord na Móna Annual Reports 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, Annual Environmental Reports (AERs) 2000 to 2023 (included in Appendix 4.4) (AERs from 2018 to 2023 are also publicly available[1]);
- Inspection of extraction records at Mountdillon Works;
- Aerial Maps from 1973 to 2019 (included in Appendix 4.5);
- Bord na Móna, *IPC Licence Environmental Code of Practice for Peat Energy Works* (included in Appendix 4.6);
- Bord na Móna, *Bord na Móna Biodiversity Action Plan 2016-2021* (2016) Brosna Press, Ferbane
- Personal communication with former Bord na Móna Employees;
- Harkins, Jim, *Silt Control Report for Peat Energy Division* (Internal Bord na Móna Report) (1991) (Appendix 4.7);
- Silt Control Study No. 1 – Internal Bord na Móna Report 1983 (included in Appendix 4.8);
- Silt Committee, Interim Report Recommended Measures 1976 (included in Appendix 4.9);
- Silt Committee Meeting Records Derrygreenagh 1984(included in Appendix 4.10)
- Silt Committee, Excavator records 1984 (included in Appendix 4.11);
- Drainage Study with Particular Reference to Pumping – Internal Bord na Móna Report 1983 (included in Appendix 4.12);
- Bord na Móna, *Environmental and Operational Procedures for the Protection of Surface Water* (included in Appendix 4.13);
- Industrial Cutaway Bog Land-Use Studies (Clonsast) – Internal Bord na Móna Report 1978 (included in Appendix 4.14);
- Peco Harvester Tests – Internal Bord na Móna Report 1986 (included in Appendix 4.15);
- Distribution and Nature of Ash Material in a Milled Peat Stockpile – Internal Bord na Móna Report 1982 (included in Appendix 4.16);
- Regional Administration in Relation to Milled Peat Operation – Internal Bord na Móna Report 1988 (included in Appendix 4.17);
- Irish Engineers Journal Supplement 1970 (p.13-15);
- Bord na Móna Living History website[2];
- Bord na Móna Peat Development in Ireland 1954 (included in Appendix 4.18);

[1] Annual Environmental Reports 2018-2023 available at: https://leap.epa.ie/licence-profile/P0504/compliance

[2] Available at: https://www.bordnamonalivinghistory.ie/

- Planning Drawing Pack (included as Appendix 4.19);
- IPC Licence Compliance Training Programme (included as Appendix 4.20).

4.3 PROJECT DESCRIPTION

This rEIAR is prepared in support of an application for Substitute Consent for peat extraction activities and all ancillary works carried out by Bord na Móna on lands at the Application Site since July 1988. The Application Site is located approximately 1 km east of Lanesborough in County Longford as outlined in Chapter 1 Figure 1-1.

The peat extraction activities and all ancillary works 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:

- Installation of surface water drainage infrastructure at Mountdillon Bog Group, specifically at Derryadd, Derryaroge and Lough Bannow Bogs to facilitate peat extraction activities from 1988 to present day;
- Vegetation clearance to facilitate peat extraction activity from 1988 to July 2019;
  - Industrial scale peat extraction (milled peat);
- Use and maintenance of pre-existing ancillary supporting infrastructure and services to facilitate peat extraction (e.g., railway infrastructure, fixed fuel tanks, drainage (drains, silt ponds, pumps), machine passes etc.), from 1988 to July 2019;
  - Control Measures associated with the above, inclusive of the IPC Licence measures (Ref. P0504-01) which commenced from 2000 onwards to the present day; and,
  - All associated site development and ancillary works.

4.3.1 Project Phases

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 July of 2019 (July 1988 – July 2019). The Peat Extraction Phase is described in detail in Section 4.7.
- 'Current Phase': the management of the Application Site since July 2019 (July 2019 to present). The Current Phase is described in detail in 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.

4.4 OVERVIEW OF THE PEAT EXTRACTION PROCESS

4.4.1 Surveying and Drainage

A description of the surveying and drainage methodologies and machinery used across the Bord na Móna bogs, including at the Application sites, is outlined on the Bord na Móna 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;

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

- 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 degree of decomposition);
- Levels were taken at 100-yard (approx. 91m) intervals or closer along parallel section lines 250 yards (approx. 228m) apart on midlands bogs (the Application Site comprises midlands bogs). The depth of the bog at each level point was determined by a Swedish type tube borer coupled in lengths of 1m. The leading tube was provided with a special rotating head which enabled a 0.5m sample from any particular depth to be carried to the surface;
- Midland virgin bogs, such as the Application Site, varied in depth from 10 foot (approx. 3m) to over 40 foot (approx. 12m) – the bulk of the soundings lying in the range 15 foot (approx. 4.5m) to 25 foot (approx. 7.5m); and,
- Apart from the survey of the bog deposit a detailed survey of all the minor streams and minor rivers carrying waters 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 Bord na Móna tractor at a slow speed (approximately½ 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); and
  - Whether further deepening of drains was required depended on the purpose of the drain was achieved by smaller-type bucket excavators and peat cutting machinery, by drag lines specially tracked to Bord na Móna'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 deposit 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 prohibitive cost. In these 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 the 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 4.4.2.

4.4.2 Drainage and Bog Preparation Machinery

4.4.2.1 Dragline/Shovel Excavator: Types 287 CU. Metres and 478 CU. Metres

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 Bord na Móna bog.

Plate 4-1: Dragline/Shovel Excavator (source: https://www.bordnamonalivinghistory.ie/equipment-detail/draglineshovel-excavator/)

4.4.2.2 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 Bord na Móna'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.

4.4.2.3 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 Bord na Móna bog.

Plate 4-2: Drainage Machine Type – M.P. Field Slitter (source: https://www.bordnamonalivinghistory.ie/equipment-detail/drainage-machine/)

4.4.2.4 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: Ditching Attachment/Ditcher

4.4.2.5 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 Bord na Móna bog.

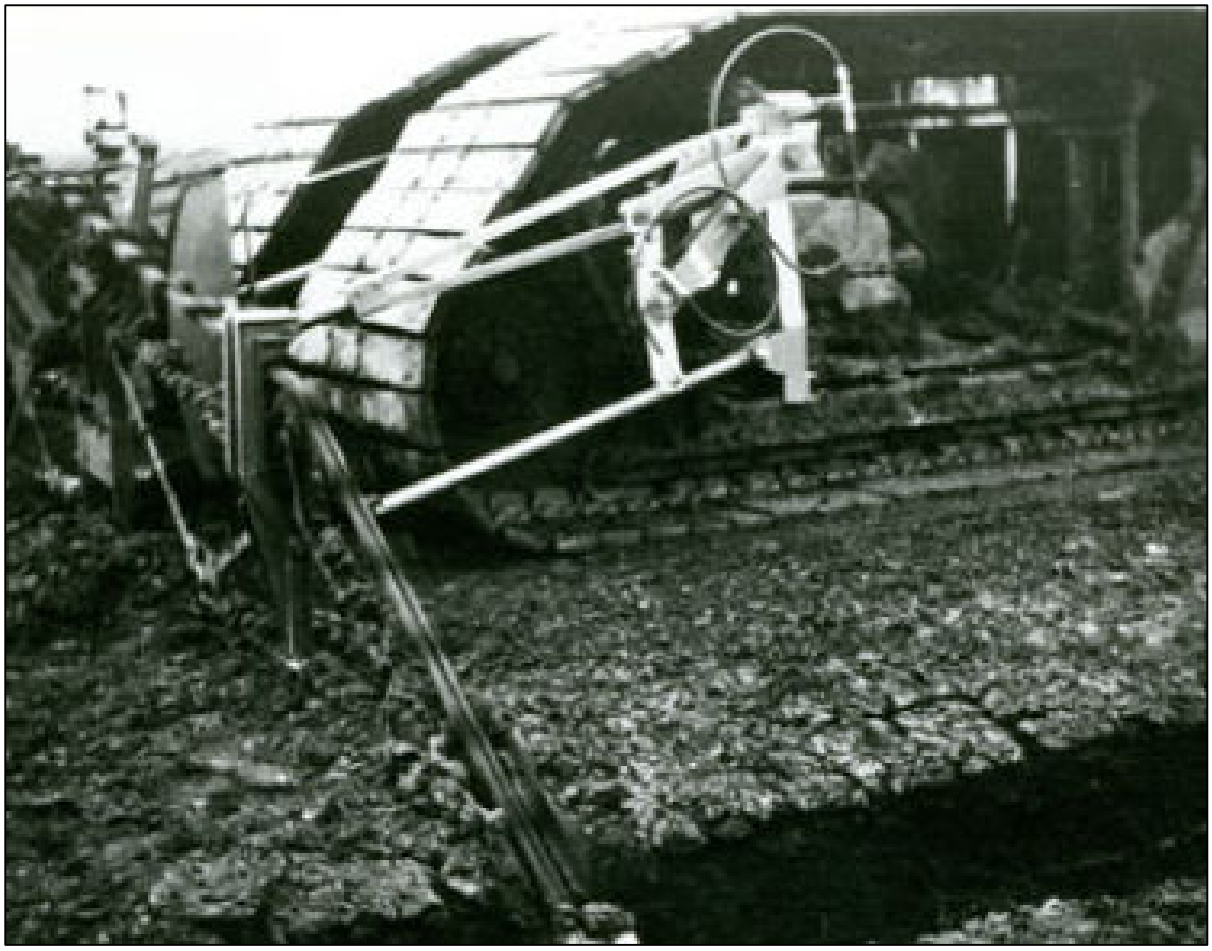


Plate 4-4: Drain Cutting Attachment – Cross Drain (source: https://www.bordnamonalivinghistory.ie/equipment-detail/drain-cutting-attachment-cross-drain/)

4.4.2.6 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 Bord na Móna bog.

Plate 4-5: Drain Cleaner Screw (source: https://www.bordnamonalivinghistory.ie/equipment-detail/drain-cleaner-screw/)

4.4.2.7 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 diesel engine and transmission of standard manufacture incorporating a differential brake/gear steering arrangement as used on 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 final drives. There were 6 forward speeds available using change sprockets. Plate 4-10 is an image of this type of machinery operating on a Bord na Móna bog. Plate 4-6 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-6: Stripping Machine (source: https://www.bordnamonalivinghistory.ie/equipment-detail/stripping-machine/)

4.4.2.8 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 Bord na Móna bog.

Plate 4-7: Levelling Machine Type – Scraper (source: https://www.bordnamonalivinghistory.ie/equipment-detail/levelling-machine/)

4.4.3 Peat Extraction Process

Two distinct peat products were extracted at the Application Site: sod peat and milled peat. 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 4.4.4.

4.4.3.1 Sod Peat Extraction

Sod peat was extracted at the Application Site from 1952 to 1984.

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 4.4.2. 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 is '*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 Plates 4-20 and 4-21.

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.

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 Bord na Móna 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 Bord na Móna.

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 300mm.

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.

4.4.3.2 Milled Peat Extraction

Milled Peat product was extracted at the Application Site from 1964. From 1984 to 2019 milled peat was the only form of peat extracted, and this was transported exclusively to the nearby Lanesboro Power Station and later Lough Ree Power Stations via the bog railway. 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 and swamp shoes and front rollers.

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:

- **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 4-9). This layer of crumbed or milled peat/moss is called a crop and would have had a moisture content of about 80% when milled;
- **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.
- **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. 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 4-11);
- **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 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. When the extraction season was over, the stockpiles were covered to keep the peat dry unless the peat was scheduled for immediate transportation from the site. Peat was stored in these stockpiles (up to 25 m wide, 10-15 m high) until required for use.

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 three passes along a stockpile by a milled peat harvester; on the first pass, a milled peat harvester which was fitted with a split cowl at the end of the jib 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 second and third 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 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 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, 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 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 Bord na Móna 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 Bord na Móna.

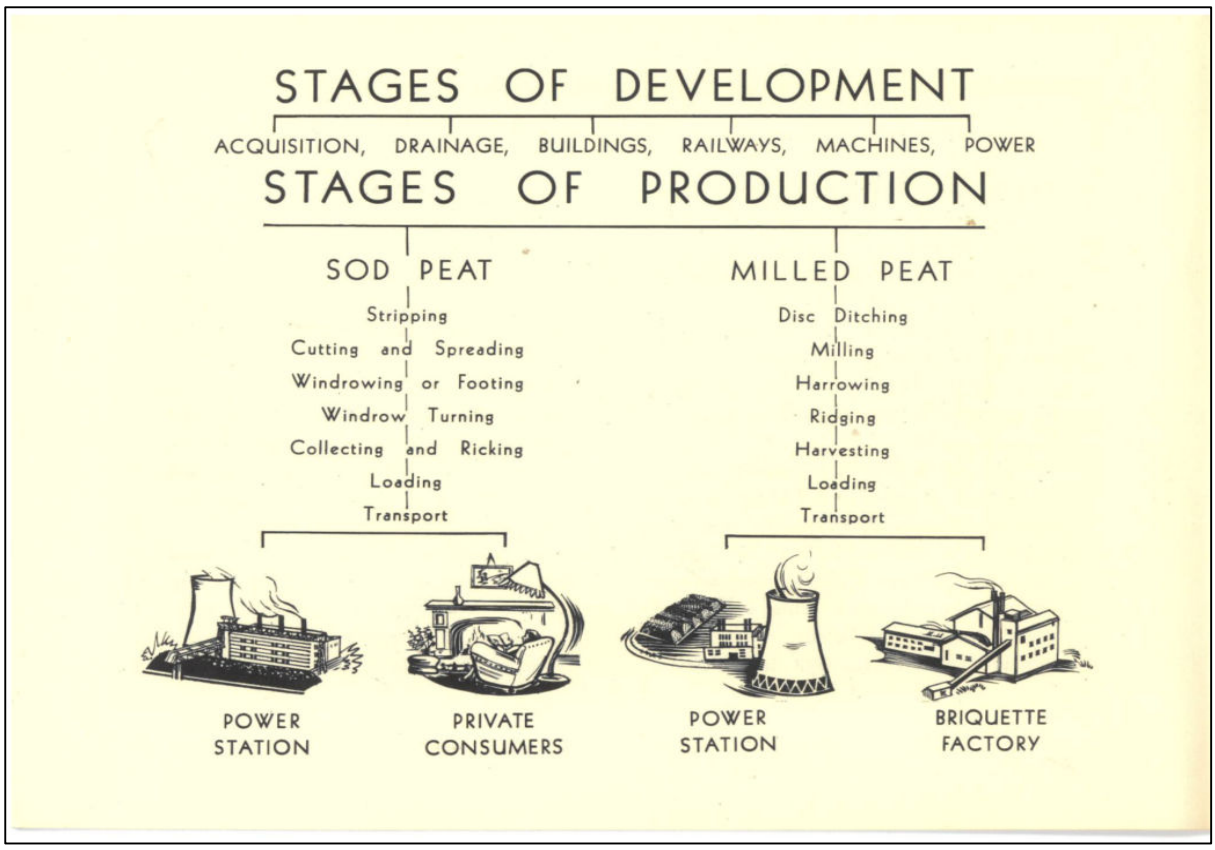


Figure 4-1: Flow chart of the sod and milled peat extraction process produced by Bord na Móna in 1954-

Plate 4-8: Milling process (source: Bord na Móna)

Plate 4-9: Harrowing process (source: Bord na Móna)

Plate 4-10: Ridging process (source: Bord na Móna)

Plate 4-11: Ridging process (source: Bord na Móna)

Plate 4-12: Harvesting - Peco Method (source: Bord na Móna)

Plate 4-13: Harvesting – Peco method (source: Bord na Móna)

Plate 4-14:Polythene covering of stockpiles

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: Bord na Móna)

4.4.4 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.

4.4.4.1 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 4-16 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-16: H.D. Tractor II (source: https://www.bordnamonalivinghistory.ie/equipment-detail/h-d-tractor-ii-2/)

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 direct.

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 4-17 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-17: LHT Tractor II (source: https://www.bordnamonalivinghistory.ie/equipment-detail/lht-tractor/)

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 4-18 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-18: Ridger Tractor (source: https://www.bordnamonalivinghistory.ie/equipment-detail/ridger-tractor/)

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 was used from approximately 2010. It has a rated engine power of approximately 70hp, 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.

4.4.4.2 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 4-19 is an image of this type of machinery operating on a Bord na Móna bog

Plate 4-19: Sod turning machine (source: https://www.bordnamonalivinghistory.ie/equipment-detail/sod-turning-machine/)

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 4-20 and Plate 4-21 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-20: Sod Peat Bagger/Excavator (source: https://www.bordnamonalivinghistory.ie/equipment-detail/sod-peat-baggerexcavator/)

Plate 4-21: Sod Peat Bagger/Excavator (source: https://www.bordnamonalivinghistory.ie/equipment-detail/sod-peat-baggerexcavator/Peat Extraction Volumes/)

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 from the boom frame, was a rubber/canvas conveyor belt running on 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 4-22 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-22: Boom Attachment (source: https://www.bordnamonalivinghistory.ie/equipment-detail/cutaway-boom-attachment/)

Chain Saw Excavator

A machine of compact, sturdy construction with a high output for its size was used in Bord na Móna 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 made 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 4-23 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-23: Chain Saw Excavator (source: https://www.bordnamonalivinghistory.ie/equipment-detail/chain-saw-excavator/)

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 Bord na Móna, one was sold to the Finnish State Fuel Supply Department, four were retained, and 20 sold as scrap.

Plate 4-24: Fóidín Machine (source: https://www.bordnamonalivinghistory.ie/equipment-detail/loading-machine/)

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 4-25 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-25: Sod Peat Loading Machine (source: https://www.bordnamonalivinghistory.ie/equipment-detail/loading-machine/)

4.4.4.3 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. The single and triple miller attachments were later replaced by an offset miller attachment known as a 'Type – I'.

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 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 4-26 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-26: Single miller attachment (source: https://www.bordnamonalivinghistory.ie/equipment-detail/miller-attachment/)

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 4-27 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-27: Boom Attachment (source: https://www.bordnamonalivinghistory.ie/equipment-detail/cutaway-boom-attachment/) Triple miller attachment (source: https://www.bordnamonalivinghistory.ie/equipment-detail/miller-attachment/)

Offset Miller Attachment (Type-I)

This attachment was used to form a bevel on the edges of milled peat fields, to assist surface drainage. 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 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 4-28 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-28: Offset (Type-I) Miller attachment (source: https://www.bordnamonalivinghistory.ie/equipment-detail/miller-attachment/)

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.

Plate 4-29 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-29: Harrow (source: https://www.bordnamonalivinghistory.ie/equipment-detail/harrow/)

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 mainframe 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 fiberglass 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 and raise the spiral casing completely off the bog surface by hydraulics, and control the jib deflector by a simple rope winch. Plate 4-30 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-30: Harvester (source: https://www.bordnamonalivinghistory.ie/equipment-detail/harvester/)

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 4-31 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-31: Milled Peat Loading Machine (source: https://www.bordnamonalivinghistory.ie/equipment-detail/loading-machine/)

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 Plates 4-32 and 4-33 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 4-33 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 4-32: Polywrapper

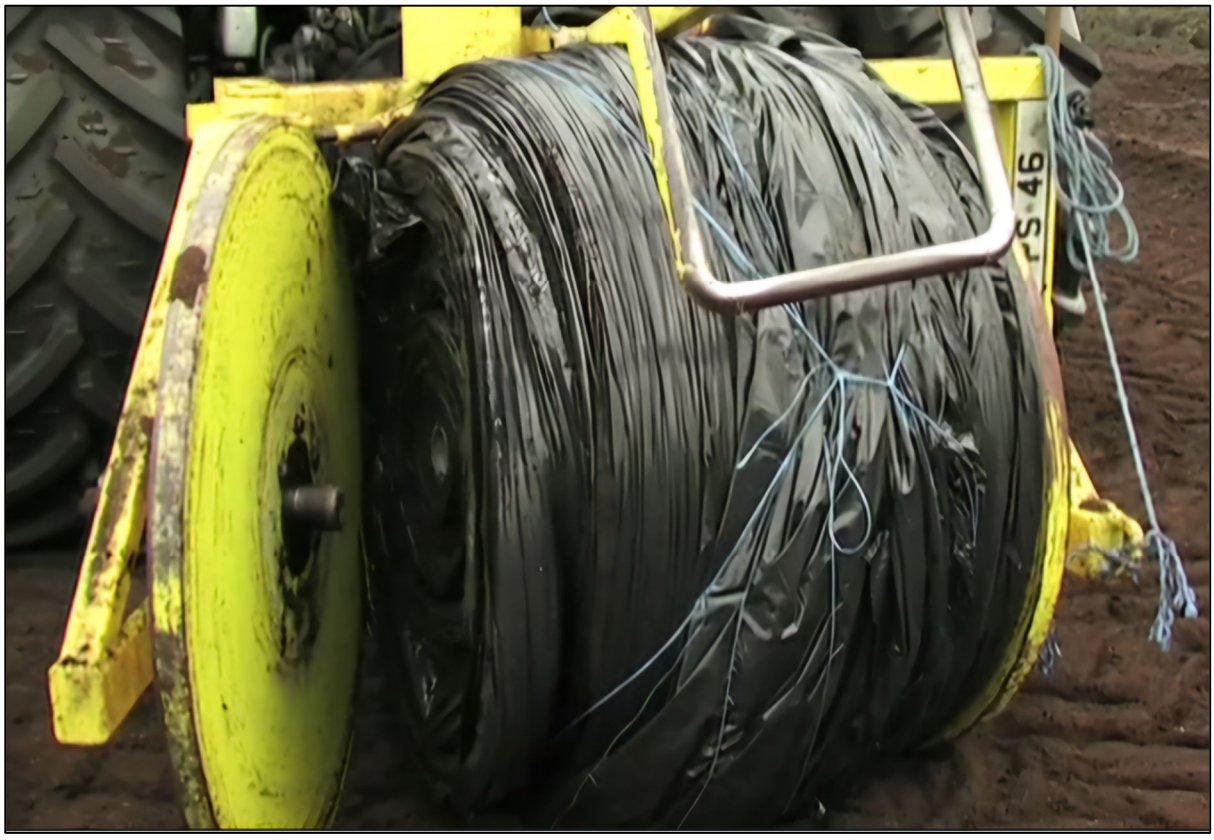


Plate 4-33: Polywrapper with the frame opened to allow access to the collected bale of polythene

4.4.5 Ancillary Structures and Infrastructure

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

- Workshops;
- Works offices;
- Welfare Facilities;
- Mobile fuel tanks;
- Fixed fuel tanks;
- Local holding areas;
- Peat loading facility;
- Tiphead; and
- Railway infrastructure.

With the exception of railway infrastructure, and 1 no. machine storage area (located in Lough Bannow bog), the remaining ancillary infrastructure is located outside of the Application Site boundary and as such substitute consent is not being sought in respect of this ancillary infrastructure. Nonetheless, in order to provide as detailed a description as possible of the Project, all of the ancillary infrastructure is described below.

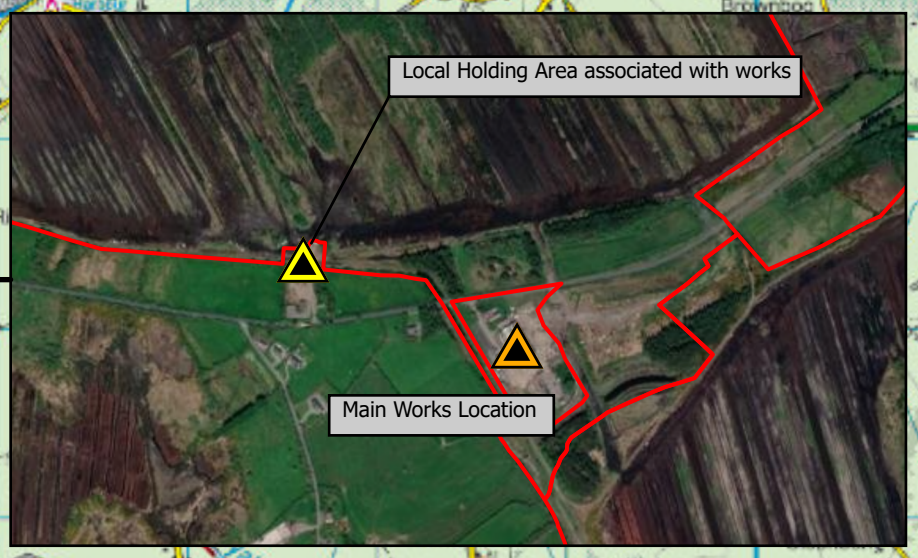
4.4.5.1 Workshops

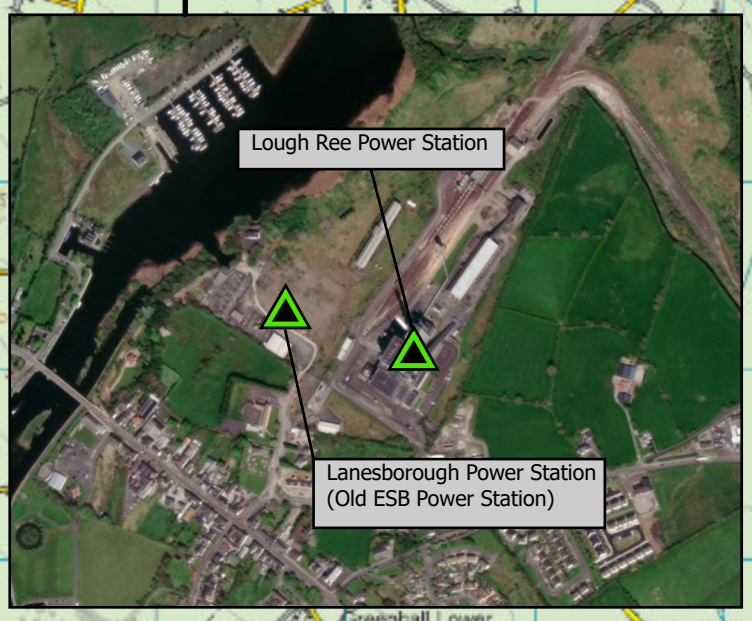
Mountdillon Works, (also referred to as 'the Works'), provided a central location for support services to the Application Site and other adjacent bogs within the Mountdillon Bog Group, and includes workshops, offices and welfare facilities such as toilets and a canteen. The Works are located along the N63, approximately 3.8 km east of Lanesborough.

Staff parking is provided at Mountdillon Works and it remains the central location for management of the activities within the Application Site. The workshops and offices at Mountdillon Works were originally constructed 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.

Originally, the central Works site for the Mountdillon Bog Group was located at Mountdillon Bog in Co. Roscommon, northwest of the Application Site and across the Shannon River. These works are also referred to as 'Mountdillon Works', owing to their siting at Mountdillon Bog. The now-central Mountdillon Works site, which is adjacent to the Application Site in Co. Longford, became the central works site for the Mountdillon Bog Group when it was constructed in the early 1960s. The original Mountdillon Works located at Mountdillon Bog in Co. Roscommon is still present at that location today, and is still used as a smaller satellite works location for machinery repair and material storage for the bog units within the Mountdillon Bog Group to the west of the Shannon River. For clarity, reference to 'Mountdillon Works' or 'the Works' throughout this rEIAR refers exclusively to Mountdillon Works located adjacent to the Application Site in Co. Longford, as indicated in Figure 4.2, unless otherwise stated. Other smaller 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.

In 1956, a railway bridge was constructed spanning the River Shannon to the north of Lanesborough, and west of Derryaroge Bog. This railway crossing facilitated rail connectivity between all of the bogs within the Mountdillon Bog Group, as well as connectivity to Mountdillon Works.





Legend

- Application Boundary
- Power Stations Locations
- Mountdillon Works
- Local Holding Areas

Bord na Móna

Figure 4.2: **Location of Mountdillon works within the Application Site**

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-30	**1:40,000**	**AK**	**24/03/2025**

During the Peat Extraction Phase, the majority of workers at the Application Site would arrive to Mountdillon Works prior to mobilising machinery stored at the Works site and navigating to the required location within the Application Site. Machinery was parked at the Works or at the local holding areas in Derryaroge, Derryadd, or Lough Bannow 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 the 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 at the Works to prevent release of fuels to the ground or surface water bodies. All tanks and drums were, and continue to be, stored in bunded areas at the Works. These standard practices were in place prior to the implementation of the IPC Licence in 2000. The workshops were mainly used to carry out repairs and maintenance on machinery which was brought in from the extraction areas.

A machine and wheel wash facility are also located at Mountdillon 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.

4.4.5.2 Works Offices

The offices at Mountdillon Works provided an administration centre for the Application Site and other bogs within the Mountdillon Bog Group. Permanent administration staff were employed throughout the Peat Extraction Phase from the time of construction of these buildings in the early 1960s. The office buildings also provided welfare facilities such as toilets and a canteen to serve employees and staff at Mountdillon Works buildings and within the Application Site.

4.4.5.3 Welfare Facilities

Welfare facilities were also provided across the Application Site. These typically 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 the Mountdillon Works offices, these smaller outposts were situated across the Application Site to provide easier access to workers further away from the central works buildings. Any remaining welfare facilities will be decommissioned as required as part of the IPC Licence decommissioning plans.

Plate 4-34 illustrations the former welfare facility at Derryaroge Bog.

Plate 4-34: Former Welfare Facility at Derryaroge Bog, north of Mountdillon Works (source: Bord na Móna)

4.4.5.4 Fuel Storage

Fuel was, and still is, stored within above bunded ground tanks at Mountdillon Works in compliance with IPC Licence Condition 9 (Plate 4-35). The fuel tanks are bunded to contain any

potential fuel spills or leaks. Refuelling procedures were upgraded to standard bunding specifications to comply with IPC Licence requirements in 2000 (refer to Section 4.7.6 for details).

The filling of tanks from the fuel supplier took place at the main fixed tanks at Mountdillon Works. Refuelling of vehicles and machinery was carried out at the Mountdillon Works, or at the local holding areas in Derryaroge, Derryadd, or Lough Bannow, but in some circumstances where machinery could not be tracked back to the Works buildings or local holding areas, refuelling was also carried out on the bogs at designated areas, away from drains or rivers, in compliance with IPC Licence Condition 9.1.13. Service trains/railcars with a fuel dispensing unit, travelled from the Works to the designated bog area to refuel the machine in question. The service trains/railcars, as shown in Plate 4-36 and Plate 4-37 were filled from the main tanks at Mountdillon Works and travelled by rail to refill the plant machinery on the bog.

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 of the peat extraction season (i.e. October to March). The practice of bunding at the Works and for mobile refuelling units was introduced in the 1970s.

Plate 4-35: Existing fuel storage tanks with bunding at Mountdillon Works

Plate 4-36: Decommissioned mobile fuel tank (rail cart) on Derryaroge Bog within the Application Site (source: Bord na Móna)

Plate 4-37: Decommissioned service train south of Mountdillon Works (source: Bord na Móna)

4.4.5.5 Local Holding Areas

There are 3 no, local holding areas associated with peat extraction at the Application Site, located at Derryaroge, Derryadd, and Lough Bannow bogs. The Lough Bannow machine storage

area is the only one within the Application Site. 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 Mountdillon 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 flat areas which were suitable for machines to park on.

4.4.5.6 Peat Loading Facility

A peat loading facility is provided within the Mountdillon Works yard since 2021. Following the closure of Lough Ree Power Station in December 2020, all remaining peat stockpiles at the Application Site were transported via rail from the Application Site to the Mountdillon Works peat loading facility for weighing and loading into heavy goods vehicles (HGVs). HGV movements were via the N63 west and Cloonfore/Clonfower Road (L1163) southwest, and later via the N3 west and the R392 southeast. The stockpiles of milled peat were then transported to either Edenderry Power Station for electricity generation, or to Derrinlough Briquette Factory for the manufacture of solid fuel products. Prior to the closure of Lough Ree Power Station, all deliveries of peat from the Application Site to the Lough Ree Power Station in Lanesborough went directly from stockpiles on the Application Site via rail carriages. An aerial image of the peat loading facility within Mountdillon works is provided in Figure 4-3.

Figure 4-3: Mountdillon Works peat loading facility (source: Google Maps)

4.4.5.7 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 Application Site in south Derryaroge, across the N63 from the Mountdillon Works (see Figure 4.4 below). The tiphead at Derryaroge was used up until sod peat sales finished in 1984.

N

Legend

- Derryaroge Tip Head
- Application Boundary

Bord na Móna

Figure 4.4: **Derryarogue Tip Head Location**

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-24	**1:20,000**	**AK**	**24/03/2025**

4.4.5.8 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 activities and ancillary works, the lifting and laying of rail was done by hand before equipment was designed for that purpose.

The railway was the only means of transporting peat from the Application Site to either the power station (Lanesboro Power Station from 1958 to 2004 and Lough Ree Power Station from 2004 to 2020), the tiphead for sale to the public (sod peat only between 1952 and 1984), or peat loading facility for export to Edenderry Power Station or Derrinlough Briquette Factory (post-December 2020). In the case of the Application Site, from 1984 to 2019 milled peat was the only form of peat extracted, and this was transported via bog railway to Lanesboro Power Station, and following the closure of Lanesboro Power Station in 2004, to the Lough Ree Power Station at the same site.

The total length of permanent track laid within the Mountdillon Bog Group was approximately 113km. Approximately 37km of this permanent track was located within the Application Site boundary and facilitated the movement of extracted peat within the Application Site from the 1960s until November 2022 when stockpile removal finished. In addition, temporary track was also laid across the Application Site as required. 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 station, or in later years to the centralised peat loading facility at Mountdillon 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 Bord na Móna 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. Several level crossings were installed around the Application Site. The gates at 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. Standard discs and warning lamps complete the level crossing gates.

The railway wagons were pulled by diesel powered locomotives, examples of which are shown in Plate 4-38.

Plate 4-38: Example of railway locomotive and wagons hauling milled peat to the power plant (source: Bord na Móna)

It should also be noted that the nearby Derraghan Ash Disposal Facility (ADF) is an EPA Licenced ash repository (Licence No. P0610-03) which is located to the west of Derryadd Bog and was used for disposal of ash from Lanesboro power station from 2002 until it's closure in 2004 and LRPS from 2004 until its closure in 2020. Derraghan ADF and the LRPS, while both ESB sites, relied upon Bord na Móna rail infrastructure to transport ash from the power station via rail carts, through the Application Site, and on towards Derraghan bog to the west of Derryadd Bog. The rail wagons pulled by Bord na Móna trains were covered with a lid to ensure that no spillage of ash or dust occurred (see Plate 4-39 below).

Plate 4-39: Example of railway locomotives pulling ash wagons

The network of railway lines also connected to the yard at the Mountdillon Works where maintenance was carried out on the locomotives and wagons as required.

A map of the railway network at the Application Site is presented in Figure 4-5 below.

N

Killashee

Lanesborough

Legend

- Application Boundary
- County Boundaries

Railway Network

- Railway Network

Bord na Móna

Figure 4.5: **Railway Network at the Application Site**

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-31	1:40,000	AK	25/03/2025

4.4.5.9 Railway Equipment

Extracted peat was transported from stockpiles on the Application Site via a series of permanent and temporary railway tracks. 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 on to 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 lattice work beam supported from the main frame to allow the passage of the rail sections through the machine. When six sections were built on the bolster bogies, they were hauled away by a locomotive. Plate 4-40 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-40: Rail Shifter (source: https://www.bordnamonalivinghistory.ie/equipment-detail/rail-shifter/)

Rail Moving Attachment

The purpose of the rail moving attachment was to lift and lay temporary railway track 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 and a longer jib was used for milled peat operations. Plate 4-41 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-41: Rail Moving Attachment to lift and lay temporary railway track, along sod peat ricks and milled peat piles. (source: https://www.bordnamonalivinghistory.ie/equipment-detail/rail-moving-attachment/)

Locomotive 80HP (Wagonmaster)

The locomotive hauled peat from the stockpiles across the Application Site to their required end destination (i.e. Lanesboro Power Station, and later Lough Ree Power Station, the tiphead for public sale up to 1984, or to Mountdillon Works following the closure of Lough Ree Power Station in December 2020). 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 4-42 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-42:Locomotive with wagons (source: https://www.bordnamonalivinghistory.ie/equipment-detail/diesel-locomotive/)

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 track. 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, if wheel hubs were fitted..

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 4-43 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4-43: Rail Car (source: https://www.bordnamonalivinghistory.ie/equipment-detail/rail-car/)

4.4.6 Site Services

Water consumption across the Application Site is primarily at the Mountdillon Works for domestic use. The water supply at Mountdillon Works is from the Lanesborough Public Water Scheme (PWS) which is supplied from two groundwater boreholes; one located at Lisreevagh to the west, and one located to the northwest next to the former Lanesborough Power Station (LBPS).

Wastewater from the welfare facilities at the Mountdillon Works is, discharged to an on-site septic tank with the effluent discharged to a percolation system through peat before penetrating to ground. The septic tank is inspected and de-sludged annually by a licenced waste permit holder to ensure the treatment system is working optimally.

Electricity supply to Mountdillon 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. There are existing 110kV and 38kV overhead power lines which cross the Application Site to the south of the Mountdillon Works and at the northern end of Derryaroge Bog.

Compressed air (oxygen and acetylene) are used mainly at the Mountdillon Works for welding and cutting purposes to maintain plant and equipment.

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

4.5 1949 TO 1988 – INITIAL DEVELOPMENT & PEAT EXTRACTION (PRE-EIA DIRECTIVE)

4.5.1 Site Description 1949 (Pre-Extraction)

Prior to the commencement of drainage, which first occurred on the Application Site in 1949, 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. The topography across the site prior to the onset of peat extraction activities is estimated to be 39 – 62 mOD. These estimations have been deduced from the 6inch OSI maps where point data is available.

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 the peat extraction activities and all ancillary works 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, welfare facilities and peat loading facilities.

During the Peat Extraction Phase of the project, only minimal land use change occurred which predominantly related to minor annual topographic changes caused by ongoing peat extraction activities and all ancillary works. While peat extraction activities and all ancillary works were ongoing it was not possible to rehabilitate the underlying peatland.

4.5.2 Drainage and Peat Extraction

The timing of the installation of drainage and initiation of peat extraction varied across the Application Site. Derryaroge Bog was the first bog to commence clearance and drainage in 1949 and would have experienced a relatively abrupt change in land cover with the commencement of peat extraction in 1952. Sod peat extraction commenced in Derryaroge in 1952, which, according to annual reports from the time, assisted with the overall drainage of the bog by removing the acrotelm (see Section 4.4.1 above for description on process of removal of acrotelm/top layer of bog). Clearance and drainage works on Derryadd and Lough Bannow Bogs commenced in 1960.

The earliest aerial imagery available (1973) confirms that that time, drainage to facilitate peat extraction was already inserted at Derryaroge, Derryadd and Lough Bannow bogs. Figure 4-9 below presents the extent of peat extraction at the Application Site in 1973, which has been

deduced from the earliest available aerial imagery for the Application Site (i.e. 1973). All aerial imagery available for the Application Site is included in Appendix 4.5.

The primary and greatest land-use change associated with the peat extraction activities and all ancillary works on the Application Site occurred during the initial drainage and vegetation removal of the bogs in advance of peat extraction activities and all ancillary works. This impact would have predominantly occurred in advance of 1988 at the Application Site. 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 4-1: 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
Derryaroge Bog	1949	1952	July 2019
Derryadd Bog	1960	1964	July 2019
Lough Bannow Bog	1960	1964	July 2019

Table 4-2 describes the general activities within the Application Site over a calendar year during each of the four quarters from 1952, 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. Fuel handling and refuelling would have increased significantly during the peat extraction season due the increased activity of the peat extraction machinery.

Table 4-2: Annual peat extraction activities at the Application Site 1952 – 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/protection/removal, peat transportation
October to December	Drain/Machinery/Pump/Silt Pond maintenance, Stockpile removal, peat transportation

4.5.3 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 4.4.3.1 and 4.4.3.2 were created by machine excavators at specific intervals, depending on whether milled or sod 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. Appendix 4.19 contains the Planning Drawing Pack which shows the detailed drainage across the Application Site.

4.5.3.1 Derryaroge Bog

Drainage works first commenced in Derryaroge Bog by 1949 according to Bord na Móna Annual Reports from that time. The earliest available aerial imagery dating from 1973 shows both milled and sod peat drainage inserted at Derryaroge Bog. In 1988, there were 11 no. pumps, 6 no. silt ponds, and 10 no. surface water emission points installed on Derryaroge Bog.

4.5.3.2 Derryadd Bog

Bord na Móna Annual Reports indicate that Derryadd Bog was first drained in 1960, and aerial imagery from 1973 shows that drainage at Derryadd Bog consisted of milled peat drainage, . By 1988, there were at least 3 no., and up to 6 no. pumps installed at Derryadd Bog. The uncertainty around the number of pumps in situ as of 1988 is a result of the uncertainty of the date of installation of 3 no. pumps which are present on the bog. For the purposes of this rEIAR, it is assumed that these pumps were in place at the 1988 baseline. As of 1988, there were 2 no. silt ponds installed at Derryadd Bog, and 5 no. surface water emission points in place.

4.5.3.3 Lough Bannow Bog

Bord na Móna Annual Reports indicate that similarly to Derryadd Bog, Lough Bannow Bog was first drained in 1960, with the aerial imagery from 1973 showing that the drainage at Lough Bannow Bog consisted of milled peat drainage. There are 3 no. pumps located at Lough Bannow Bog. The date of installation of these pumps is not known. For the purposes of this rEIAR, it is assumed that these 3 no. pumps were in place at the 1988 baseline. There are 4 no. surface water emission points in place on Lough Bannow bog, all of which were in place pre-1988. At present, there are 5 no. silt ponds located on Lough Bannow Bog, 3 no. of which were installed between 1988 and 1995. The installation date of the remaining 2 no. silt ponds is unknown. For the purposes of this rEIAR, it is assumed that the installation dates of the 2 no unknown silt ponds was pre-1988, and as such, they were in place at the 1988 baseline.
The extent of the drainage network in place in Derryaroge, Derryadd and Lough Bannow Bogs and timelines of installation associated with same are outlined in Figures 4.6, 4.7 and 4.8 respectively.

N

Legend

- Application Boundary
- Pre - 1988 Discharge Points
- P05_09 Drain

Pump Sites

- 1988 - 1995
- Decommissioned
- Not Known
- pre - 1988

Silt Ponds

- 1988 - 1995
- Pre - 1988
- Not Known

Derryadd Enhanced Drainage

- Decommissioned
- Not Known (Post-1995)
- Pre-1988 Upgraded Post-1995
- Pre-1988 Main Drainage Channels (Including rehabilitation area)

Bord na Móna

Figure 4-6:

Derryarogue Bog Drainage Network

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-26	1:19,000	AK	24/03/2025

N

IO-1 IO-2 IO-3 IO-4 IO-5 IO-6 IO-10 IO-31 EO-2 EO-6 IO-10 IO-40 IO-11 IO-11 IO-11 IO-11 EO-10 IO-16 EO-10 IO-15 EO-8 EO-7 EO-7 IO-12 IO-12 IO-12 EO-9 IO-14 IO-14 IO-23 EO-10 IO-13 IO-13 IO-30 IO-13 IO-13 IO-13 EO-8 EO-12 IO-22

Legend

- Application Boundary
- Pre - 1988 Discharge Points
- P05_09 Drain

Pump Sites

- Not Known
- pre - 1988

Silt Ponds

- 1988 - 1995
- Pre - 1988
- Not Known

Derryadd Enhanced Drainage

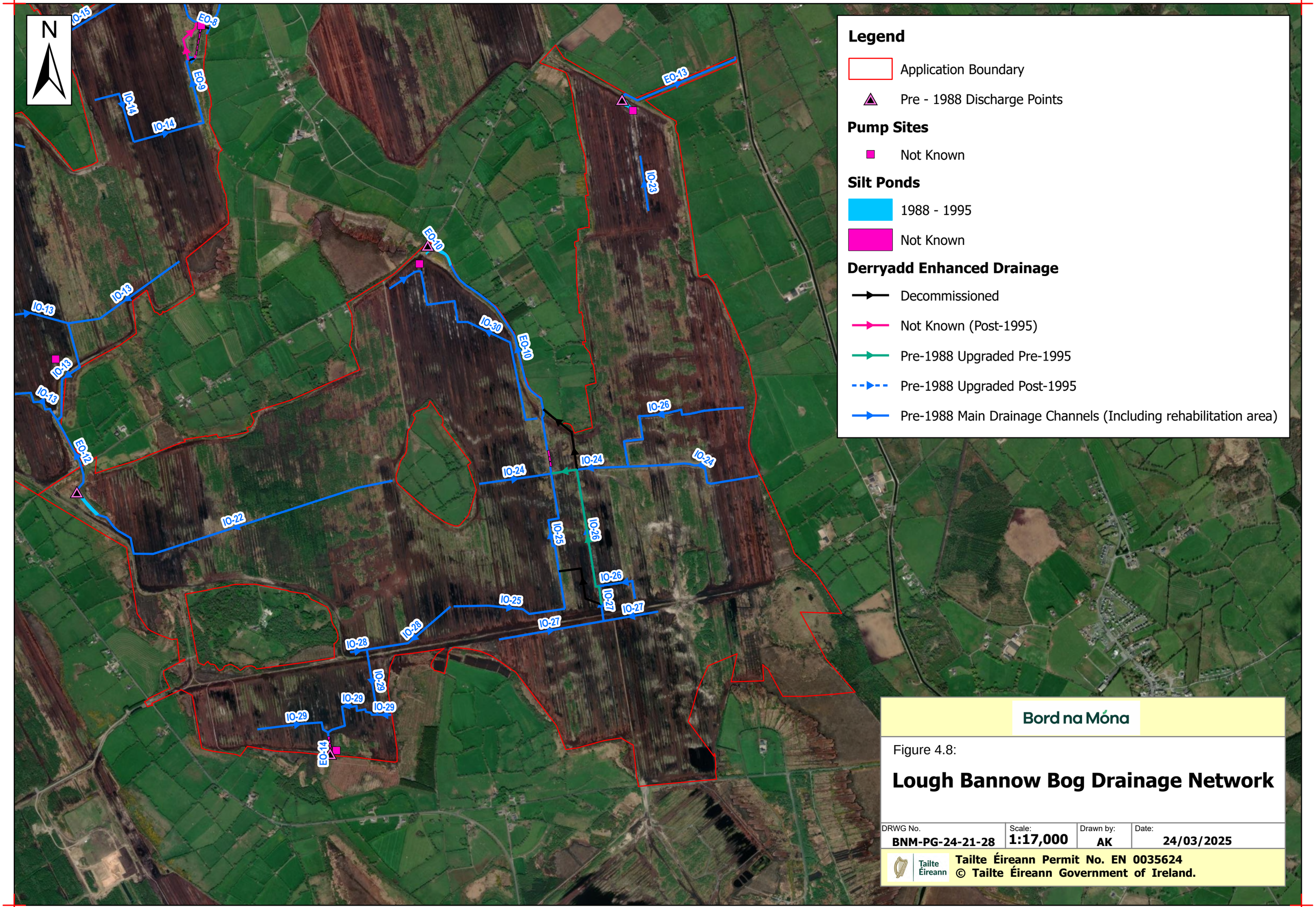
- Decommissioned
- Not Known (Post-1995)
- Pre-1988 Upgraded Pre-1995
- Pre-1988 Upgraded Post-1995
- Pre-1988 Main Drainage Channels (Including rehabilitation area)

Bord na Móna

Figure 4.7:

Derryadd Bog Drainage Network

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-27	1:18,000	AK	24/03/2025



Bord na Móna

Figure 4.8:

Lough Bannow Bog Drainage Network

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-28	1:17,000	AK	24/03/2025

Tailte Éireann

4.5.4 Peat Extraction Pre-1988

4.5.4.1 Background

As discussed in Chapter 5 - Planning Policy, the decision to commence peat extraction at the Application Site was closely linked to the decision of the Electricity Supply Board (ESB) to construct the 20MW sod peat-fired Lanesboro Power Station, located in Lanesborough, west of the Application Site. This initial 20MW installation, which was known as Unit 1 of Lanesboro Power Station, was planned and constructed on the basis of an agreement between ESB and Bord na Móna that the station would be fuelled with peat supplied exclusively by Bord na Móna, which was to be extracted from bogs in the surrounding area, including the Application Site. The sod peat-fired Unit 1 of Lanesboro Power Station was commissioned in 1958. Subsequently, a 40MW Unit 2 and 45MW Unit 3 of Lanesboro Power Station were commissioned in 1966 and 1983 respectively. Rather than sod peat, Unit 2 and Unit 3 were fired by milled peat, also supplied by Bord na Móna. Unit 1 of Lanesboro Power Station was closed in 1983, with Unit 2 and Unit 3 continuing to operate until 2004 and 2003 respectively. Lough Ree Power Station, a 100MW generating unit, was commissioned in 2004, and ultimately replaced the Lanesboro Power Station. Lanesboro Power Station was demolished in 2007.

4.5.4.2 Sod Peat Extraction 1952 to 1984

As noted in Section 4.5.2, peat extraction began at the Application Site in Derryaroge Bog in 1952 in the form of sod peat. Derryaroge Bog was the only bog within the Application Site which was subject to sod peat extraction. Before Lanesboro Power Station was commissioned in 1958, sod peat was extracted for domestic sale and to supply the Dublin market via trucks. Sod peat from Derryaroge Bog supplied Unit 1 of the LPS, from its opening in 1958, to its closure in 1983. The processes and machinery associated with sod peat extraction are described in Section 4.4.3.1.

Sod peat from the Application Site was also brought by rail to the tiphead in Derryaroge for sale to the public. In total, there were three tip heads located within the Mountdillon Bog Group; at Mountdillon Bog, Derraghan Bog, and Derryaroge Bog, all of which are located outside of the Application Site. Sod peat extracted from the Application Site which was transported off site via tiphead went exclusively through the tiphead at Derryaroge Bog. The tipheads at Mountdillon and Derraghan bogs closed in the 1970s, with the tiphead at Derryaroge remaining operational into the 1980s.

Sod peat extraction at Derryaroge Bog ceased in 1984 following the closure of LPS Unit 1. Following the cessation of sod peat extraction in Derryaroge Bog, the areas of sod peat extraction were converted to milled peat extraction (i.e. the drainage infrastructure was amended to facilitate milled peat extraction) to allow peat from Derryaroge Bog to continue to supply Lanesboro Power Station.

4.5.4.3 Milled Peat Extraction 1964 to 1988

Milled peat extraction commenced at the Application Site in 1964. From 1966, milled peat from the Application Site was sent to Lanesboro Power Station to supply the newly-commissioned milled peat-fired Unit 2 and Unit 3 of the power station. The processes and machinery associated with milled peat extraction are described in Section 4.4.3.2.

During the period from 1964 to 1988 milled peat was the predominant form of peat extraction ongoing throughout the Application Site. Milled peat was the only form of peat extraction

undertaken on Derryadd and Lough Bannow bogs. From 1984 onwards, following the cessation of sod peat extraction in Derryaroge Bog, milled peat extraction was the only form of peat extraction at the Application Site. Figure 4-9 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, 1995, 2004, and 2019. Labels are added to the imagery to identify the three bogs within the Application Site as well as neighbouring bogs.

Milled peat was transferred from the stockpiles into railway wagons by a loading machine or excavator and transported by rail to the power station at Lanesborough exclusively during this time period.

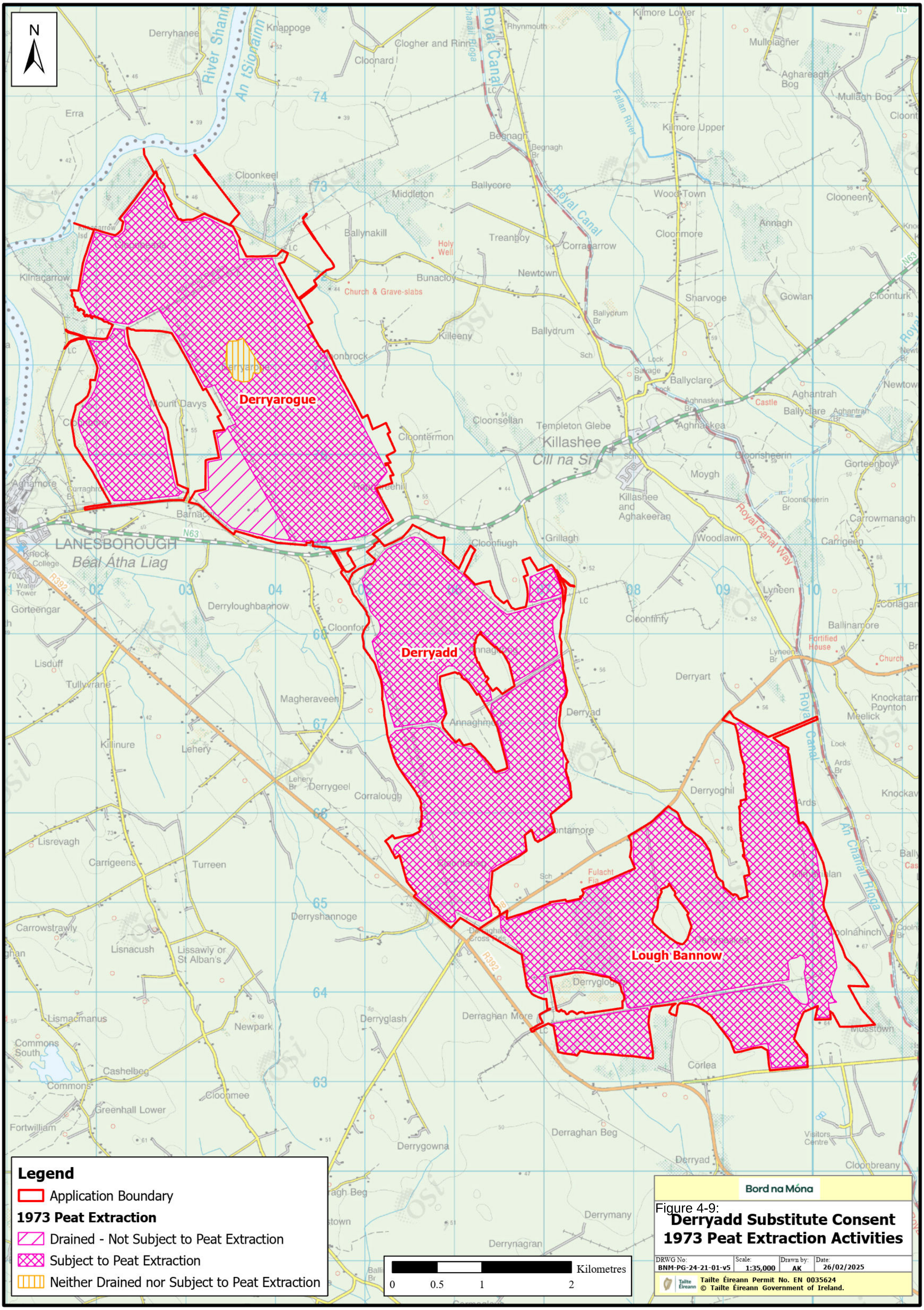


Figure 4-9:
Derryadd Substitute Consent
1973 Peat Extraction Activities

4.5.4.4 Peat Extraction Volumes 1952 - 1988

It is estimated that approximately 60,000 tonnes of sod peat were extracted annually from Derryaroge Bog between 1952 and 1984, which would have been predominantly delivered to Unit 1 of the LPS between 1958 and 1984. Smaller volumes of sod peat were transported by rail to the tiphead at Derryaroge Bog, north of the Mountdillon Works, for public sale.

It is estimated that approximately 329,000 tonnes of milled peat was produced annually at the Application Site between 1964 and July 1988, with deliveries of stockpiled peat to the LPS (Unit 2 and 3) occurring from 1966 onwards. While Unit 2 of LPS opened in 1966, milled peat extraction started earlier in 1964 to ensure that there was sufficient supply in stockpiles in the event of future bad harvests due to weather.

It is estimated that between the commencement of peat extraction at the Application Site in 1952 and July 1988, approximately 9,998,326 tonnes of peat was extracted (1,920,000 tonnes of sod peat from 1952 – 1984 and 8,078,326 tonnes of milled peat from 1964 – July 1988).

4.5.5 Control Measures pre-1988

With the exception of silt control (which from 1974 was subject to a formal management program as discussed in Section 4.5.6.9 below), formal documentation outlining dedicated measures referred to as control measures practised on site from 1948 - July 1988 are not available. However, based on personal communication with a retired Bord na Móna manager, the following measures below were enacted at the Application Site as part of daily, monthly, and annual bog management and operations and were outlined in the IPC Licence application submitted to the EPA in 1999.

4.5.5.1 Peat Extraction Machinery – Maintenance Programmes and Storage

- All peat extraction machinery listed in Section 4.4.4 were stored either at the Mountdillon Works, or at machine storage locations in Derryaroge, Derryadd, or Lough Bannow bogs at the end of the workday;
- All machinery was regularly inspected, serviced and maintained;
- 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,
- A self-contained machine parts washer was located in the workshop at the Mountdillon Works.

4.5.5.2 Refuelling Facilities

- Refuelling and maintenance of all vehicles were undertaken at the Mountdillon Works, or at machine storage locations in Derryaroge, Derryadd, or Lough Bannow bogs. 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 the Mountdillon Works to the bogs where the machinery was located. Refuelling procedures were upgraded to standard bunding specifications to comply with IPC Licence requirements in 2000 (refer to Section 4.4.5.4 for details).

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

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.

4.5.5.3 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):

- 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;
- 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;
- Each canteen/office were required to be equipped with a fire blanket and fire extinguisher;
- There were required to be at least one fire point at all office premises;
- Petrol and other oils were required to be stored in designated oil stores;
- Batteries were not charged in working areas unless suitable protection was provided;
- Training was provided for oxygen cylinder storage and use;
- 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.
- 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,
- Fire Safety Audits were undertaken at six monthly intervals along with random audits. Yearly assessments were undertaken of all audits completed.

4.5.5.4 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 Bord na Móna established a policy to preserve the vegetation and tree cover on all bog fringes and on any mineral islands[4]. In addition, the following measures were undertaken at a minimum to minimise dust emissions and later expanded under IPC Licence:

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

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

4.5.5.5 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.

4.5.5.6 Surface Water Management

Surface water run-off from the Mountdillon Works and hard standing areas drained via onsite surface water drainage systems, which were installed as part of the construction of buildings and hardstand areas over the decades, into the adjacent peatland surface water drainage network.

All machinery was regularly inspected and serviced. All machinery was regularly cleaned via power steam wash system at a wash bay which drained into an interceptor unit and associated gravel soak pit. There are 2 interceptor units which facilitated the removal of any oil/grease components. This was done to minimise dust and particle release.

Formal silt control measures adopted in 1974 are outlined in Section 4.5.6.9 below.

4.5.5.7 Maintenance Programme for Internal Drains

The internal drains were 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 drains and dispose of it by spreading it on the adjacent field. Drain maintenance was carried out using ditchers. These works were programmed to ensure that the drains servicing the peat extraction areas were fit for purpose. Drain maintenance was carried out mainly prior to and post the peat extraction season (i.e. between October and March).

4.5.5.8 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:

- Visual inspection of pumps daily;
- Operational check of pumps biweekly; and,
- Service of pumps monthly.

4.5.5.9 Silt Management

As part of the Third Development Programme in the 1970s, Bord na Móna 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 a memo sent to Mountdillon Works from the Bord na Móna Production Manager in March 1976 setting out the recommendations of the silt committee is included in Appendix 4.9. It is understood that this memo was sent to the Managers of all Bord na Móna Works sites including Mountdillon Works as the memo directs that *"At all milled peat bogs in production, works should carry out surveys and select sites for silt ponds as recommended"*. It is therefore assumed that Mountdillon works would have commenced the selection of sites for the establishment of silt ponds at the bogs around this time. Further Bord na Móna records show that silt pond measures were introduced across all Bord na Móna bogs in the early to mid-1980's in response to the 1977 *Water Pollution Act*. A number of silt ponds were installed at the Application Site pre-1988 to reduce sediment discharge from the extraction works. 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 4-10. 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 site.

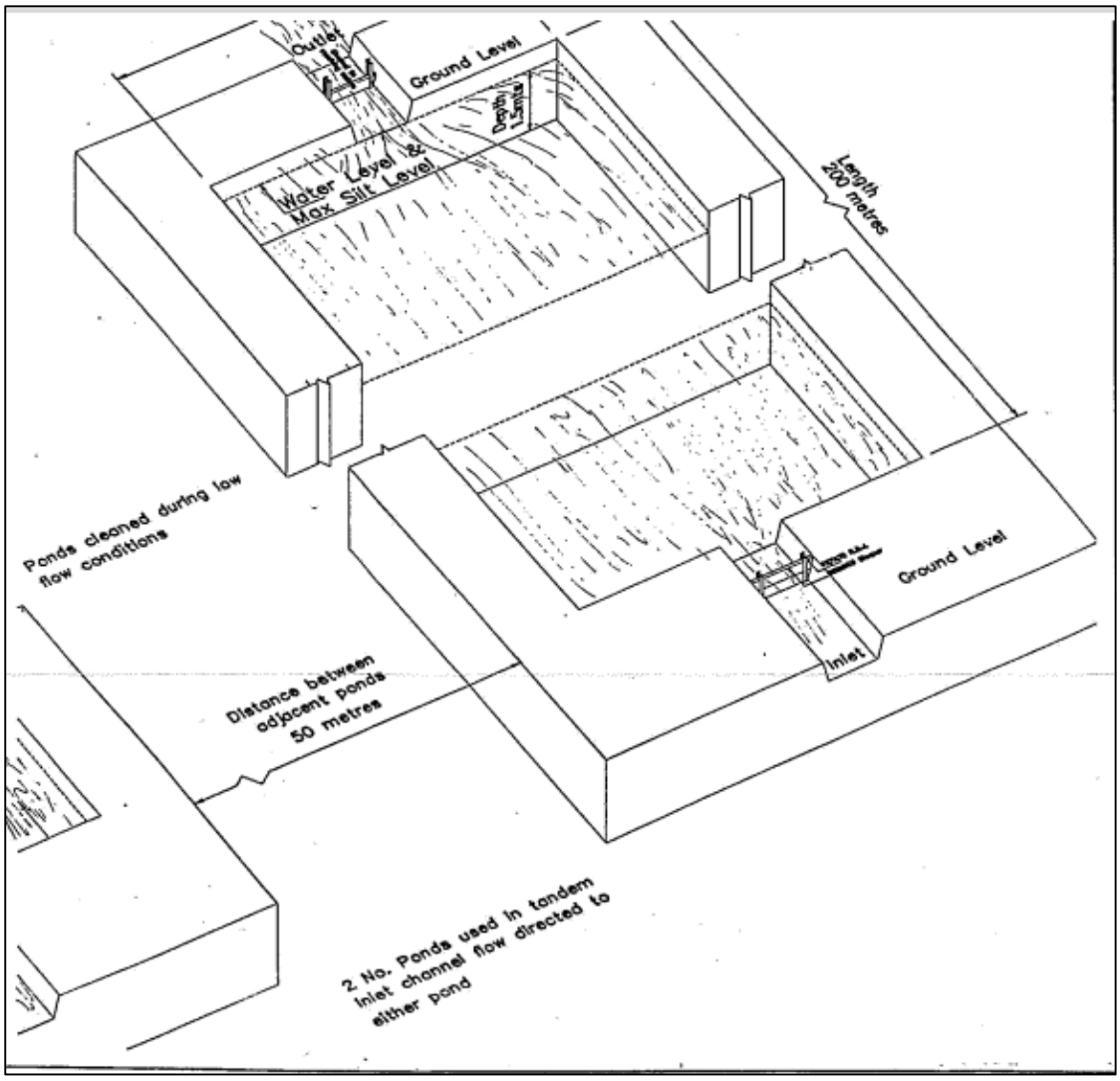


Figure 4-10: – Silt pond design implemented at the Mountdillon Bog Group (Source: Bord na Móna IPC Licence Application submitted to the EPA in 1999)

*Other records of Silt Committee meetings (April 1984 included in Appendix 4.10), attended by the Manager from the Mountdillon Bog Group, 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 [Bord na Móna] *effluents".*

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

4.5.5.10 Waste Management

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

- Waste oils and brake fluids drained from machinery during servicing were collected in drums and emptied to a designated waste oil storage tank;
- Waste oil storage tank contents were transported off-site by a licenced waste disposal contractor;
- Oil and fuel filters were changed at vehicle service intervals;
- Spent filters were collected and disposed of by a licensed waste disposal contractor;
- Used batteries were collected by licensed battery collection contractor;
- Off-washings form the self-contained machine parts washer were collected within a sludge tank at the workshops;
- 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;
- Waste polythene removed from stockpiles was collected at the roadside by a plastic recycling company; and
- 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.

4.5.5.11 Archaeological Disturbance

As part of peat extraction training, all employees hired to ork 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).

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 seven days. The Gardai would then contact the Commissioner of Public Works. A record of archaeological finds and observations within the Application Site can be found in Section 13.3. of Chapter 13: Cultural Heritage of this rEIAR.

4.6 JULY 1988 - REIAR BASELINE

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

As described in in Chapter 1 and Section 4.1, the application for substitute consent, and therefore this rEIAR, covers the period from July 1988, the timeframe for when the EIA Directive was required to be transposed into Irish Law, to present day. As such, 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. The activities carried out as of July 1988, combined with the activities from July 1988 onwards, form the Project. The remedial impact assessments are presented in the subsequent specialist chapters.

4.6.1 Site and Activity Description – 1988 rEIAR Baseline

By 1988, the land use at the Application Site was well established as industrial peat extraction. All bogs were fully drained and milled peat extraction was the only form of peat extraction taking place across the Application Site in 1988. As outlined in Section 4.4.3.1, sod peat extraction, which had been taking place exclusively in Derryaroge Bog, ended in 1984. Following the cessation of sod peat extraction, works to convert the drainage infrastructure from sod peat drainage (as described in Section 4.4.3.1) to milled peat drainage (as described in Section 4.4.3.2) commenced. It is not clear from records or aerial imagery when milled peat extraction commenced in the former sod peat extraction areas of Derryaroge, but aerial imagery indicates that by 1995, milled peat drainage had replaced sod peat drainage, with milled peat extraction underway by that time. For the purposes of this rEIAR, it is assumed that areas of sod peat drainage in Derryaroge Bog had been fully converted to milled peat drainage by 1988, with milled peat extraction underway at the time. In 1988, milled peat extracted from the Application Site was transferred via rail to Unit 2 and 3 of the Lanesboro Power Station for Station for electricity generation. The main entrance points to the Application Site were located at the Mountdillon Works off the N63 in the north of Derryadd bog, in the south of Derryaroge bog on the N63, and at the south of Lough Bannow via a local access road. Mountdillon Works, which comprised a canteen, storage sheds and maintenance buildings, is still in situ at present day. The following ancillary infrastructure was established at the site by July 1988:

- Railway infrastructure (all bogs within the Application Site);
- Internal machine passes/tracks (all bogs within the Application Site);
- Silt ponds and drains (all bogs within the Application Site); and
- Pumping stations (all bogs within the Application Site).

Figure 4-11 shows the extent of peat extraction across the Application Site in 1988.

Drain deepening and maintenance would have continued at the Application Site in 1988. As stated in Section 4.5.3, drainage channels were in place prior to 1988 as well as a number of silt ponds, outfalls, and pumps.

The total tonnage of peat extracted at the Application Site between July and December 1988 was 176,747 tonnes. The estimated topography of the Application Site in as of July 1988 is based on an average depth of milled peat extraction of 0.1m per year over a 31-year period, which has been worked back from the 2019 topography. As milled peat was the only form of peat extracted at the Application Site from 1984 onwards, this approach is considered to be the most robust in determining the topography in 1988.

4.6.2 1988 Peat Extraction Activities

Table 4-3 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 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 4-3: – 1988 Peat Extraction Activities

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/protection/removal, peat transportation
October to December	Drain/Machinery/Pump/Silt Pond maintenance, Stockpile removal, peat transportation

There are no detailed records for peat extraction volumes for 1988, therefore data for the years 1992 to 2001 (refer to Section 4.7.2 and Table 4-4 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 176,747 tonnes of milled peat would have been extracted from the Application Site between July and December 1988.

4.7 PEAT EXTRACTION PHASE 1988 – 2019 (DRAINAGE, PEAT EXTRACTION & ASSOCIATED ACTIVITIES)

As demonstrated above, by 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.

4.7.1 Drainage Design

During the Peat Extraction Phase, the deepening and maintenance of drainage channels continued beyond 1988, up until the cessation of peat extraction in 2019. As the areas subject to peat extraction from 1988 to 2019 reduced in their extent (refer to Figures 4-11 to 4-14) and the depth of peat available was subsequently reducing, the extent and number of drains requiring deepening and maintenance reduced accordingly.

Machinery used for drainage works would have been largely the same as that described in Section 4.4.2 with ever-improving engine efficiency in tractors and excavators.

Drainage construction methodologies are described in Sections 4.4.2, 4.4.3.1 and 4.4.3.2.

Derryaroge Bog

In 1988 milled peat extraction was continuing in northern and western sections of Derryaroge Bog. As previously discussed, Derryaroge Bog was the only bog unit within the Application Site which was subject to sod peat extraction. Sod peat extraction ceased in 1984, and works to convert the drainage infrastructure from sod peat drainage (as described in Section 4.4.3.1) to milled peat drainage (as described in Section 4.4.3.2) commenced. It is not clear from records or aerial imagery when milled peat extraction commenced in the former sod peat extraction areas of Derryaroge, but aerial imagery indicates that by 1995, milled peat drainage had replaced sod peat drainage in Derryaroge, with milled peat extraction underway by that time. For the purposes of this rEIAR, it is assumed that areas of sod peat drainage in Derryaroge Bog had been fully converted to milled peat drainage, with milled peat extraction underway in those areas by 1988. By 2004, only the northern and western side of Derryaroge remained subject to peat extraction. At the point of the cessation of peat extraction 2019, only a part of the southern extent of the bog was subject to peat extraction. By the end of the Peat Extraction Phase in 2019, 12 no. pumps (with 4 no. decommissioned), 9 no. silt ponds and 10 no. surface water emission points were in place, all of which remain in situ today. Of the 12 no. pumps, 11 no. were installed pre-1988 (4 no. of these are now decommissioned), with 1 no. pump installed between 1988 and 1995. Of the 9 no. silt ponds installed at Derryaroge Bog, 6 no. were installed pre-1988, and 3 no. installed between 1988 and 1995. All 10 no. surface water emission points were in place pre-1988.

Derryadd Bog

Drainage was fully inserted in Derryadd Bog by 1988, with the full extent of the drained area subject to milled peat extraction. Between 1995 and 2004, peat extraction ceased in some areas in the centre of the bog and revegetation began to occur. At the point of the cessation of peat extraction in 2019, peat extraction was occurring near the east and west boundaries, with extraction also occurring a in portion of northeast corner of Derryadd bog. There are 6 no. pumps located in Derryadd Bog; at least 3 no. of which were installed and operational pre-1988, with the installation of the remaining 3 no. pumps unknown. There are 5 no. silt ponds, 2 no. of which were installed pre-1988, with the remaining 3 no. installed between 1988 and 1995. There are 5 no. surface water emission points, all of which were in place pre-1988.

Lough Bannow Bog

Drainage was fully inserted in Lough Bannow bog by 1988, with the full extent of the drained area subject to milled peat extraction. By 1995, peat extraction had ceased on the western side of the bog, and by 2004, extraction had also ceased on the eastern side of the bog. The areas subject to peat extraction gradually reduced in Lough Bannow bog between 2004 and 2019, and at the point of the cessation of peat extraction in 2019, only areas on the northeastern southern boundaries were subject to peat extraction. There are 3 no. pumps on Lough Bannow Bog; the installation dates of these pumps are unknown. There are 5 no. silt ponds, 3 no. of which were installed between 1988 and 1995. The installation date of the remaining 2 no. silt ponds is unknown. There are 4 no. surface water emission points in place on Lough Bannow bog, all of which were in place pre-1988.

Silt Ponds

Upgrades to silt ponds were undertaken at the Application Site following a 1990 survey undertaken by Bord na Móna which involved a daily sampling and analysis programme at

different locations in the Bord na Móna landholdings (including the Mountdillon Bog Group) 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 4.7) 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 (which is included in Appendix 4.1) details the requirements for Bord na Móna 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. 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.

4.7.2 Peat Extraction

Milled peat extraction, under the same processes described in Section 4.4.3.2, continued at the Application Site from 1988 until July 2019, at which point peat extraction permanently ceased across the Application Site. Improvements and modernisation of machinery occurred between 1988 and 2019 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 2019 assessment period (i.e., from late 1990s/2000 onwards), peat extraction gradually slowed down and then ceased permanently in July 2019 across the Application Site, with a corresponding reduction in fuel handling/refuelling, machinery maintenance and stockpile development.

Peat extraction maps for the years 1995, 2004, and 2019 are presented in Figures 4-12, Figure 4-13 and Figure 4-14 and illustrate the extent of extraction activity at the Application Site over time, including at the point of the cessation of peat extraction in 2019. Corresponding aerial images for the years 1995, 2004, and 2019 are included in Appendix 4.5.

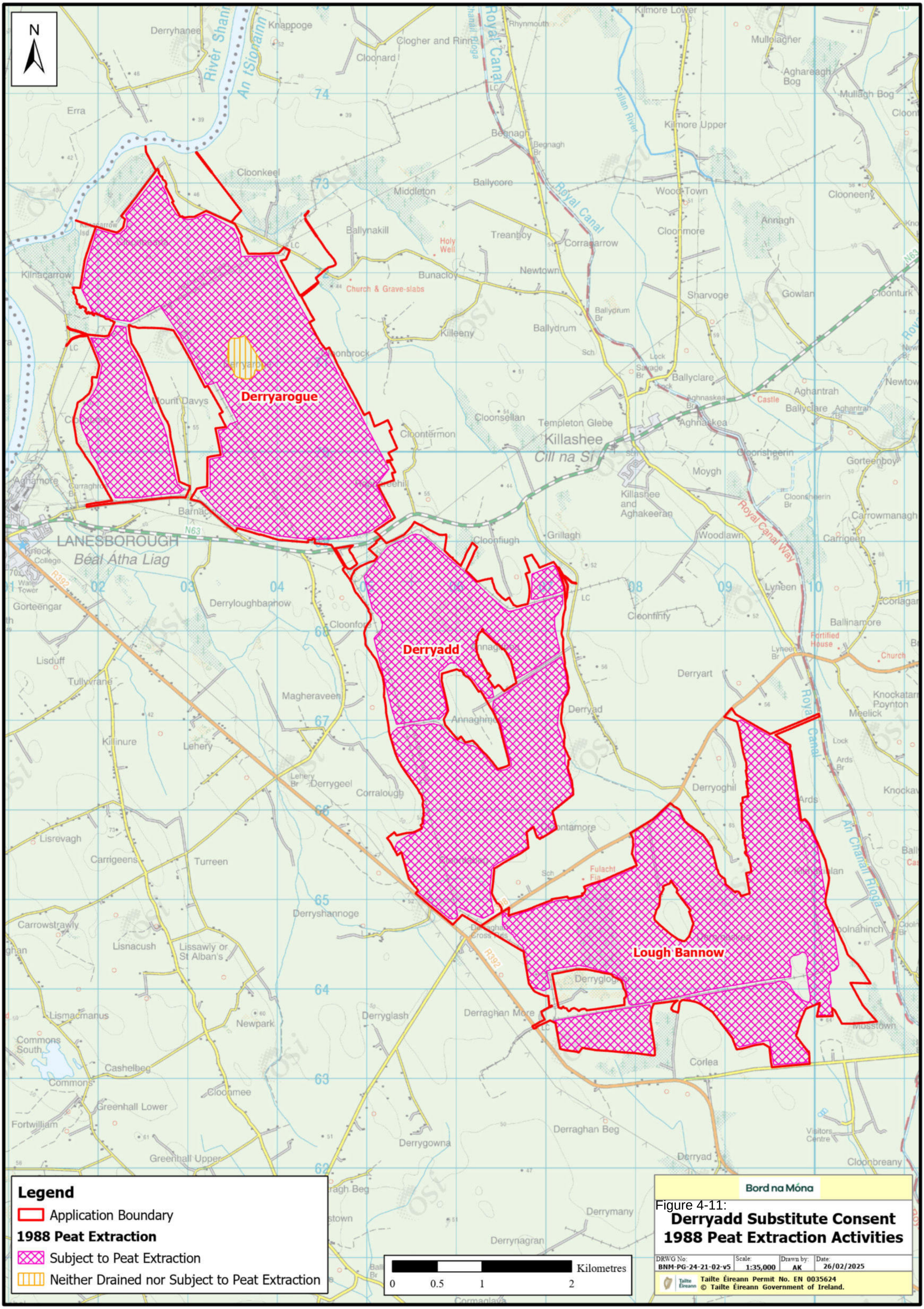

N
Derryarogue
Derryadd
Lough Bannow
Legend
Application Boundary
1988 Peat Extraction
Subject to Peat Extraction
Neither Drained nor Subject to Peat Extraction
0
0.5
1
2
Kilometres
Bord na Móna
Derryadd Substitute Consent
1988 Peat Extraction Activities
DRWG No: BNM-PG-24-21-02-v5
Scale: 1:35,000
Drawn by: AK
Date: 26/02/2025
Tailte Éireann Permit No. EN 0035624
© Tailte Éireann Government of Ireland.

Figure 4-11:

Figure 4-12:

Derryadd Substitute Consent
1995 Peat Extraction Activities

Bord na Móna

DRWG No:	Scale:	Drawn by:	Date:
BNM-PG-24-21-03-v5	1:35,000	AK	26/02/2025

Legend

- Application Boundary

1995 Peat Extraction

- Drained - Not Subject to Peat Extraction
- Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction

Kilometres
0 0.5 1 2

Derryarogue
Derryadd
Lough Bannow

N

Derryarogue

Derryadd

Lough Bannow

Legend

Application Boundary

2004 Peat Extraction

Drained - Not Subject to Peat Extraction

Subject to Peat Extraction

Neither Drained nor Subject to Peat Extraction

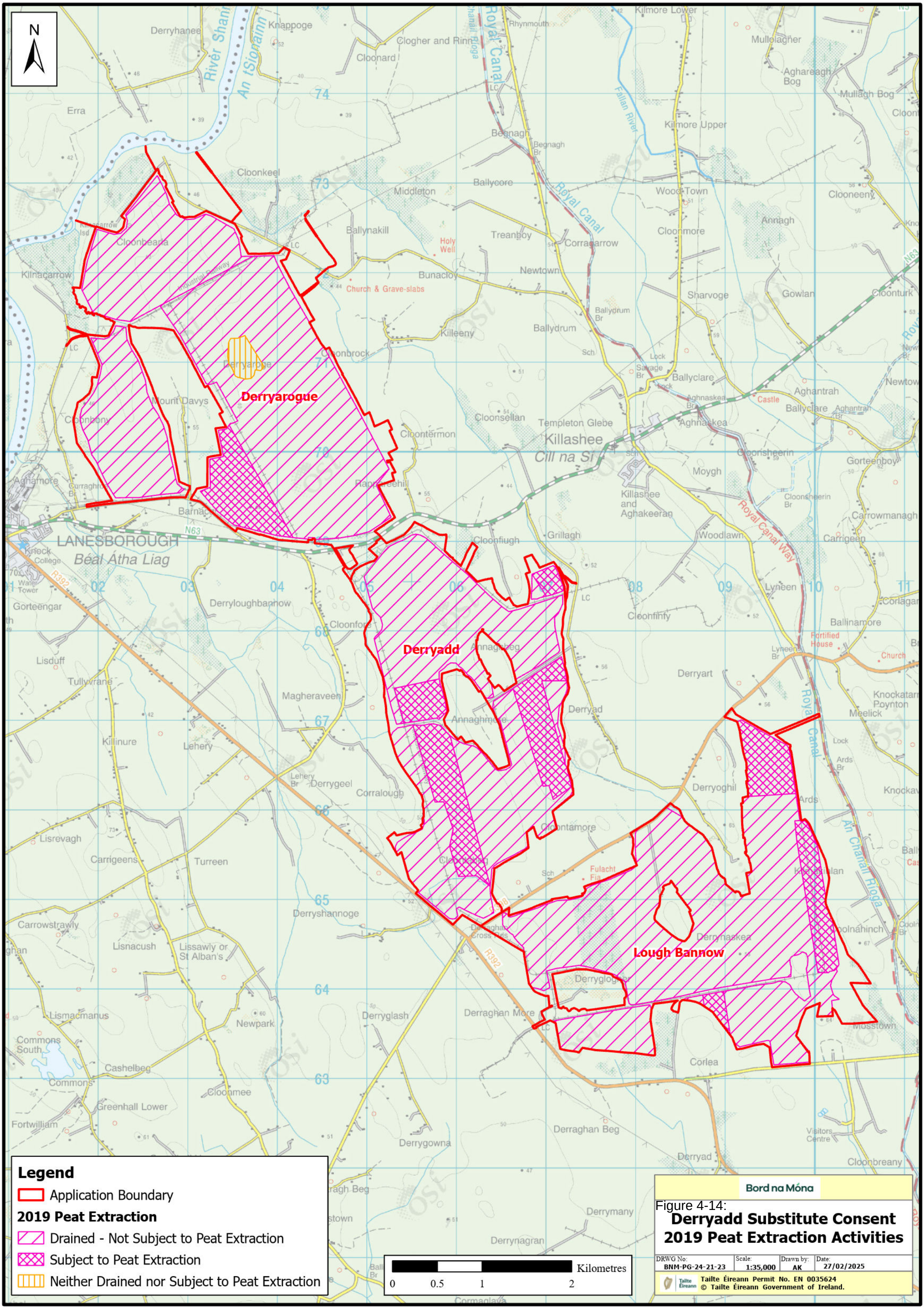
0 0.5 1 2 Kilometres

Bord na Móna

Figure 4-13:

Derryadd Substitute Consent
2004 Peat Extraction Activities

DRWG No:	Scale:	Drawn by:	Date:
BNM-PG-24-21-04-v5	1:35,000	AK	26/02/2025


N
Derryhanee
Knappoge
River Shannon
An tSionainn
Clogher and Rinn
Cloonard
Royal Canal
Rhynmouth
Kilmore Lower
Mullolagher
Aghareagh Bog
Mullagh Bog
Erra
Fallan River
Kilmore Upper
Begnagh
Begnagh Br
Cloonkeel
Ballycore
Middleton
Wood Town
Clooneeny
Annagh
Cloonmore
Ballynakill
Holy Well
Treanboy
Corracarrow
Cloonbearla
Kilnacarrow
Bunacloy
Newtown
Church & Grave-slabs
Sharvoge
Gowlan
Cloonturk
Ballydrum Br
Killeeny
Ballydrum
Cloonbrock
Derryarogue
Derryarogue
Lock
Savage Br
Ballyclare
Aghantrah
Mount Davys
Aghnaskea Br
Castle
Ballyclare
Aghantrah Br
Cloonbony
Cloonsellan
Templeton Glebe
Killashee
Cill na Sí
Cloontermon
Aghnaskea
Cloonsheerin
Gorteenboy
Moygh
Killashee and Aghakeeran
Cloonsheerin Br
Carrowmanagh
Barnacurragh
Rapparee Hill
Grillagh
Woodlawn
Carrigeen
Royal Canal Way
Cloonfiugh
LANESBOROUGH
Béal Átha Liag
Knock College
Water Tower
Gorteengar
Derryloughbannow
Cloonfore
Cloonfinfy
Lyneen
Corlagar
Ballinamore
Derryadd
Annaghbeg
Fortified House
Church
Lisduff
Tullyvrane
Derryart
Magheraveen
Annaghmore
Derryad
Knockatarn
Poynton
Meelick
Killinure
Lehery
Lehery Br
Derrygeel
Corralough
Derryoghil
Ards
Ards Br
Lisrevagh
Carrigeens
Turreen
Derryshannoge
Carrowstrawly
Lisnacush
Lissawly or St Alban's
Lough Bannow
Derryglogher
Derryhaskea
Derraghan More
Derryglash
Newpark
Lismacmanus
Commons South
Cashelbeg
Commons
Cloonmee
Greenhall Lower
Fortwilliam
Derraghan Beg
Derrygowna
Derrymany
Derrynagran
Corlea
Visitors Centre
Cloonbreany
Legend
Application Boundary
2019 Peat Extraction
Drained - Not Subject to Peat Extraction
Subject to Peat Extraction
Neither Drained nor Subject to Peat Extraction
0
0.5
1
2
Kilometres
Bord na Móna
Figure 4-14:
Derryadd Substitute Consent
2019 Peat Extraction Activities
DRWG No: BNM-PG-24-21-23
Scale: 1:35,000
Drawn by: AK
Date: 27/02/2025
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4.7.3 Peat Extraction Volumes July 1988 to 2019

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 1988 to 2019 are set out in Figure 4.15 and Table 4-4. There are no detailed records for peat extraction volumes between 1988 and 1991, therefore data for 10-year period between 1992 and 2001 have been selected as a representative sample from which an average value has been calculated to represent peat extraction volumes in the 1988 to 1991 period. Figure 4-16 shows the locations of existing silt ponds within and adjacent to the Application Site.

Between July 1988 and July 2019, an average of 288,215 tonnes of peat were extracted each year, with a total of approximately 9,222,879 tonnes extracted between July 1988 and the cessation of peat extraction in July 2019. There was a closing stock of milled peat recorded for the 2019 season of 84,008 tonnes at the point of the cessation of peat extraction. This closing stock was subsequently systematically transferred by rail to Lough Ree Power Station until the power station ceased operations in December 2020. Following the closure of Lough Ree Power Station, stockpiles were removed to Edenderry Power Station and Derrinlough Briquette Factory. During the Peat Extraction Phase, Bord na Móna 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. 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 4-4, the most productive extraction year was 1993 with 645,731 tonnes extracted this season. The least productive extraction year was 2002 with 124,952 tonnes. The year of 2019 doesn't represent a full extraction year as peat extraction ceased early in July 2019.

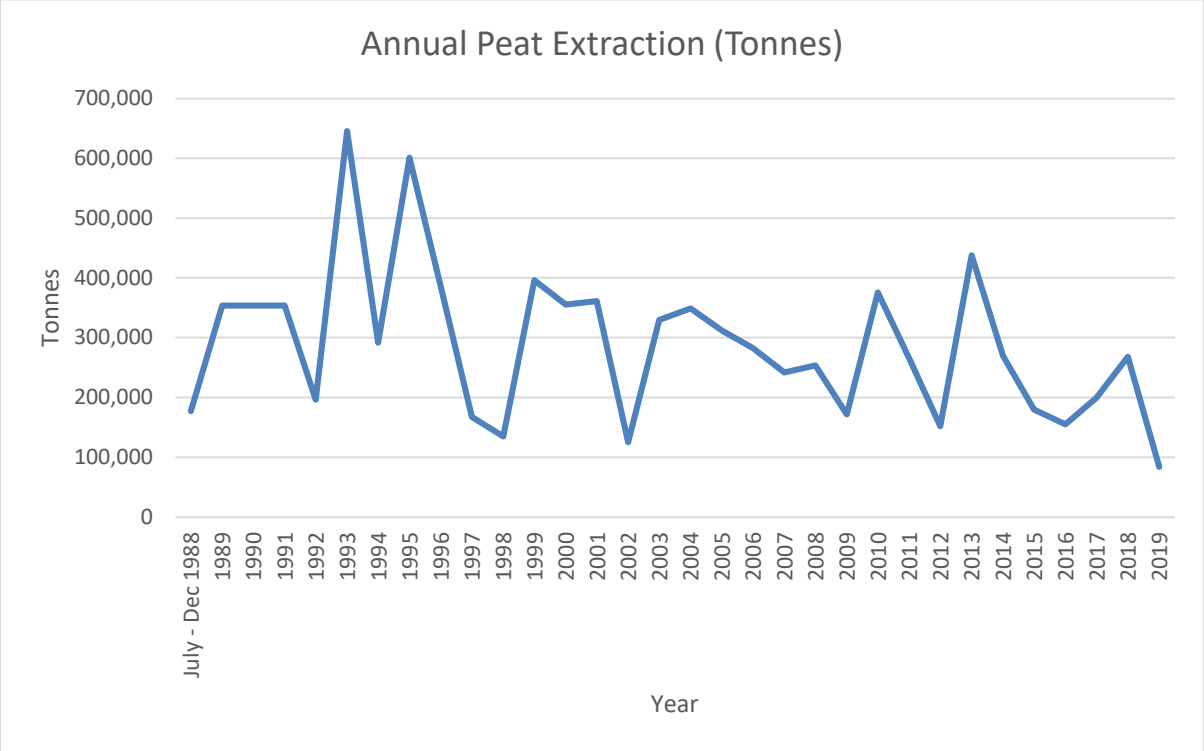


Figure 4-15: Annual Peat Extraction Volumes July 1988 – July 2019

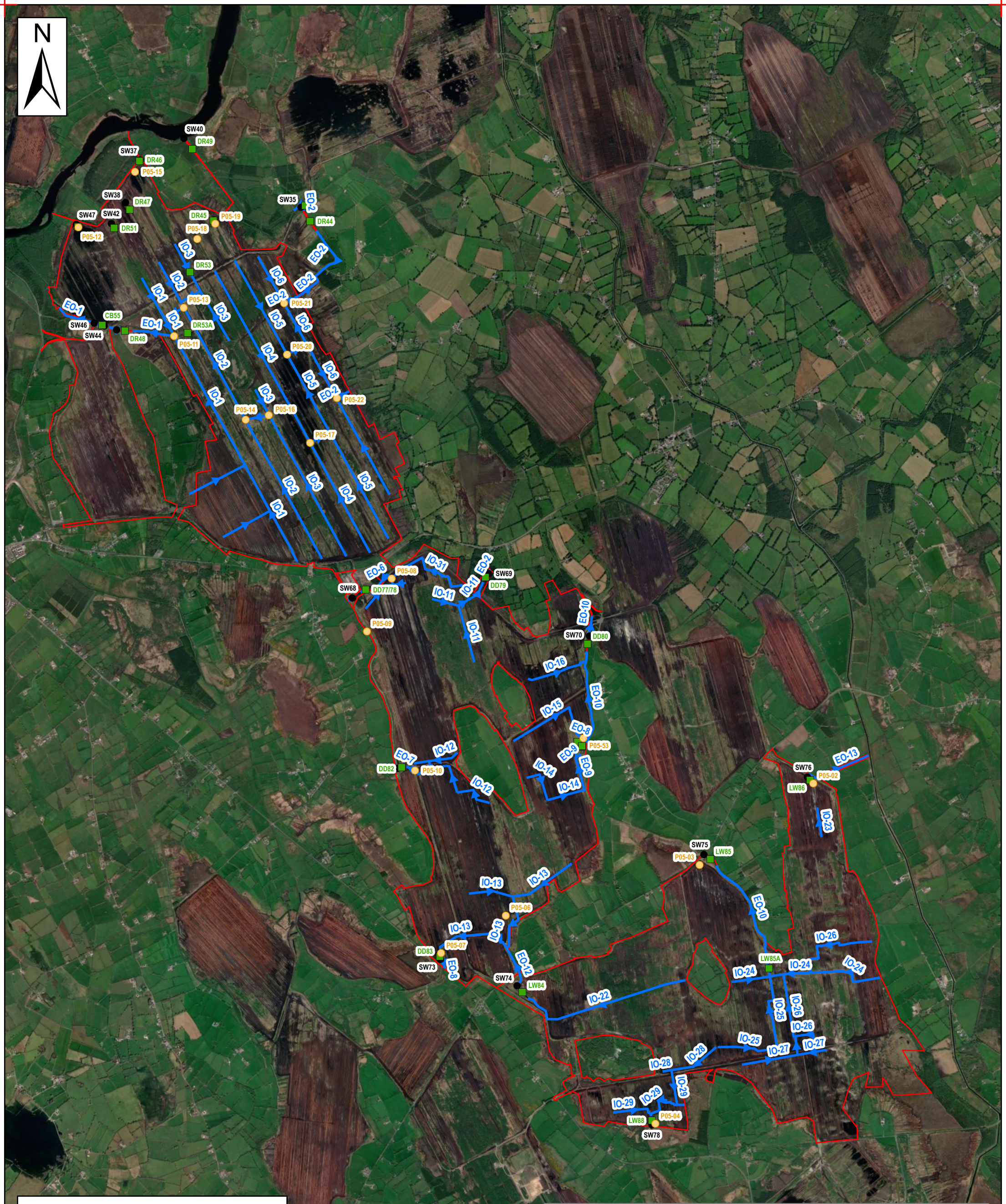
Table 4-4: Annual peat extraction quantities for the period 1988 to 2019

Year	Annual Extraction (Tonnes)
July – December 1988*	176,747**
1989	353,493**
1990	353,493**
1991	353,493**
1992	196,266
1993	645,731
1994	291,430
1995	600,739
1996	386,862
1997	167,239
1998	134,561
1999	395,820
2000	355,023
2001	361,257
2002	124,952
2003	329,375
2004	348,936
2005	312,112
2006	282,405
2007	241,904
2008	253,686
2009	171,506
2010	375,757
2011	265,415
2012	151,635
2013	437,822
2014	269,654
2015	179,391
2016	154,839
2017	199,266
2018	268,062
January - July 2019	84,008***
Total	**9,222,879**

**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 1992 and 2001 in the absence of accurate data.*

****Peat extraction at the Application Site came to an end midway through this year leading to a lower annual extraction volume compared to previous years.*


N
SW40
DR49
SW37
DR46
P05-15
SW38
DR47
SW47
SW42
DR51
P05-12
DR45
P05-19
P05-18
SW35
EO-2
DR44
IO-3
DR53
IO-1
IO-2
P05-13
EO-1
CB55
SW46
SW44
DR48
DR53A
P05-11
IO-4
P05-21
IO-5
IO-6
P05-20
P05-22
P05-14
P05-16
P05-17
SW68
DD77/78
P05-08
SW69
DD79
IO-31
IO-11
EO-6
P05-09
SW70
DD80
EO-10
IO-16
IO-15
EO-8
P05-53
EO-9
DD82
P05-10
EO-7
IO-12
IO-14
SW76
P05-02
LW86
EO-13
IO-23
SW75
P05-03
LW85
IO-13
P05-06
DD83
P05-07
SW73
SW74
LW84
EO-12
LW85A
IO-24
IO-26
IO-22
IO-25
IO-27
IO-28
IO-29
LW88
P05-04
SW78
Legend
Substitute Consent Boundary
Internal/External Outfall
Pump Sites
Silt Ponds
Discharge Points
Bord na Móna
Figure 4-16:
Drainage System
DRWG No.
BNM-PG-24-21-29
Scale:
1:35,000
Drawn by:
AK
Date:
24/03/2025
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4.7.4 Ancillary Activities 1988 to 2019

As outlined in Section 4.4.5 there were various ancillary structures and features associated with peat extraction activities at the Application Site.

The Mountdillon Works served as the central location for support services, including workshops, offices, and welfare facilities. These facilities were primarily used for the maintenance and repair of machinery associated with peat extraction and ancillary activities. The offices at Mountdillon 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 4.4.5.1, the workshops and offices at the Mountdillon Works were built 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, known as Tea Centres, were scattered across the Application Site. These facilities provided workers with a clean area for taking breaks and welfare services.

As outlined in Section 4.4.5.4, fuel for machinery was, and still is, stored in above-ground tanks with bunding to prevent fuel spills or leaks. These tanks are located at the Mountdillon Works, and refuelling procedures were upgraded to comply with licensing requirements in 2000. The Mountdillon Works yard included a peat loading facility, described in Section 4.4.5.5, with a weighbridge for accurate recording of peat tonnages and deliveries.

Described in Section 4.4.5.7 above, during the Peat Extraction Phase, a 36-inch gauge railway system was the exclusive means of transporting milled peat from the bogs of the Application Site to the nearby Lanesboro Power Station up to 2004, and to Lough Ree Power Station from 2004 to 2020. The steel rails, with a weight of 30lbs to 35lbs per yard, were mounted on steel sleepers, with some areas using heavier rails on creosoted pine or redwood sleepers. Approximately 37km of permanent track existed within the Application Site during these period, and temporary tracks were laid as needed to transport peat from stockpiles to the power station or the central peat loading facility at Mountdillon Works. These temporary tracks were typically 30-foot sections, laid and lifted using special equipment. The construction of permanent rail beds depended on proper drainage, and various level crossings were installed. Diesel locomotives were used to pull peat-filled wagons, which were equipped with lids to prevent the release of dust during transportation.

4.7.5 Control Measures 1988 to 2000

Post-1988, but prior to the implementation of the IPC Licence at the Application Site in 2000, the environmental management measures set out in Section 4.5.6, remained in place across the Application Site. In addition, as evidenced in the 1991 Harkins Report (see Appendix 4.7), silt control measures in the form of silt ponds were in place prior to 1988, with Bord na Móna 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.

4.7.5.1 Archaeological Code of Practice

Bord na Móna 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 Bord na Móna 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 Bord na Móna Bogs, with the results being forwarded for inclusion in the Sites and Monuments Record.

Since 1998, Bord na Móna 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 Bord na Móna. The Agreed Principles set out 10 standards within which archaeology in the Bord na Móna peatlands were managed. Five Archaeological Liaison Officers were spread across the Bord nan Móna Bog Groups and received training on how to deal with and report finds. Since 1998, all archaeological surveys were funded by Bord na Móna. 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 Bord na Móna had been subject to archaeological survey.[5]

A Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna was established in 2012.[6] This Code superseded the Agreed Principles. The Code provided a framework within existing legislation, policy and practice to enable Bord na Móna to progress with peat extraction activities and all ancillary works and simultaneously ensure archaeological control measures is in place. The measures Bord na Móna are responsible for are listed below:

Bord na Móna will

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

[6] 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

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.*

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

Bord na Móna was granted an IPC Licence (Reg. No. P0504-01) for the Mountdillon 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 4.7.5 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, Bord na Móna 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.

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 9 Hydrology and Hydrogeology of this rEIAR and the Annual Environmental Reports (AER) included as Appendix 4-4 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 outline 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 10: 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 Bord na Móna 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 9 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 7 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 site is decommissioned, where applicable.

4.7.6.1 Standard Operation Procedures

To facilitate the production of AERs, Bord na Móna 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 Bord na Móna 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 Bord na Móna operatives, the local community and local authorities. Please see Appendix 4-13 Environmental and Operational Procedures for Protection of Surface Water for details.

4.8 CURRENT PHASE (JULY 2019 TO PRESENT DAY)

4.8.1 Decommissioning Process

In January 2021, Bord na Móna 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 July 2019. The Application Site still operates under the requirements of IPC Licence P0504-01, and any decommissioning works undertaken with respect to peat extraction activities and all ancillary works are in accordance with Condition 10 of the IPC Licence, which states that 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 Bord na Móna 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 November 2022, as well as decommissioning of other infrastructure, which is to follow at a later date, outlined in Table 4-5. As outlined in Section 4.4.5.7, approximately 37km of permanent rail track was located within the Application Site boundary. To date 1km of permanent rail has been decommissioned and removed in the south of Lough Bannow Bog. The remaining 36km of rail track will be decommissioned as part of the overall decommissioning programme for the IPC Licence. Decommissioning activities are detailed for each of the three bogs within the Application Site in Appendix 4.3.

Table 4-5: – Future decommissioning items for 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 All Bogs
3	Decommission peat stockpiles	Completed November 2022
4	Decommission or remove buildings and compounds	Relevant to All Bogs
5	Decommission fuel tanks and associated facilities	Relevant to Derryadd Bog
6	Decommission and removal of septic tanks	Relevant to Derryadd Bog
7	Decommissioning and removal of a number of existing bog pumps where suitable/necessary	Relevant to All 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.*
- *Condition 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, Bord na Móna 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 Climate Action Scheme

The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures with the primary aim of optimising climate action benefits of rewetting former industrial peat extraction areas by creating soggy peatland conditions that will allow compatible peatland habitats to redevelop. These measures are separate to those defined by the IPC Licence. This programme has been developed to optimise ecosystem service benefits of peatland rehabilitation and restoration, particularly carbon storage and reducing carbon emissions. In addition, this will also benefit biodiversity and water (water quality and catchment management), as well as providing space for local communities and people to enjoy the outdoors. The scheme is supported by Government through Ireland's National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC). Please see https://www.bnmpcas.ie/ for details. The National Parks and Wildlife Service (NPWS) acts as the Scheme regulator and there is ongoing engagement with the EPA. This scheme is in addition to the IPC Licence requirements and therefore does not form part of this substitute consent application and is being applied at specific locations across the Bord na Móna landbank that are identified as suitable for the prescribed enhancement measures, e.g., north and western sections of Derryaroge bog where PCAS is currently underway.

The scope of the rehabilitation measures for the sections of Derryaroge that are currently active under the PCAS Programme include the following, which are directly taken from Section 8 of the Derryaroge Cutaway Bog and Decommissioning and Rehabilitation Plan 2023 (included in Appendix 4-3, which is also publicly accessible on the Bord na Móna PCAS website[7]):

Derryaroge North and West:

- *Re-assessment of the pumping regime and removing pumps if this desired and has no significant external impact. A significant part of the site has already developed a mosaic of wetland habitats with deeper water. Hydrological modelling will look to optimise water levels. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal flooding regime will develop, with water levels fluctuating in association with levels in*

[7] https://www.bnmpcas.ie/wp-content/uploads/sites/18/2023/06/Derryarogue-Final-Rehab-Plan-2023-v12.pdf

the adjacent River Shannon Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.

- *Intensive drain blocking and construction of berms in shallow peat areas/modelled depressions to create/promote the spread of wetland habitats*
- *Regular drain blocking (3/100) on dry cutaway along with the blocking of outfalls and management of water levels,*
- *Re-alignment of piped drainage*
- *Deep Peat measures including field re-profiling, resulting in bunded areas suitable for Sphagnum inoculation, on deeper peat*
- *Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application*
- *Initial hydrological modelling indicates that a small part of the site will develop a mosaic of wetland habitats with the potential for some deeper water. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation by looking to set water depths at < 0.5 m, where possible. It is inevitable that some small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage.*

These rehabilitation measures are ongoing on the relevant lands within Derryaroge Bog. Details of monitoring associated with the enhanced peatland rehabilitation measures associated with PCAS are outlined in Section 4.9.2.2 below.

4.9 REMEDIAL PHASE

4.9.1 Peatland Rehabilitation Plans

Following the conclusion of the decommissioning activities, Bord na Móna 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."

Bord na Móna has produced a draft Cutaway Bog Decommissioning and Rehabilitation Plan for each of the three bogs within the Application Site (i.e., Derryaroge Bog, Derryadd Bog, and Lough Bannow Bog). Please see Appendix 4-3 for details. Bord na Móna has finalised the rehabilitation plan for part of Derryaroge Bog (see Derryaroge Cutaway Bog and Decommissioning and Rehabilitation Plan 2023, included in Appendix 4-3) and this area is currently being rehabilitated. It is the intention of Bord na Móna 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[8]);
- 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 Mountdillon Bog Group;
- Geographical Information System (GIS) Mapping;
- Bord na Móna drainage surveys;
- Bog topography and LIDAR data;
- Previous research studies on 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 Bord na Móna 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 peatland and woodland 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

[8] *Bord na Móna. 2016. Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane.* http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf

this rehabilitation plan, and when identified 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 draft Cutaway Bog Decommissioning and 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. Draft Cutaway Bog Decommissioning and Rehabilitation Plans for each bog which outline the proposed rehabilitation for the Application Site have been prepared and are detailed below. A timeline for the stages of the measures included in the Cutaway Bog Decommissioning and Rehabilitation Plans is provided in Table 4.6 below. Further details can be found in the Cutaway Bog Decommissioning and Rehabilitation Plans provided in Appendix 4-3.

Table 4-6: Timeline for Cutaway Bog Decommissioning and Rehabilitation Plan Actions

	Derryaroge (2023 Plan)	Derryadd (2025 (Draft) Plan)	Derryaroge (2025 (Draft) Plan)	Lough Bannow (2025 (Draft) Plan)
Completed and Ongoing	A significant part of the site has already re-vegetating, with significant cover of pioneer vegetation 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 as vegetation develops and consolidates.	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.	A significant part of the site has already re-vegetating, with significant cover of pioneer vegetation 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 as vegetation develops and consolidates.	• 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. Small wetlands are already developing. 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. • A portion of the cutaway has already been developed as a conifer plantation by Coillte. This will be subject to ongoing forestry management. • Bog restoration was carried out in the remnant raised bog zone around Lough Bawn pNHA in 2017 (15 ha). An area of bog previously drained by Bord na Móna but never developed was re-wetted using peat dams to block the drains.

	Derryaroge (2023 Plan)	Derryadd (2025 (Draft) Plan)	Derryaroge (2025 (Draft) Plan)	Lough Bannow (2025 (Draft) Plan)
				This improved the condition of the buffer zone around Lough Bawn pNHA.
Short-term Planning Actions (0-1 Years)	• Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Derryaroge Bog. This will take account of peat depths, topography, drainage, and hydrological modelling. • A drainage management assessment of the proposed enhanced rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted. • A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known	• Seek formal approval of the rehabilitation plan from the EPA. • Develop a detailed site plan outlining how the various rehabilitation methods will be applied. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies). • A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted. • A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible. • A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out. • A review of remaining milled peat stocks is to be carried out. • An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required. • Ensure all activities comply with the environmental protection requirements of the IPC Licence. • Carry out Appropriate Assessment (AA) of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA (if required) in the plan for the delivery of rehabilitation and decommissioning across the site. • Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.		

	Derryaroge (2023 Plan)	Derryadd (2025 (Draft) Plan)	Derryaroge (2025 (Draft) Plan)	Lough Bannow (2025 (Draft) Plan)
	archaeological disturbance, where possible. • A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out. • A review of remaining milled peat stocks is to be carried out. • An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required. • Ensure all activities comply with the environmental protection requirements of the IPC Licence. • Carry out Appropriate Assessment of the Rehabilitation Plan. • Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental			

	Derryaroge (2023 Plan)	Derryadd (2025 (Draft) Plan)	Derryaroge (2025 (Draft) Plan)	Lough Bannow (2025 (Draft) Plan)
	control measures during the implantation of the rehabilitation plan.			
Short-term Practical Actions (0-2 Years)	• Carry out proposed measures as per the detailed site plan. This will include a combination of bunding and drain blocking on deep peat, and fertiliser application targeting bare peat areas of headlands, high fields and other areas (where required) in addition to wetland creation and management prescriptions. • All rehabilitation will be carried out with regard to best practice environmental control measures. • Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions. • Carry out the proposed monitoring, as outlined. • While natural colonisation is expected to commence almost immediately once peat production ceases, • Rehabilitiation measures in Derryaroge West and North are ongoing (2024-)	• Carry out proposed measures as per the detailed site plan. All rehabilitation will be carried out with regard to best practice environmental control measures. • Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions. • Carry out the proposed monitoring. • 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.		

	Derryaroge (2023 Plan)	Derryadd (2025 (Draft) Plan)	Derryaroge (2025 (Draft) Plan)	Lough Bannow (2025 (Draft) Plan)
	• Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential run-off of suspended solids from the site during the rehabilitation phase. • Submit an ex post report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an ex ante estimate for year 2 of the Scheme; and so on for each year of the Scheme.			
Long-term Actions (>3 Years)	• 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 works have commenced on the Application Site already in the form of natural revegetation and re-colonisation (as described in the Cutaway Bog Decommissioning and Rehabilitation Plans (Appendix 4.3)) and in Table 4-7 above. Further rehabilitation work will commence immediately following the full decommissioning of the Application Site. The Cutaway Bog Decommissioning and Rehabilitation Plans included provides a description of the three bogs and their ecology. It also provides a framework and outline 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 Cutaway Bog Decommissioning and Rehabilitation Plans (and shown on the potential Future Habitats Map) will include the exact locations of the drains to be blocked and any bunds to be constructed 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 Bord na Móna 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).

4.9.2.2 Monitoring

As per the 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 neighbours land, general land security, boundary management, dumping and littering. The number of these site visits will reduce after 2 years to bi-annually, and then after 5 years to annual visits. Monitoring visits will also consider any requirements for further practical rehabilitation measures.

The baseline condition of the site will be established post-rehabilitation implementation by using an aerial survey to take an up-to-date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.

Water quality monitoring at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.

In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing IPC Licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.

Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.

The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC. This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.

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.

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

- Vegetation and habitat monitoring after rehabilitation is completed using a cutaway bog condition assessment. This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, Sphagnum cover, bare peat cover and water levels. It is proposed that sites can be monitored against this baseline in the future.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson et al., 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.

4.10 POTENTIAL FUTURE LAND USE

4.10.1 Proposed Derryadd 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 2024, 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.

The overall permanent footprint of the proposed wind farm will be less than 4% of the total area of the Application Site, and therefore does not impact or change the overall goals and outcomes of the proposed rehabilitation plans. As such, it is the intention of the Applicant to integrate the peatland rehabilitation measures with the proposed future wind farm. The key objectives of environmental stabilisation and re-wetting of the cutaway areas will occur between and surrounding the proposed windfarm infrastructure. This has proven successful during construction of Mountlucas and Cloncreen Wind Farms.

The 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. Further details of this proposed wind farm development can be obtained at the project website (https://www.derryaddwindfarm.ie/). A separate planning application for the proposed Derryadd Wind Farm will be submitted directly to An Bord Pleanála through the Strategic Infrastructure Development planning process. As mentioned, the wind farm footprint comprises approximately 4% of the total area of the Application Site and the wind farm application includes proposals to rehabilitation the site to support peatland, wetland and woodland habitats. The 132 MW windfarm development, if constructed, will generate 404,712 MWh of renewable energy annually, based on a 35% capacity factor. This has the potential to reduce Ireland's CO_2 emissions by 4.5% of the 2030 Electricity Sector carbon budget. This figure takes into account the carbon emissions related to the construction of the windfarm development including the removal of peat for the development construction. The generation of renewable electricity will be beneficial in terms of meeting national targets and the objectives of CAP24.'

Both the remedial measures and the proposed Derryadd Wind Farm are cumulatively assessed with the future remedial measures that will be carried at the Substitute Consent Application Site.

4.10.2 Ongoing and Future Enhanced Rehabilitation Measures (PCAS)

As part of Condition 10 of the IPC Licence, decommissioning and rehabilitation will be carried out as standard remedial measures associated with peat extraction activities and all ancillary works at the Application Site as described in Sections 4.8 and 4.9 above. In line with Bord na Móna's accelerated decarbonisation strategy, and the availability of government funding, the company has also committed to ambitious enhanced peatland decommissioning, rehabilitation and restoration measures, targeting circa 33,000 ha in over 80 no. Bord na Móna bogs.

This strategy has been developed to optimise ecosystem service benefits of peatland rehabilitation and restoration, particularly carbon storage and reducing carbon emissions. In addition, this will also benefit biodiversity and water (water quality and catchment management), as well as providing space for local communities and people to enjoy the outdoors.

PCAS measures are ongoing within areas to the north and west of Derryaroge Bog (refer to the 2023 Derryaroge Bog Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4.3). Sites are considered for inclusion within the PCAS on a year-by-year basis and the inclusion of Derryaroge, Derryadd and Lough Bannow Bogs are subject to ongoing review. In the event that future PCAS plans are not implemented or prepared, the Application Site will be rehabilitated in line with the Cutaway Bog Decommissioning and Rehabilitation Plans outlined in Section 4.9.1 above and included in Appendix 4.3.

Both the enhanced rehabilitation measures (PCAS) and the proposed wind farm are cumulatively assessed in this rEIAR with the future remedial measures (described in Section 4.9) that will be carried out at the Application Site as part of the IPC Licence requirements under Condition 10 of the Licence.

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