

## Table of Contents

|        |                                                   |      |
|--------|---------------------------------------------------|------|
| 8.     | Land, Soils and Geology .....                     | 8-1  |
| 8.1    | Introduction .....                                | 8-1  |
| 8.1.1  | Statement of Authority .....                      | 8-1  |
| 8.2    | Assessment Methodology .....                      | 8-1  |
| 8.2.1  | Legislative and Guidance Review .....             | 8-2  |
| 8.2.2  | Consultation.....                                 | 8-3  |
| 8.2.3  | Desk Review.....                                  | 8-4  |
| 8.2.4  | Site Walkover and Site Investigation Data.....    | 8-5  |
| 8.2.5  | Impact Assessment Methodology .....               | 8-5  |
| 8.3    | Establishment of Baseline .....                   | 8-7  |
| 8.3.1  | Site Location.....                                | 8-7  |
| 8.3.2  | Topography .....                                  | 8-9  |
| 8.3.3  | Land (Land take).....                             | 8-10 |
| 8.3.4  | Peat/Soils and Subsoils.....                      | 8-13 |
| 8.3.5  | Site Specific Investigation .....                 | 8-20 |
| 8.3.6  | Bedrock Geology .....                             | 8-21 |
| 8.3.7  | Soil Contamination .....                          | 8-24 |
| 8.3.8  | Economic Geology .....                            | 8-26 |
| 8.3.9  | Geological Heritage.....                          | 8-26 |
| 8.3.10 | Peat Stability and Slope Stability .....          | 8-27 |
| 8.4    | Characteristics of the Development.....           | 8-30 |
| 8.4.1  | Peat Extraction Phase (July 1988- June 2020)..... | 8-32 |
| 8.4.2  | Current Phase (June 2020 – Present Day).....      | 8-32 |
| 8.4.3  | Remedial Phase .....                              | 8-33 |
| 8.5    | Assessment of Significant Effects.....            | 8-34 |
| 8.5.1  | Do-Nothing.....                                   | 8-34 |
| 8.5.2  | Peat Extraction Phase (1988- June 2020).....      | 8-35 |
| 8.5.3  | Current Phase (June 2020 – Present).....          | 8-37 |
| 8.5.4  | Remedial Phase.....                               | 8-38 |
| 8.6    | Control/Mitigation and Monitoring Measures .....  | 8-39 |
| 8.6.1  | Peat Extraction Phase (1988-2020) .....           | 8-39 |
| 8.6.2  | Current Phase (2020– Present Day) .....           | 8-42 |
| 8.6.3  | Remedial Phase.....                               | 8-42 |
| 8.7    | Residual Effect.....                              | 8-43 |
| 8.7.1  | Peat Extraction Phase (1988 – June 2020).....     | 8-43 |
| 8.7.2  | Current Phase (June 2020 to present day) .....    | 8-44 |
| 8.7.3  | Remedial Phase.....                               | 8-45 |
| 8.8    | Cumulative and Indirect Effects.....              | 8-46 |

|                                                       |                                    |      |
|-------------------------------------------------------|------------------------------------|------|
| 8.8.1                                                 | Peat Extraction Phase .....        | 8-46 |
| 8.8.2                                                 | Current Phase.....                 | 8-46 |
| 8.8.3                                                 | Remedial Phase.....                | 8-47 |
| 8.9                                                   | Major Accidents and Disasters..... | 8-48 |
| 8.10                                                  | References.....                    | 8-49 |
| Appendix 8-1 Site Investigations Location Report..... |                                    | 8-50 |

## List of Tables

|                                                                    |      |
|--------------------------------------------------------------------|------|
| Table 8-1 – List of Consultees and Record of Consultations .....   | 8-3  |
| Table 8-2: Estimation of Importance of Geological Attributes ..... | 8-5  |
| Table 8-3: Estimated Site Topography Changes .....                 | 8-9  |
| Table 8-4: Calculated Change in Elevation .....                    | 8-9  |
| Table 8-5: Peat Extraction Volumes.....                            | 8-14 |
| Table 8-6: Peat Depths.....                                        | 8-14 |
| Table 8-7: Summary of Soils and Subsoils.....                      | 8-20 |
| Table 8-8: IEL Licences within 2 km.....                           | 8-24 |
| Table 8-9: Registered IPC Licences within 2 km .....               | 8-25 |
| Table 8-10: Assessment of Geohazards .....                         | 8-28 |

## List of Figures

|                                                                                                                                   |      |
|-----------------------------------------------------------------------------------------------------------------------------------|------|
| Figure 8-1: Land, Soils and Geology Study Area.....                                                                               | 8-8  |
| Figure 8-2: Soils Map.....                                                                                                        | 8-17 |
| Figure 8-3: Subsoils Map .....                                                                                                    | 8-18 |
| Figure 8-4: Photos of Subsoil Exposures at Ballybeg (northern area of Ballybeg) and Drumman Bog (north of the River Mongagh)..... | 8-19 |
| Figure 8-5: Bedrock Geology Map .....                                                                                             | 8-23 |
| Figure 8-6: Regional Landslide Susceptibility Map .....                                                                           | 8-29 |



## 8. LAND, SOILS AND GEOLOGY

### 8.1 INTRODUCTION

This chapter reports on the likely significant effects on Land, Soils and Geology as a result of Bord na Móna peat extraction and ancillary activities at Toar, Derryarkin, Ballybeg, Drumman, and Derryhinch bogs (the “Application Site”) which form part of the Derrygreenagh Bog Group.

As stated in Section 2.2 of Chapter 2 – Methodology, 1988 is the environmental baseline as this is the year in which the EU Council Directive 85/337/EEC was first transposed into Irish Law. There is no legal requirement to complete a remedial EIAR on any of the activities occurring at the Application Site prior to the transposition of this EU Council Directive. Nevertheless, for completion, a brief overview of the activities occurring at the Application Site from the onset of drainage works to facilitate peat extraction in 1950 up to July 1988 is provided. The baseline land, soils and geological environment in the year 1988 is then described in detail along with a description of the activities from 1988 to the cessation of peat extraction in June 2020 (the Peat Extraction Phase), the management of the site since 2020 (Current Phase) and the activities intended to be carried out at the site into the future (Remedial Phase).

Chapter 4 (Project Description) provides a full description of the Application Site and describes the peat extraction activities that took place, along with the subsequent ongoing decommissioning and future rehabilitation.

A description of the control measures which were used to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, any mitigation and monitoring arrangements are discussed. Due to the retrospective nature of the assessment, this chapter will focus on existing or pre-existing measures used in order to mitigate the likely significant effects of historic peat extraction. Any residual effects and remedial (future) effects are also assessed.

#### 8.1.1 Statement of Authority

This chapter has been completed by John Dillon and Tristan Martin of TOBIN. TOBIN Hydrologists and Hydrogeologists are familiar with the site characteristics of the Toar, Derryhinch, Derryarkin, Ballybeg and Drumman Bogs since 2022.

John Dillon (BSc, MSc, MCIWM, PGeo) has over 18 years of experience in hydrogeological/hydrological assessment for EIS/EIA. John is a Senior Environmental Consultant in TOBIN. John has an active involvement in the compilation of remedial environmental impact assessment reports (EIARs), planning applications and wind farms.

Tristan Martin (BSc, MSc,) is a hydrogeologist with 3 years of experience in geo-environmental assessments for a wide variety of projects. Tristan has contributed to Land, Soils and Geology chapter for this remedial EIAR and has undertaken four EIARs on a range of projects including wind farm applications.

### 8.2 ASSESSMENT METHODOLOGY

The main considerations with regard to the assessment of effects on land, soils and geology from peat extraction activities, based on the Irish Geological Institute (IGI, 2013) and Environmental

Protection Agency (EPA, 2022) Guidance, relate to the changes in land use, geological environment and peat stability.

## 8.2.1 Legislative and Guidance Review

### 8.2.1.1 Legislation

This chapter has been prepared having regard to the general guidance documents the following legislation specific to this chapter:

- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Planning and Development Act, 2000, as amended;
- S.I. No. 296 of 2018: European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which transposes the provisions of Directive 2014/52/EU into Irish law;
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended);
- European Communities (Drinking Water) Regulations 2007 (As amended);
- S.I. No. 9 of 2010: European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended); and,
- S.I. No. 296 of 2009: The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (as amended by S.I. No. 355 of 2018).

### 8.2.1.2 Guidance

The assessment was carried out in accordance with the following guidance and tailored accordingly based on professional judgement and experience:

- Institute of Geologists Ireland (IGI) (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- Environmental Protection Agency (EPA) (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- National Roads Authority (NRA) (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006; and,
- Environmental Protection Agency (2006): Environmental Management in the Extractive Industry (Non-Scheduled Minerals).

## 8.2.2 Consultation

The EIA scoping correspondence was issued to appropriate statutory and non-statutory bodies in August 2023 and in June 2026, in accordance with Article 28 of the Planning and Development Regulations, 2001 (as amended). A full list of responses to these scoping correspondences is provided in Table 2-1 of Chapter 2. The responses which are relevant to Land, Soils and Geology have been provided in Table 8-1 below.

**Table 8-1 – List of Consultees and Record of Consultations**

| Consultee Name                                                                                                                                          | Summary of Response Received (2023)                                                                                                                                                                                                                                                             | Summary of Responses Received (2026)                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Offaly Co.Co. Planning Department                                                                                                                       | No response received                                                                                                                                                                                                                                                                            | No response received                                                                                                                                                                                                                                                                                                            |
| Meath Co.Co. Planning Department                                                                                                                        | No response received                                                                                                                                                                                                                                                                            | No response received                                                                                                                                                                                                                                                                                                            |
| Westmeath Co. Co. Planning Department                                                                                                                   | No response received                                                                                                                                                                                                                                                                            | No response received                                                                                                                                                                                                                                                                                                            |
| Minister for Housing, Local Government and Heritage c/o The Manager, Development Applications Unit Department of Housing, Local Government and Heritage | No response received                                                                                                                                                                                                                                                                            | No response received                                                                                                                                                                                                                                                                                                            |
| Environmental Protection Agency                                                                                                                         | No response received                                                                                                                                                                                                                                                                            | No response received                                                                                                                                                                                                                                                                                                            |
| Irish Peatlands Conservation Council (IPCC)                                                                                                             | The response from IPCC (15/03/2023) details their observation of Bord na Móna 's Mandate to develop peat bogs and the loss of this valuable habitat. The response goes onto detail specific case studies of peat extraction, bog drainage and Bord na Móna 's Raised Bog Restoration Programme. | No response received                                                                                                                                                                                                                                                                                                            |
| Geological Survey of Ireland                                                                                                                            | No response received                                                                                                                                                                                                                                                                            | Geological Survey Ireland issued a letter in response to the EIA Scoping request, confirming receipt of the EIA Scoping report. GSI recommended using GSI various data sets when conducting EIAR. The response did not include specific information relating to the Substitute Consent application.<br>- In summary various GSI |

| Consultee Name | Summary of Response Received (2023) | Summary of Responses Received (2026)               |
|----------------|-------------------------------------|----------------------------------------------------|
|                |                                     | datasets including soils, geology and hydrogeology |

### 8.2.3 Desk Review

A desk study was undertaken in January to May 2026, in order to collate and review background information relevant to the Application Site and surrounding study area, as defined in section 8.3.1, during the assessment. The study area has been reviewed against the land, soils and geology environment as well as the scale of peat extraction activities. While the focus of the assessment is on the Land, Soils and Geology within the Application site, the total extent of the study area is 2 km from the Application Site boundary as shown in Figure 8-1. The information obtained is listed below<sup>1</sup>.

- Integrated Pollution Control Licence (IPC) Derrygreenagh Bog Group (Ref: P0501-01) Environmental Protection Agency, Appendix 4-2;
- Cutaway Bog Decommissioning and Rehabilitation Plans, Appendix 4-3;
- Annual Environmental Reports 2001-2025, as shown in Appendix 4-4<sup>2</sup>
- IPC Licence P0501 Application<sup>3</sup>;
- Aerial Maps from 1973 to 2020, Appendix 4-5;
- Bord na Móna data on peat depth and drainage;
- Bord na Móna Lidar data;
- Geological Survey of Ireland (GSI) online mapping ([www.gsi.ie](http://www.gsi.ie));
- Environmental Protection Agency database ([www.epa.ie](http://www.epa.ie));
- Teagasc Soils Map Viewer ([www.gsi.ie](http://www.gsi.ie));
- Met Éireann Meteorological Databases ([www.met.ie](http://www.met.ie));
- National Parks and Wildlife Services Public Map Viewer ([www.npws.ie](http://www.npws.ie));
- Water Framework Directives Catchments Map Viewer ([www.catchments.ie](http://www.catchments.ie));
- Bedrock Geology 1:100,000 Scale Map Series, Geological Survey of Ireland ([www.gsi.ie](http://www.gsi.ie));
- Geological Survey of Ireland – Groundwater Body Characterisation Reports ([www.gsi.ie](http://www.gsi.ie));
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps ([www.floodinfo.ie](http://www.floodinfo.ie));

<sup>1</sup> All listed Information accessed between April and May 2026

<sup>2</sup> 2008 to 2024 are publicly available on the EPA website. Search for a Licence/Permit | <https://www.epa.ie/our-services/licensing/licencesearch/>

<sup>3</sup> Available at <https://leap.epa.ie/licence-profile/P0501/versions/1ec7e87d-7c61-e211-9eb5-0050568a69e2>



- Department of Environment, Community and Local Government on-line mapping viewer ([www.myplan.ie](http://www.myplan.ie)); and
- Derrygreenagh Power Project Planning Application and associated EIAR (ACP Planning Reference 19.319023), which was consented in 2026;
- Derryarkin Sand and Gravel Planning Application and associated EIAR (Offaly County Council Planning Reference 1925), which was consented in 2019.

## 8.2.4 Site Walkover and Site Investigation Data

Soils, subsoils, bedrock geology and other geological features were assessed through available desk study information, site investigation data and information gathered during site walkovers. This has been detailed in the following sections. A dedicated site walkover for ground-truthing historical/geological maps and assessing current conditions was undertaken on 11 May 2023 and 15 April 2026.

In addition to the surveys completed by TOBIN, site investigations have been completed adjacent to the Application Site. These site investigations included detailed ground investigations (trial pits and boreholes) completed by Irish Drilling Ltd (IDL) as part of the sand and gravel extraction areas (Planning Ref. No. 1925) in May 2015. More recently, site investigations to inform the Derrygreenagh Power Project Planning Application (Reference 19.319023); in the form of trial pits and boreholes, were also carried out by IDL between April and July 2023. This Site Investigation report is included in Appendix 8-1. In addition, the staff of Bord na Móna undertook peat depth surveys on parts of the active bogs in 2019 / 2020.

## 8.2.5 Impact Assessment Methodology

The importance/sensitivity of the geological, hydrogeological and hydrological receptors was assessed on completion of the desk study and baseline assessment. Examples of the sensitivity classification was included in the NRA *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (2008) and also presented in Appendix C of the IGI *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements* (2013). Additional classification criteria were added based on professional judgement to address peat importance/sensitivity of the geological environments as set out in Table 8-2.

Table 8-2: Estimation of Importance of Geological Attributes

| Importance | Criteria                                                                                                                                                                                                                                                                               | Typical Example                                                                                                                                                                                                                                    |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very High  | Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and / or soft organic soil underlying route is significant on a national or regional scale. | <ul style="list-style-type: none"> <li>• Geological feature rare on a regional or national scale (NHA).</li> <li>• Large existing quarry or pit.</li> <li>• Proven economically extractable mineral resource</li> <li>• Intact Peatland</li> </ul> |

| Importance | Criteria                                                                                                                                                                                                                                 | Typical Example                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High       | Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and / or soft organic soil underlying site is significant on a local scale. | <ul style="list-style-type: none"> <li>Contaminated soil on site with previous heavy industrial usage.</li> <li>Wetlands/Mires</li> <li>Large recent landfill site for mixed wastes.</li> <li>Geologically feature of high value on a local scale (County Geological Site).</li> <li>Well drained and / or high fertility soils.</li> <li>Moderately sized existing quarry or pit.</li> <li>Marginally economic extractable mineral resource</li> </ul> |
| Medium     | Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and / or soft organic soil underlying site is moderate on a local scale.     | <ul style="list-style-type: none"> <li>Contaminated soil on site with previous light industrial usage.</li> <li>Small recent landfill site for mixed wastes.</li> <li>Moderately drained and / or moderate fertility soils.</li> <li>Small existing quarry or pit.</li> <li>Sub-economic extractable mineral resource</li> <li>Inactive raised bog/peat headlands</li> </ul>                                                                            |
| Low        | Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and / or soft organic soil underlying site is small on a local scale.              | <ul style="list-style-type: none"> <li>Large historical and / or recent site for construction and demolition wastes.</li> <li>Small historical and / or recent site for construction and demolition wastes.</li> <li>Poorly drained and / or low fertility soils.</li> <li>Uneconomically extractable mineral resource.</li> <li>Cutover Peatlands</li> </ul>                                                                                           |

## 8.3 ESTABLISHMENT OF BASELINE

Subject to the availability of data/records, the conditions that existed in 1988 have been included throughout this report as the baseline comparison year.

With these key stages in mind, the receiving environment is discussed in terms of landscape and topography (geomorphology), superficial and solid geology, as well as peat stability.

### 8.3.1 Site Location

The Application Site is located approximately 12 km southeast of Mullingar. The site is split across counties Westmeath, Meath and Offaly as shown in Figure 1-1 and comprises an area of approximately 2637 ha. The regional review of geological conditions covers a minimum zone of 2 km from this site boundary as suggested in the Institute of Geologists of Ireland (IGI) guidelines (2013). The study area has been reviewed against the geological/hydrogeological environment as well as the scale of peat extraction activities.

While the focus of the assessment is on the Land, Soils and Geology within the Application Site, the total extent of the study area is 2 km from the Application Site boundary as shown in Figure 8-1.

Derryhinch Bog is located in the north of the Application Site, between the M6 and the Mongagh River, on the Meath-Westmeath border. Derryarkin Bog and Drumman Bog are located in the centre of the Application Site, on the Offaly-Westmeath border. Ballybeg Bog is located in the south of the Application Site, between the Yellow River and the Grand canal in county Offaly. Toar Bog is located in the west of the Application Site, on the Offaly-Westmeath border.



**Legend**

Application Site

2km Buffer

01.53 Kilometers

Spatial Reference

Datum: IRENET95

EPSG: 2157

Copyrights:

Earthstar Geographics, © OpenStreetMap (and) contributors, CC-BY-SA

A

10/09/2026

First issue

K.K

B.K

Rev

Date

Description

By

Chkd.

Client:

Project:

Derrygreenagh Substitute Consent

Title:

Figure 8-1:  
Land Soils and Geology  
Study Area (showing 2km buffer)

Scale @ A3:

1:80,000

Prepared by:

Checked by:

Date:

K.Kale

B.Kasonde

September 2026

TOBIN

Tel: +353-(0)1-8030406

Email: info@tobin.ie

www.tobin.ie

TOBIN Consulting Engineers will not be liable for any use of this document for any purpose other than that for which it was originally prepared and provided. Except where specifically and explicitly agreed in writing by TOBIN Consulting Engineers as copyright holder, no part of this document may be reproduced, or transmitted in any form and this document shall not be viewed upon by any third party for any purpose.

Map Ref:

12334-006-AE-S.BO-TOB-A

Draft:

A

## 8.3.2 Topography

### 8.3.2.1 Pre-Extraction Topography

The topography across the Application Site prior to the onset of peat extraction activities is estimated to be 82-97.5 mOD (meters above ordnance datum). These estimations have been deduced from the 6 inch OSI maps where point data is available. The topography prior to peat extraction activities in 1958, was a relatively uniform low-lying bogland within the Application Site, while the surrounding landscape consisted of low-lying agricultural grassland and peatlands, as referenced in the benchmark notes on historical 25" OSI mapping (1897 – 1913) and Cassini 6" (1940s) mapping from the area. The topographical levels historical 25" OSI mapping (1897 – 1913) were highest to the west at Toar bog and tapered towards the centre the Application Site and towards the water features. Some drainage features were evident on the historical 25" maps. No detailed elevation survey of these bogs was available from before peat extraction commenced in 1958.

The estimated topographic changes through time for each individual bog are shown in Table 8-3 below.

**Table 8-3: Estimated Site Topography Changes**

| Bog Name   | Pre-Extraction (1958-1988) (mOD) | 1988 Topography (mOD) | 2020 Topography (mOD) |
|------------|----------------------------------|-----------------------|-----------------------|
| Derryhinch | 86.3                             | 82.8                  | 79.4                  |
| Drumman    | 81.7                             | 79.6                  | 77.5                  |
| Derryarkin | 85.6                             | 81.88                 | 81.5                  |
| Ballybeg   | 88.4                             | 87.34                 | 86.2                  |
| Toar       | 97.5                             | 96.5                  | 95.5                  |

**Table 8-4: Calculated Change in Elevation**

| Bog Name   | Change in Elevation (pre-extraction to end of extraction) (m) | Number of Years of Extraction | Average Elevation Change Rate (m per year of extraction) |
|------------|---------------------------------------------------------------|-------------------------------|----------------------------------------------------------|
| Derryhinch | 6.9                                                           | 59                            | 0.117                                                    |
| Drumman    | 4.2                                                           | 60                            | 0.070                                                    |
| Derryarkin | 4.1                                                           | 33                            | 0.124                                                    |
| Ballybeg   | 2.2                                                           | 62                            | 0.035                                                    |
| Toar       | 2.0                                                           | 60                            | 0.033                                                    |

### ***8.3.2.2 1988 Baseline Topography***

Historically, the topographic profile of the Application Site was higher than that observed at present day (2026), with the topographic changes varying across the Application Site depending on each bogs' extraction history (refer to Chapter 4).

The OSI 25" maps have a number of topographical elevations on each bog. By subtracting the current levels from the elevations, the heights reduced by 2.0 m (Toar Bog) to 6.9 m (Derryhinch Bog) from 1958 to 2020. This equates to 0.033 m to 0.117 m per year of peat extraction. This average was calculated for each bog based on the difference in elevation divided by the number of years of peat extraction (See Table 8-4).

The topography of the Application Site in 1988, is based on an average depth of milled peat extraction of ~ 0.033-0.117 m per year over the 30-year period from the start of peat extraction activities in 1958 to 1988.

As seen in Table 8-3 above, the baseline topography of the Application Site from 1988 ranges from 79.6 to 96.5 mOD (meters above ordnance datum), with the highest elevation located at Toar Bog at the southwest of the Application Site.

All areas of the Application Site will have experienced some decrease in topography since 1988 due to the installation of drainage and removal of peat during peat extraction work activities and all ancillary works.

### ***8.3.2.3 Current Topography***

The current topography of the Application Site (2026) is relatively flat and low lying with the majority of the area within 75.5 to 95.4 mOD (meters above ordnance datum), with higher elevation areas located at Toar Bog in the west and areas near Derrygreenagh Hill, and lower elevated areas to the east of Ballybeg Bog and to the north of Drumman.

Topography at the site has been modified through the peat extraction activities, and all ancillary works and associated drainage works. Today the highest elevations are found at headlands and remnant peat banks around the perimeter of the Application Site, which create a boundary berm, forming a basin effect within the former extraction areas in the middle of the bogs. These remnant peat banks and headlands provide an approximation (albeit drained and subsided) of the original ground elevations which existed across the site prior to the commencement of any peat extraction related activities.

## **8.3.3 Land (Land take)**

### ***8.3.3.1 Land – Historical Change summary***

The primary change to land-use associated with peat extraction occurs during the initial drainage of the bog and the removal of vegetation in advance of peat extraction as outlined in Section 4.5.1 of Chapter 4. Based on the historical OSI maps, activities at the Application Site pre-development comprised of undeveloped raised bog with turf cutting and drainage along bog edges.

From 1950, drainage ditches were installed to drain the upper surface of the bog by lowering the local peat water table (full details on the drainage implemented at the site are provided in Chapter 4). After the Application Site was drained, vegetation was removed from the bog



surface, leaving only bare peat fields between the drains. At this time, ancillary features were also constructed including railway lines, workshops, welfare facilities. The timing of the installation of drainage and initiation of peat extraction varied across the Application Site. Clearance and drainage work across the Application Site began in 1950, and the land bank would have experienced a relatively abrupt change in land cover with the commencement of peat extraction in 1958.

During the Peat Extraction Phase only minimal soils/land use change occurred. By 1988, the land use at the Application Site was well established as industrial peat extraction. All bogs were substantially drained and milled peat extraction was the only form of peat extraction taking place across the Application Site in 1988.

Land use changes within the Application Site have been investigated using available aerial photographs dating from 1973 to the most recently available photographs (2025). Annual Reports were also consulted to help develop the timeline of changes across the site. The observed changes in land use for the individual bogs comprising the Application Site are discussed in the following paragraphs.

### **Derryarkin Bog**

The first drainage works at Derryarkin bog occurred in 1950 according to Bord na Móna Annual Reports from that time. Derryarkin Bog would have experienced a relatively abrupt change in land cover from raised bog to industrial peat extraction with the commencement of peat extraction in 1958. The earliest available aerial photograph dating from 1973 shows Derryarkin Bog to be subject to milled peat extraction. In 1988, there were zero pumps, silt ponds or surface water emission points installed on Derryarkin Bog.

### **Derryhinch Bog**

The first drainage works commenced in Derryhinch Bog in 1950 according to Bord na Móna's Annual Reports from that time. Derryhinch Bog would have experienced a relatively abrupt change in land cover from raised bog to commercial peat extraction with the commencement of peat extraction in 1958. The earliest available aerial photograph dating from 1973 shows Derryhinch Bog to be subject to milled peat extraction. In 1988, there were zero pumps and four silt ponds. No surface water emission points were installed on Derryhinch Bog.

### **Toar Bog**

The first drainage works commenced in Toar Bog in 1950 according to Bord na Móna's Annual Reports from that time. Toar Bog would have experienced a relatively abrupt change in land cover from raised bog to commercial peat extraction with the commencement of peat extraction in 1958. The earliest available aerial photograph dating from 1973 shows Toar Bog to be subject to milled peat extraction. In 1988, there were zero pumps, five silt ponds, and five surface water emission points installed on Toar Bog.

### **Ballybeg Bog**

The first drainage works commenced in Ballybeg Bog in 1950 according to Bord na Móna's Annual Reports from that time. Ballybeg Bog would have experienced a relatively abrupt change in land cover from raised bog to commercial peat extraction with the commencement of peat extraction in 1958. The earliest available aerial photograph dating from 1973 shows Ballybeg



Bog to be subject to milled peat extraction. In 1988, there were two pumps and six silt ponds. There were no surface water emission points installed on Ballybeg Bog.

Verbal communication from a former employee of Bord na Móna confirmed that two screw pumps were installed at Ballybeg Bog in 1987 and were later replaced by a modern submersible pump around the year 2000. In 1988, there were six silt ponds Ballybeg Bog and no surface water emission points. Peat extraction ceased at Ballybeg Bog in 2020.

### Drumman Bog

The first drainage works commenced in Drumman Bog in 1950 according to Bord na Móna's Annual Reports from that time. Drumman Bog would have experienced a relatively abrupt change in land cover from raised bog to commercial peat extraction with the commencement of peat extraction in 1958. The earliest available aerial photograph dating from 1973 shows Drumman Bog to be subject to milled peat extraction. In 1988, there were zero pumps installed, five silt ponds, and no surface water emission points installed on Drumman Bog.

Peat extraction maps for the years 1988, 1995, 2004 and 2020 are presented in Section 4.7.3 in Chapter 4 and illustrate land-use change over time as the extent of extraction activity changes at the Application Site, including at the point of the cessation of peat extraction at the Application Site in 2020. Corresponding aerial images for the years 1988, 1995, 2004, and 2020 are included in Appendix 4.5.

#### *8.3.3.2 Land – Current Phase (2020- Present)*

Corine land cover maps (2018) show that the Application Site is located predominantly on “peat bogs” with some areas of “mineral extraction sites”, “transitional woodland scrub”, “pastures”, “land principally occupied by agriculture, with significant areas of natural vegetation” and “broad leaved mixed forests” along its margins.

The present day land use and land cover surrounding the site comprises primarily of agricultural pastures, and small areas of transitional woodland-shrub and coniferous forestry.

A scattered pattern of rural dwellings and farmhouses are located along the local road network surrounding the site. The closest mapped urban centres are Tyrrellspass and Rochfortbridge to the north and Rhode to the south.

The following paragraphs discuss the current land cover at each of the five bogs comprising the Application Site.

### Toar Bog

Peat extraction ceased at Toar Bog in 2018. Following the cessation of peat extraction, the land-use/land cover in the former extraction area changed from peat extraction to areas of bare peat which are currently experiencing natural re-vegetation in some places. The majority of Toar Bog is classified on the Corine land cover map (2018) as “peat bogs” with some areas of “land principally occupied by agriculture, with significant areas of natural vegetation” and “pastures” at the western and southern edges.

### Derryarkin Bog

Peat extraction in Derryarkin Bog ceased between 1988 and 1991. Natural re-colonisation of the cutaway so far has been effective across the site. Some cutaway was developed in the past



(1980s) as grassland. A significant portion of the site has already been developed as a conifer plantation by Coillte (12%). This forestry (conifer plantation) has established and is considered to be rehabilitated. Part of the site is used for gravel extraction and there has also been some rehabilitation of this area. There have been several phased pilot rehabilitation measures at Derryarkin Bog. Wetlands (143 ha) were created in 2001-2002 when main outfalls were blocked and cutaway was deliberately re-wetted. An area of cutaway (13 ha) with significant bare peat cover adjacent to the road in Derryarkin was treated with fertiliser to encourage natural colonisation in 2016. The majority of Derryarkin Bog is classified on the Corine land cover map (2018) as “peat bogs” and “mineral extraction sites”.

### **Ballybeg Bog**

Ballybeg was the last of the bogs at the Application Site at which peat extraction ceased in 2020. Parts of the site are already re-vegetating, with established 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 large section of the cutaway has already been developed as an Alder Biomass trial.

### **Drumman Bog**

Peat extraction ceased at Drumman Bog in 2018. Parts of the site are already re-vegetating, with establishing 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 portion of the site has already been developed as a conifer plantation by Coillte (11%). Part of the site was used to establish an herb production trial. This pilot project has now been completed, and the herb production has helped to establish vegetation as a nursery crop.

### **Derryhinch Bog**

Peat extraction ceased at Derryhinch Bog in 2017. Following the cessation of peat extraction, the land-use/land cover in the former extraction area changed from peat extraction to areas of bare peat which are currently experiencing natural re-vegetation in some places.

## **8.3.4 Peat/Soils and Subsoils**

### ***8.3.4.1 Peat Extraction (1958 – July 1988)***

Milled peat extraction commenced at the Application Site in 1958. The bogs were developed for the extraction of peat to supply the 80MW Rhode Power Station, located southeast of the Application Site, and the Croghan Briquette Factory. It is estimated that between the commencement of peat extraction at the Application Site in 1958 and July 1988, approximately 21,551,625 tonnes of milled peat were extracted.

### ***8.3.4.2 Peat Extraction (July 1988- June 2020)***

As outlined in Chapter 4 and Section 8.3.3, the Application Site remained subject to peat extraction until 2020. Between July 1988 and 2020, an average of 173,799 tonnes of peat were

extracted each year, with a total of 5,735,371 tonnes extracted at the Application Site between July 1988 and the cessation of peat extraction in 2020.

Peat extraction operations were weather dependent and therefore peat volumes extracted varied each year. From the recorded volumes (see Table 4-4, Chapter 4) the most productive extraction year was 1995 with 400,097 tonnes extracted that season. The least productive extraction year was 2020 with 13,248 tonnes extracted. The year of 2020 doesn't represent a full extraction year as peat extraction ceased in June 2020.

Table 8-5 presents a summary of the weight of peat extracted (in tonnes) and calculated volumes of peat extracted (m<sup>3</sup>). A bulk estimate of 1.2 m<sup>3</sup>/tonne was used to calculate volumes of peat removed.

As discussed in Section 8.3.2.2, the estimated baseline topography of the Application Site from 1988 ranges from 79.6 to 96.5 mOD (meters above ordnance datum), with the highest elevation located at Toar Bog at the southwest of the Application Site. The change in topography as a result of peat extraction varies across the Application Site (See Table 8-3).

**Table 8-5: Peat Extraction Volumes**

| Extraction Dates | Peat Weight (Tonnes) | Bulk Estimate Peat Volume (m3) |
|------------------|----------------------|--------------------------------|
| 1958 - 1988      | 21,551,625           | 25,861,950                     |
| 1988 - 2020      | 5,735,371            | 6,882,445                      |

### Subsoil Thicknesses

The depth of peat across the site is generally between 0 and 2 m, however there are some areas where peat depths are greater than 3 m. Information provided by Bord na Móna and site walkovers in relation to peat depths in 2019/2020 are presented in Table 8-6 below. Peat depths at the Application Site have decreased between 1988 to 2020 overall.

**Table 8-6: Peat Depths**

| Bog               | Estimated Peat Depths 1988                                                                                              | Peat Depth Survey in 2019/2020                                                                                                                                                                |
|-------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Derryhinch</b> | Peat depths were generally less than 3 m, locally up to 6 m. Areas of till exposed towards the central east-west ridge. | Peat depths are generally less than 2 m, locally up to 5 m. Areas of till exposed towards the central east-west ridge.                                                                        |
| <b>Derryarkin</b> | Peat Depth of 0.2 to 3 m. Peat depths were generally less than 1 m.                                                     | Peat Depth c.0.2 to 3 m No peat depth data for 2020 as peat extraction has ceased. Peat depths are generally less than 1 m. Large areas of gravels exposed and gravel quarries active.        |
| <b>Drumman</b>    | Peat depths were generally less than 1 m<br>Gravels exposed in areas.                                                   | No peat extraction to the north or south of the Mongagh River. Peat depths are generally less than 1 m to the east of the Mongagh. Large areas of gravels exposed and gravel quarries active. |

| Bog             | Estimated Peat Depths 1988                                                                                                       | Peat Depth Survey in 2019/2020                                                                                                |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Ballybeg</b> | Peat depths were generally less than 1.5 m, with some areas including headlands and to the south >2 m. Gravels exposed in areas. | Peat depths are generally less than 1 m, with some areas including headlands and to the south >2 m. Gravels exposed in areas. |
| <b>Toar</b>     | Peat depths were variable – generally 2-6 m to the west and <1 m to the east. Gravels exposed in parts of the bog.               | Peat depths are variable – generally 2-5 m to the west and <1 m to the east. Gravels exposed in parts of the bog.             |

### 8.3.4.3 Current Phase (June 2020- Present)

Information on soils in the region was gathered from the Teagasc soils map and the GSI Online Map Viewer in May 2026. The following soils are present within 2 km of the Application Site:

- Cutaway/cutover peat (Cut);
- Made Ground (Made);
- Deep well drained basic minerals (BminDW);
- Shallow well drained acidic and basic minerals (AminSW and BminSW);
- Shallow, rocky, peaty/non-peaty basic and acidic mineral complexes (AminSRPT and BminSRPT);
- Shallow peaty poorly drained basic mineral (BminSRPT);
- Shallow poorly drained basic mineral (BminSP);
- Lacustrine type soils (Lac);
- Peaty poorly drained acidic and basic minerals (AminPDPT and BminPDPT);
- Poorly drained acidic and basic minerals (AminPD and BminPD);
- Alluvial Mineral Soils (AlluvMIN);
- Fen peat (FenPt).

The area around the Application Site is dominated by peat and peaty soils. Peat is an organic soil derived by the accumulation of partially decomposed plant matter in favourable locations, following a change in climate conditions. Raised bog peat accumulates at a slow rate but has gradually enveloped the landscape.

Alluvial soils have been deposited and characterise the banks and floodplain of the Yellow River to the east of the bogs. The rest of the soil types within the study area are mainly a combination of acidic and basic mineral soils, the most common being deep well drained basic minerals. Basic soils are present throughout the surrounding area. The published soils map ([www.gsi.ie](http://www.gsi.ie)) for the area as outlined in Figure 8-2 shows that cutover/cutaway peat is mapped across the site. Please note that this map is a predictive map whereby key soil forming factors vegetation and topography are mapped and a set of rules applies to these datasets to predict the soils that may occur at any given location.

Information on subsoils and Quaternary sediments in the region was gathered from the GSI and EPA Map Viewers in April 2026. The following subsoils and Quaternary sediments are present within the Application Site:

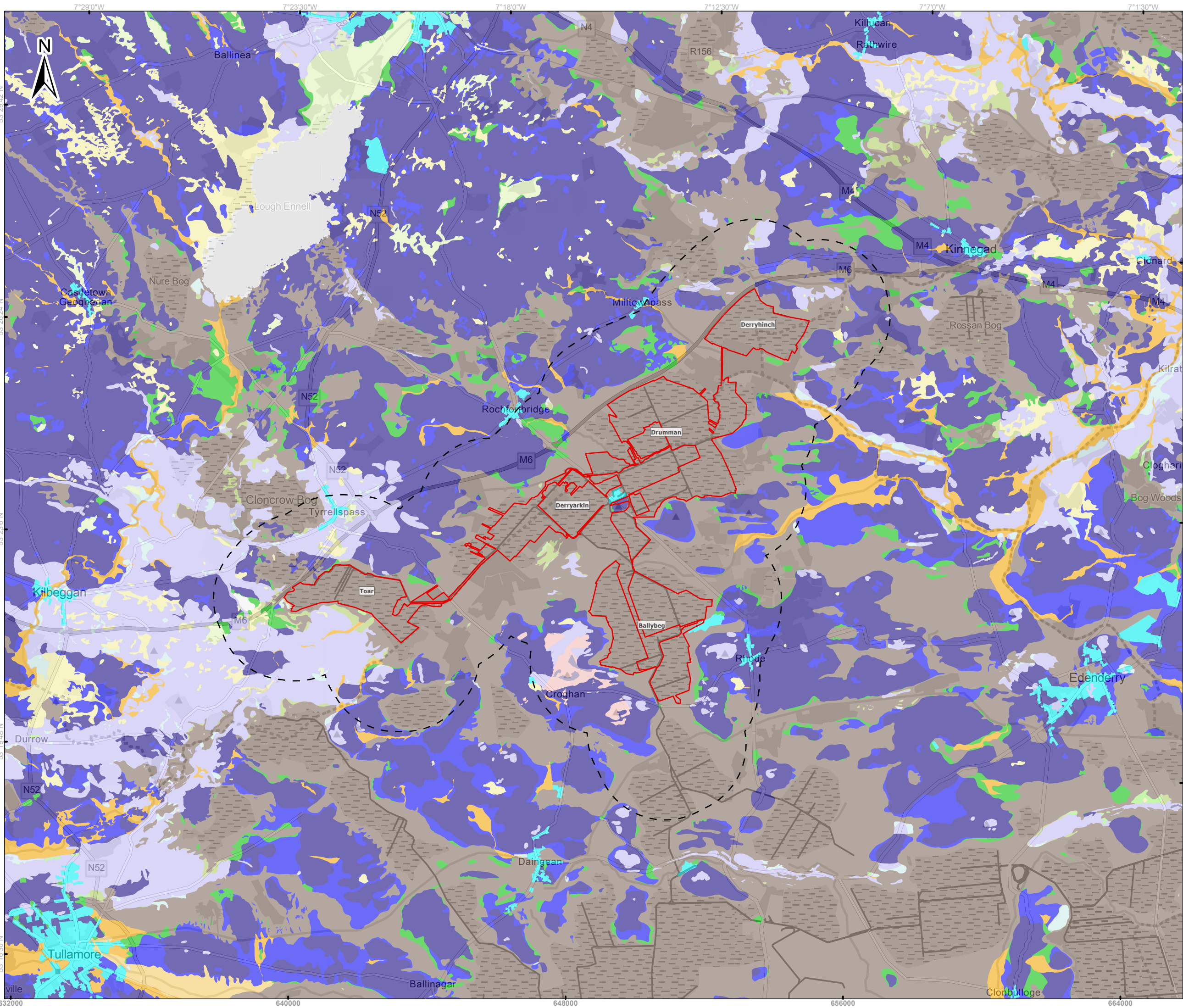
- Cutover peat (Cut);
- Till derived from limestones (TLs);
- Gravels derived from limestones (GLs);

- Eskers comprised of gravels of basic reaction (BasEsk);
- Alluvium (A);
- Lacustrine sediments (L);
- Bedrock outcrop or subcrop (Rck); and
- Karstified bedrock outcrop or subcrop (KaRck).

Cutover peat covers the majority of the site and till derived from limestones covers the majority of the area surrounding the Application Site. Alluvial deposits are found along the floodplain of the Yellow River. There is an area of raised peat (intact) mapped to the south of Toar bog.

The quaternary sediments present at the Application Site and how they are distributed across the study area is shown in Figure 8-3 below. Examples of soil exposures are included in Figure 8-4.

As evident in Figure 8-4, 'Bog iron' is exposed in several places within the Derryarkin bog. Additional areas of iron deposits were noted in Ballybeg bog. During the bog formation, mineral rich groundwaters containing dissolved iron, precipitate when they come into contact with the air or oxygen rich surface waters, to form iron minerals. Based on site observations, discontinuous bog iron deposits are up to 1 m thick in areas.



**Legend**

Application Site Boundary

2km Buffer

**Soils**

AlluvMIN - Mineral alluvium

AlluvMRL - Marl type soils

AminSP - Surface water

Gleys / Ground water

Gleys Shallow

AminSRPT - Podzols Peaty

AminSW - Lithosols / Regosols

BminDW - Grey Brown Podzolics / Brown Earths Basic

BminPD - Surface water

Gleys / Ground water

Gleys Basic

BminPDPT - Peaty Gleys

Basic Parent Materials Basic

BminSP - Surface water

Gleys / Ground water

Gleys Shallow

BminSPPT - Peaty Gleys

BminSRPT - Lithosols

BminSW - Renzinas / Lithosols

Cut - Raised Bog cutaway/cutover

FenPT - Fen peat

Lac

Made

Water

0 1.5 3 Kilometers

|                          |            |                                                                                                                   |     |       |
|--------------------------|------------|-------------------------------------------------------------------------------------------------------------------|-----|-------|
| <b>Spatial Reference</b> |            | <b>Copyrights:</b>                                                                                                |     |       |
| Datum: IRENET95          |            | Sources: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri, © |     |       |
| EPSG: 2157               |            |                                                                                                                   |     |       |
|                          |            |                                                                                                                   |     |       |
|                          |            |                                                                                                                   |     |       |
| A                        | 21/08/2026 | First Issue                                                                                                       | K.K | B.K   |
| Rev                      | Date       | Description                                                                                                       | By  | Chkd. |

Client:

Project: Derrygreenagh Substitute Consent

Title: Figure 8-2: Soils Map

Scale @ A3: 1:100,000

|              |             |             |
|--------------|-------------|-------------|
| Prepared by: | Checked by: | Date:       |
| K.Kale       | B.Kasonde   | August 2026 |

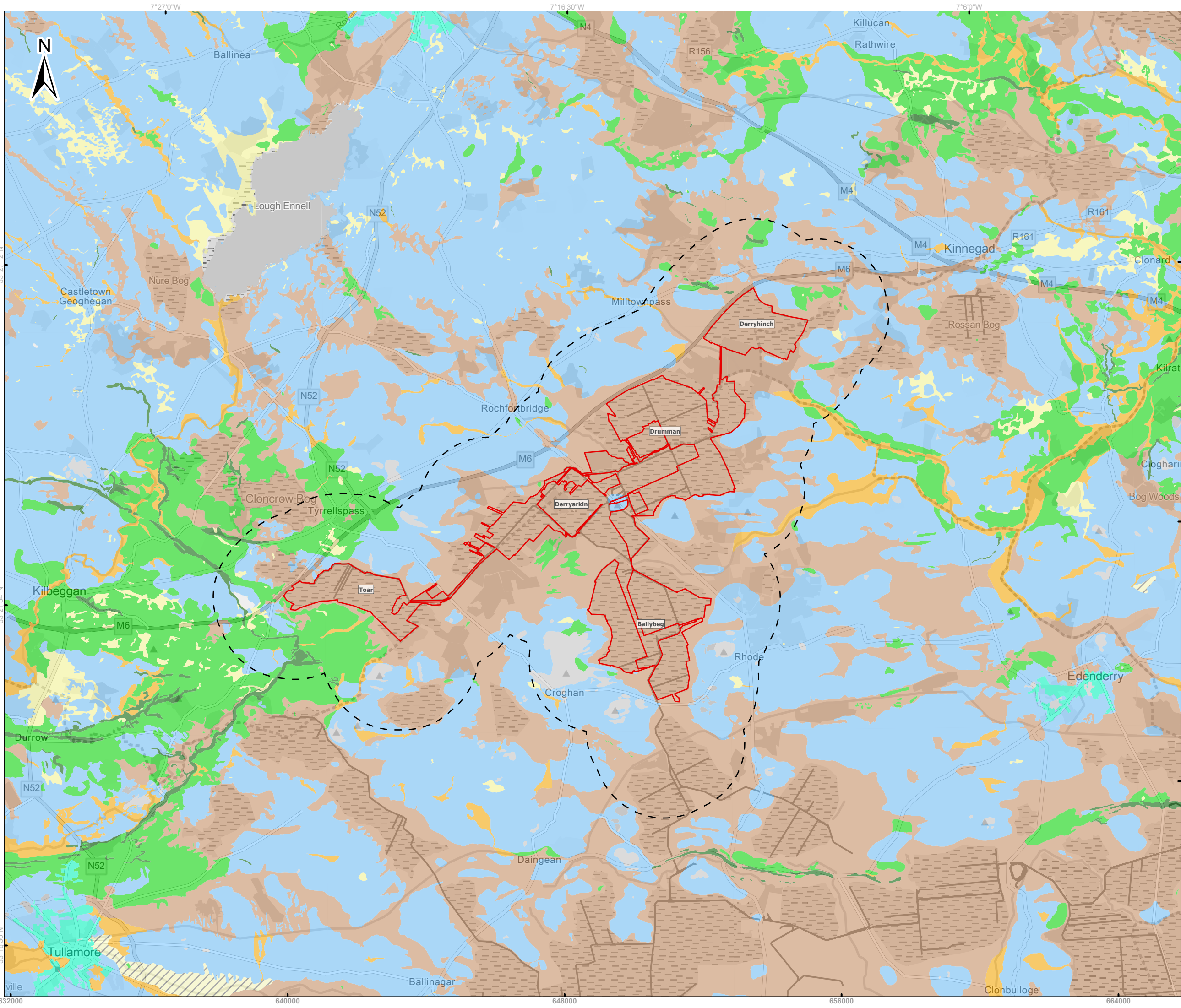
Tel: +353-(0)1-8030406  
Email: info@tobin.ie  
www.tobin.ie

Map Ref:

12334-007-SO-S.BO-TOB-A

Draft:

A



**Legend**

- Application Site
- 2km Buffer
- Subsoils**
  - A, Alluvium
  - BasEsk, Eskers comprised of gravels of basic reaction
  - Cut, Cut over raised peat
  - FenPt, Fen Peat
  - GLs, Gravels derived from Limestones
  - KaRck, Kartsified bedrock outcrop or subcrop
  - L, Lacustrine sediments
  - Mrl, Lake marl
  - Rck, Bedrock outcrop or subcrop
  - RsPt, Raised Peat (intact)
  - TLs, Till derived from limestones
  - Urban
  - Water

**Spatial Reference**  
Datum: IRENET95  
EPSG: 2157

**Copyrights:**  
Sources: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri, ©

|     |            |             |     |       |
|-----|------------|-------------|-----|-------|
|     |            |             |     |       |
|     |            |             |     |       |
|     |            |             |     |       |
| A   | 10/09/2026 | First Issue | K.K | B.K   |
| Rev | Date       | Description | By  | Chkd. |

Client:

Project:

Derrygreenagh Substitute Consent

Title:

Figure 8-3:  
Subsoils Map

Scale @ A3:

1:100,000

Prepared by:

K.Kale

Checked by:

B.Kasonde

Date:

September 2026

Tel: +353-(0)1-8030406  
Email: info@tobin.ie  
www.tobin.ie

Map Ref:

12334-008-SSO-S.BO-TOB-A

Draft:

A



Figure 8-4: Photos of Subsoil Exposures at Ballybeg (northern area of Ballybeg) and Drumman Bog (north of the River Mongagh)

A summary of the soils and subsoils in each bog are included in Table 8-7. A map of the local subsoil cover is attached as Figure 8-3.

Figure 8-4 shows regenerating vegetation with areas of exposed peat and bog iron and a soil exposure through peat deposits, with marl/alluvial and delta sand and gravels.

**Table 8-7: Summary of Soils and Subsoils**

| Bog Name   | Soils                                                                                                                                                                                                                                                                        | Subsoils                                                                                                                                                                                                                                       |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Toar       | Cutover peat (Cut) surrounded by Cut, BminDW, BminSW, BminSRPT, BminPDPT, BminPD, BminSP, BminSPPT, Lac, and AlluvMIN along the nearby watercourses.                                                                                                                         | Cutover peat surrounded by Cutover peat, Till derived from limestones, Gravels derived from limestones, Eskers comprised of gravels of basic reaction and Alluvium along streams/rivers.                                                       |
| Ballybeg   | Cutover peat (Cut) surrounded by Cut, BminDW, BminSW, BminSRPT, BminPDPT, BminPD, BminSP, BminSPPT, Lac, and AlluvMIN along the nearby watercourses. There is an area of Made ground to the east of Ballybeg Bog at the Rhode Power Station.                                 | Cutover peat surrounded by Cutover peat, Till derived from limestones, Gravels derived from limestones, Lacustrine sediments, Bedrock outcrop or subcrop, Karstified bedrock or subcrop and Alluvium along streams/rivers.                     |
| Derryarkin | Cutover peat (Cut) and small pockets of BminPDPT surrounded by Cut, BminDW, BminSW, BminSRPT, BminPDPT, BminPD, BminSP, BminSPPT, and AlluvMIN along the nearby watercourses. There is an area of Made ground to the east of Derryarkin Bog at the Derrygreenagh Works site. | Cutover peat and Till derived from limestones surrounded by Cutover peat, Till derived from limestones and Gravels derived from limestones.                                                                                                    |
| Drumman    | Cutover peat (Cut), BminDW and an area of Made ground at the Derrygreenagh Works site, surrounded by Cut, BminDW, BminSW, BminSRPT, BminPDPT, BminPD, BminSP, BminSPPT, Lac, and AlluvMIN along the nearby watercourses.                                                     | Cutover peat and Till derived from limestones surrounded by Cutover peat, Till derived from limestones, Gravels derived from limestones and Alluvium along nearby watercourses.                                                                |
| Derryhinch | Cutover peat (Cut) surrounded by Cut, BminDW, BminSW, BminSRPT, BminPDPT, BminPD, BminSP, BminSPPT, Lac, and AlluvMIN along the nearby watercourses.                                                                                                                         | Cutover peat surrounded by Cutover peat, Till derived from limestones, Gravels derived from limestones, Lacustrine sediments, Bedrock outcrop or subcrop, Eskers comprised of gravels of basic reaction and Alluvium along nearby watercourses |

### 8.3.5 Site Specific Investigation

As outlined in Section 8.3.4, a number of phases of site investigation were undertaken at the various bogs including

- Bord na Móna 's Peatland surveys -1985-2019
- Derryarkin Sand and Gravel Applications – 2015 and 2019

- Derrygreenagh Power Project – 2023

The peatlands surveys were undertaken across the various bogs between 1985 and 2019. Peat depths are summarised above in Table 8-6.

Site investigations were undertaken to support a planning application for sand and gravel extraction adjacent to the Application Site (Offaly County Council Planning Ref 19/25). These site investigations were undertaken by SLR in 2015 and 2019. The SI focused primarily on the areas of then-prospective sand and gravel extraction. Based on that site investigation, data peat depths in the sand and gravel extraction areas varied, with an average depth of <1 m.

Site investigation for the Derrygreenagh Power Project (ACP Ref. PA19.319023) were undertaken between April 2023 and July 2023. Site investigation included:

- Fourteen rotary core boreholes to depths ranging from 11.0 m to 58.0 m bgl
- Fifteen trial pits to depths ranging from 0.50 m to 4.80m bgl
- Eleven cone penetration tests to depths ranging from 0.24 m to 17 m bgl.

Bedrock was encountered in the rotary core boreholes at depths varying from 5.00m to 39.3m below ground level.

### 8.3.6 Bedrock Geology

Information on the bedrock geology was obtained from the Geological Survey of Ireland (GSI) online map viewer in April 2026. The bedrock geology underlying the Toar, Derryarkin, Ballybeg, Drumman and Derryhinch bogs can be seen in Figure 8-5. The Application site is underlain by Basalts & other Volcanic rocks, Dinantian Pure Unbedded Limestones, Dinantian Upper Impure Limestones, and Dinantian Pure Bedded Limestones.

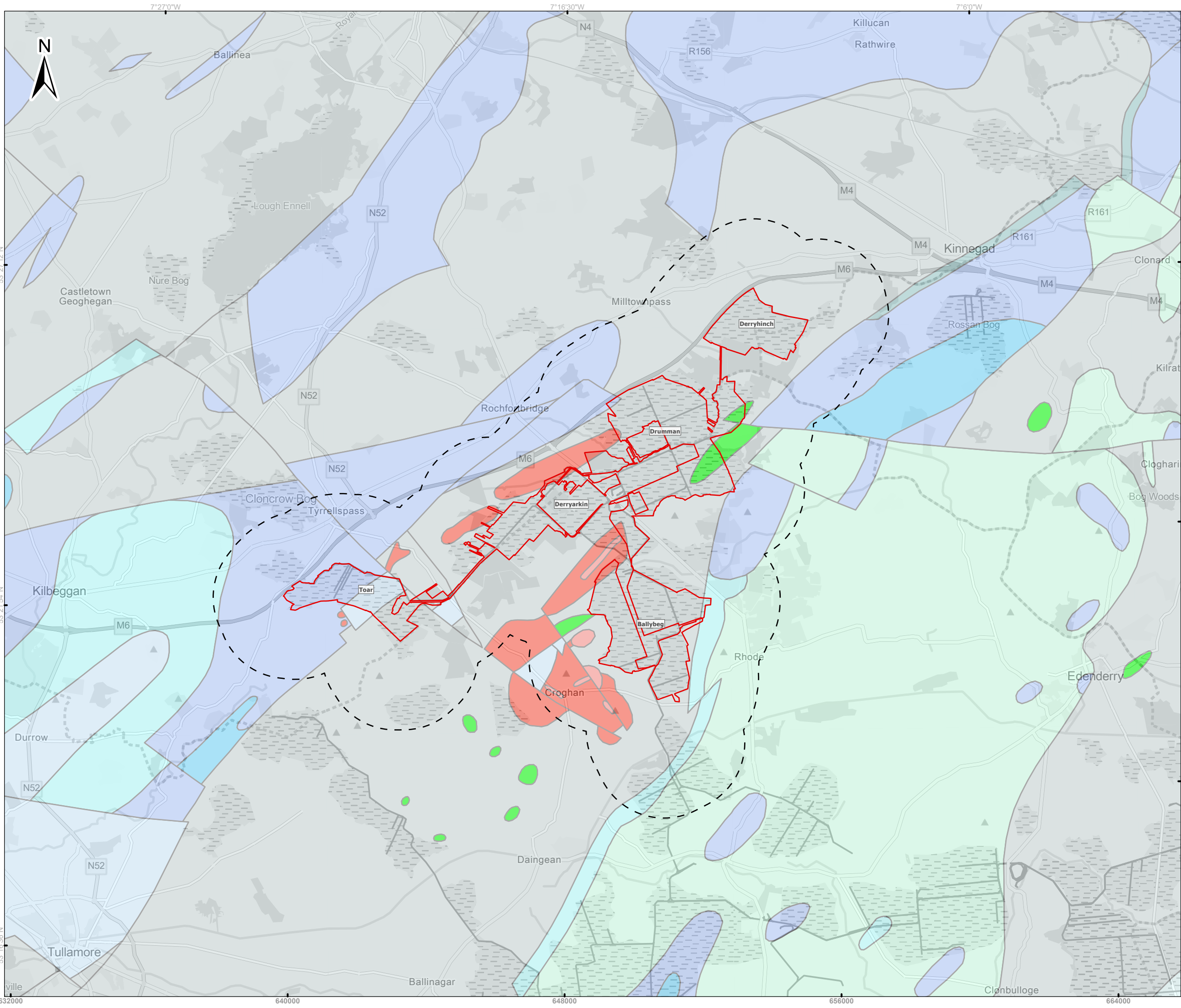
The Toar Bog is underlain by the Waulsortian Limestones, Visean Limestones (undifferentiated), and Lucan formation, with areas of agglomerate to the south and north of Toar Bog. The Ballybeg Bog is underlain by the Lucan formation with pockets of the Allenwood formation in the east and Agglomerate in the north. There is an area of Volcanics (undifferentiated) to the west of Ballybeg Bog and an area of Basalt to the north. The Derryarkin Bog is underlain by the Lucan formation, Agglomerate and Basalt. The Drumman Bog is underlain by the Lucan formation, Volcanics (in Carboniferous), Agglomerate and Waulsortian Limestones. The Derryhinch Bog is underlain by the Lucan formation. The Edenderry Oolite Member is mapped to the east of the Drumman Bog.

Waulsortian Limestones described as massive, unbedded lime-mudstones; and the Lucan Formation comprises mostly of dark limestone and shale.

There are a number of faults in the area that cross through the Toar Bog, Ballybeg Bog and Drumman Bog. These are predominantly orientated in a general southwest to northeast direction or a southeast to northwest direction.

Bedrock outcrops are present throughout the study area, particularly to the west of Ballybeg Bog, but are not mapped within the bogs. Based on SI data at Derrygreenagh, depth to bedrock is over 30m. Similarly, a review of quarry applications in the area and Yellow River wind farm indicate depth to bedrock is over 10 m.

There is one karst feature mapped within 2 km of the Ballybeg Bog. This is identified as a spring and is located approximately 0.6 km to the east of the Ballybeg Bog. Mount Briscoe cave is located approximately 2.1 km to the southwest of Ballybeg Bog.



### Legend

Application Site

2km Buffer

#### Bedrock Geology

Allenwood Formation

Ballyadams Formation

Ballysteen Formation

Edenderry Oolite Member

Lucan Formation

Tober Colleen Formation

Visean Limestones (undifferentiated)

Waulsortian Limestones

Agglomerate

Basalt

Volcanics

01.53

Kilometers

Spatial Reference

Datum: IRENET95

EPSG: 2157

Copyrights:

Sources: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri, ©

|     |            |             |     |       |
|-----|------------|-------------|-----|-------|
|     |            |             |     |       |
|     |            |             |     |       |
|     |            |             |     |       |
| A   | 10/09/2026 | First Issue | K.K | B.K   |
| Rev | Date       | Description | By  | Chkd. |

Client:

Project:

Derrygreenagh Substitute Consent

Title:

Figure 8-4:  
Bedrock Geology Map

Scale @ A3:

1:100,000

Prepared by:

Checked by:

Date:

K.Kale

B.Kasonde

September 2026

TOBIN

Tel: +353-(0)1-8030406

Email: info@tobin.ie

www.tobin.ie

TOBIN Consulting Engineers will not be liable for any use of this document for any purpose other than that for which it was originally prepared and provided. Except where specifically and explicitly agreed in writing by TOBIN Consulting Engineers as copyright holder, no part of this document may be reproduced, or transmitted in any form and this document shall not be deemed upon by any third party for any purpose.

Map Ref:

Draft:

12334-009-B.GEO-S.BO-TOB-A

A

### 8.3.7 Soil Contamination

An evaluation was undertaken to determine the presence and extent of potentially contaminated land in the study area. This evaluation is based on the identification of potential source pathways and receptors.

A review of the EPA website for existing and historic licenced and illegal waste activities, mines and industries was carried out to identify any potential contamination sources present in the area to identify any potential contaminating activities near the Application Site. Based on the site walkover of the bog areas, there is no evidence of contaminated lands on the Application Site. As outlined in the EIAR which supported the planning application for the Derrygreenagh Power project (ACP Ref. PA19.319023), located adjacent to the Application Site, site investigation undertaken to support that development did not indicate significant contamination (AECOM, 2024).

#### 8.3.7.1 Waste Facilities

The EPA/WFD online water maps contain a points dataset of the location of current Waste facilities (including licensed, applied, surrendered, rejected etc.). In 1996 the EPA began licensing certain activities in the waste sector. These include landfills, transfer stations, hazardous waste disposal and other significant waste disposal and recovery activities.

The Drumman Materials Recycling and Waste Transfer Facility (Licence No: W0275-01) was never commenced. No significant contamination was identified at the Derrygreenagh Works as part of the Derrygreenagh Power Project application.

#### 8.3.7.2 Industrial Emission Licences (IEL)

The EPA/WFD online water maps contain a point dataset of Industrial Emissions Licensing (IEL) facilities. The EPA is the competent authority for granting and enforcing Industrial Emissions Licences (IEL) for specified industrial and agriculture activities listed in the First Schedule to the Environmental Protection Agency Act 1992 as amended. There are six IELs within 2 km of the Application Site – See Table 8-8.

**Table 8-8: IEL Licences within 2 km**

|                       | Reg No.                     |                         |                                        |                          |                                  |                                |
|-----------------------|-----------------------------|-------------------------|----------------------------------------|--------------------------|----------------------------------|--------------------------------|
|                       | P1193-01                    | P0938-02                | P0694-01                               | P0628-01                 | P0649-01                         | P0487-07                       |
| <b>Name</b>           | Castlelost Flex Gen Limited | Skeagh Farms            | SSE Generation Ireland Limited (Rhode) | Electricity Supply Board | Mr Kevin Kiernan (Carrick Farms) | Breedon Cement Ireland Limited |
| <b>Location</b>       | Northwest of Derryarkin Bog | South of Derryarkin Bog | East of Ballybeg Bog                   | East of Ballybeg Bog     | East of Drumman Bog              | East of Derryhinch Bog         |
| <b>Licence Status</b> | Licensed                    | Licensed                | Licensed                               | Other                    | Licensed                         | Licensed                       |

|                             | Reg No.                                                                                 |                                                                                                                              |                                                                                         |                                                                                         |                                                                                       |                                                                                                                                                                               |
|-----------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | P1193-01                                                                                | P0938-02                                                                                                                     | P0694-01                                                                                | P0628-01                                                                                | P0649-01                                                                              | P0487-07                                                                                                                                                                      |
| <b>Date From</b>            | 2023                                                                                    | 2015                                                                                                                         | 2015                                                                                    | 2017                                                                                    | 2015                                                                                  | 2015                                                                                                                                                                          |
| <b>Category</b>             | Industry                                                                                | Industry                                                                                                                     | Industry                                                                                | Industry                                                                                | Industry                                                                              | Industry                                                                                                                                                                      |
| <b>Class of Activity</b>    | 2.1                                                                                     | 6.2 (b)                                                                                                                      | 2.1                                                                                     | 2.1                                                                                     | 6.2 (a)                                                                               | 10.2                                                                                                                                                                          |
| <b>Activity Description</b> | Combustion of fuels in installations with a total rated thermal input of 50 MW or more. | The rearing of pigs in an installation where the capacity exceeds 2,000 places for production pigs which are each over 30kg. | Combustion of fuels in installations with a total rated thermal input of 50 MW or more. | Combustion of fuels in installations with a total rated thermal input of 50 MW or more. | The rearing of pigs in an installation where the capacity exceeds 750 places for sows | Production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other kilns with a production capacity exceeding 50 tonnes per day |

### 8.3.7.3 Integrated Pollution Control (IPC) Sites

The EPA/WFD online water maps contain a points dataset of Integrated Pollution Control (IPC) sites. The EPA has been licensing certain activities since 1994. IPC licensing is governed by the Environmental Protection Agency Act 1992 as amended. Detailed procedures concerning the IPC licensing process are set out in the EPA Act 1992 as amended, and the associated licensing regulations.

IPC licences aim to prevent or reduce emissions to air, water and land, reduce waste and use energy/resources efficiently. An IPC licence is a single integrated licence which covers all emissions from the facility and its environmental management. All related operations that the licence holder carries in connection with the activity are controlled by this licence. There are two IPC licensed sites within 2 km of the Application Site boundary, as detailed in Table 8-9.

**Table 8-9: Registered IPC Licences within 2 km**

|                       | Reg. No                                     |                              |
|-----------------------|---------------------------------------------|------------------------------|
|                       | P0501-01                                    | P0503-01                     |
| <b>Name</b>           | Bord na Móna Energy Limited (Derrygreenagh) | Bord na Móna Biomass Limited |
| <b>Licence Status</b> | Licensed                                    | Licensed                     |



|                             | Reg. No                                                                                        |                                                                                                |
|-----------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|                             | P0501-01                                                                                       | P0503-01                                                                                       |
| <b>Date From</b>            | 2000                                                                                           | 2020                                                                                           |
| <b>Category</b>             | Industry                                                                                       | Industry                                                                                       |
| <b>Class of Activity</b>    | 1.4                                                                                            | 1.4                                                                                            |
| <b>Activity Description</b> | The extraction of peat in the course of business which involves an area exceeding 50 hectares. | The extraction of peat in the course of business which involves an area exceeding 50 hectares. |

The desk study indicated that no illegal waste activities were present within 2 km of the Application Site boundary. Minor spills etc may have occurred during the lifetime of the licences however there is no on-site evidence of contamination detected.

Based on the risk assessment which supported the planning application for the Derrygreenagh Power project (ACP Ref. PA19.319023) (AECOM, 2024), low concentrations of a range of metals, petroleum hydrocarbons and Polycyclic Aromatic Hydrocarbons (PAHs) were reported in near-surface soil samples from across the Power Plant Area, but all at below applicable human health Generic Acceptance Criteria for the land use.

### 8.3.8 Economic Geology

The GSI Online Aggregate Potential Mapping Database shows that there are active quarries within the study area including Derryarkin Sand and Gravel and Kilmurry Sand and Gravel. Extensive areas of gravel underlie the peat deposits and are considered to be fan and delta gravel deposited at the edge of the midland esker gravels located to the west at Kilbeggan and Tullamore. The gravel deposits underlie part of the Toar, Drumman, Derryarkin bogs and the northern section of Ballybeg bog.

There are mineral locations present within the study area which consists of Bog iron ore is exposed in several places within the Derryarkin bog. Additional areas of iron deposits were noted in Ballybeg bog. Mineral rich groundwaters containing dissolved iron, precipitate when they come into contact with the air or oxygen rich surface waters, to form iron minerals. Based on site observations, discontinuous bog iron deposits are up to 1m thick in areas.

The overlying peat deposits at the site could be classified as “Low” importance as the peat is not designated in this area and is significantly degraded in most places at the Application Site as a result of industrial peat extraction and ancillary activities which commenced in the 1950s.

### 8.3.9 Geological Heritage

The GSI provides scientific appraisal and interpretive advice on geological and geomorphological sites and is responsible for the identification of important sites that are capable of being conserved as Natural Heritage Areas (NHA).

There are four designated geological heritage sites within 2 km of the Application Site.

There is a designated geological heritage site to the west of Ballybeg Bog which is the Croghan Hill (Site Code: OY014). The site is an extinct volcano that formed in the Carboniferous and is an important in terms of volcanic igneous geology, particularly in this part of the midlands, which is mainly underlain by Carboniferous limestones.

Toberdaly Spring is located 0.5 km south and east of Ballybeg bog. Toberdaly Spring is a natural freshwater spring that supplies the Rhode water supply scheme and is located southwest of Rhode, 1 km northwest of the Toberdaly bridge which crosses the Grand Canal. At an elevation of 79 mOD, the spring has an average abstraction rate of up to 2,500 m<sup>3</sup>/day. Toberdaly Spring is an important site in terms of hydrogeology. Water from Pool Well (Toberdaly) is pumped to three separate schemes at Fahy, Croghan and Rhode. The site is recommended as a County Geological Site.

There are three designated geological heritage sites to the west of Toar Bog which are the South Westmeath hummocks (Site Code: WH024), the Rahugh Ridge (Site Code: WH021) and the Split Hill and Long Esker Complex (Site Code WH025).

Croghan Hill, the South Westmeath hummocks, the Rahugh Ridge and the Split Hill and Long Esker Complex sites are not located within the Application Site and therefore there was no significant direct effects on the land soils and geology of these sites from works conducted at the Application Site.

There have been no other additional geological heritage sites identified within 2 km of the Application Site

### 8.3.10 Peat Stability and Slope Stability

Bord na Móna's records do not document the occurrence of any historic landslides at the Application Site. Similarly, based on a review of the GSI's historical aerial photos (1973), the GSI's records of historical landslide events, and the OSI online database ([www.osi.ie](http://www.osi.ie)) no historic landslides occurred within the Application Site or within 2 km of the site. The GSI have developed a landslide susceptibility map which identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers where the landslides occur and what causes them (slope, soil type and the impact of the flow of water in an area). The site and the surrounding areas are classified as Low and Moderately Low susceptibility. No evidence of peat instability was noted on the site, i.e., peat pipes. The majority of the site has "Low" susceptibility for landslides, with some "Moderately Low" susceptibility areas in Derryarkin and Ballybeg bogs. Figure 8-6 shows the landslide susceptibility classification of the bogs.

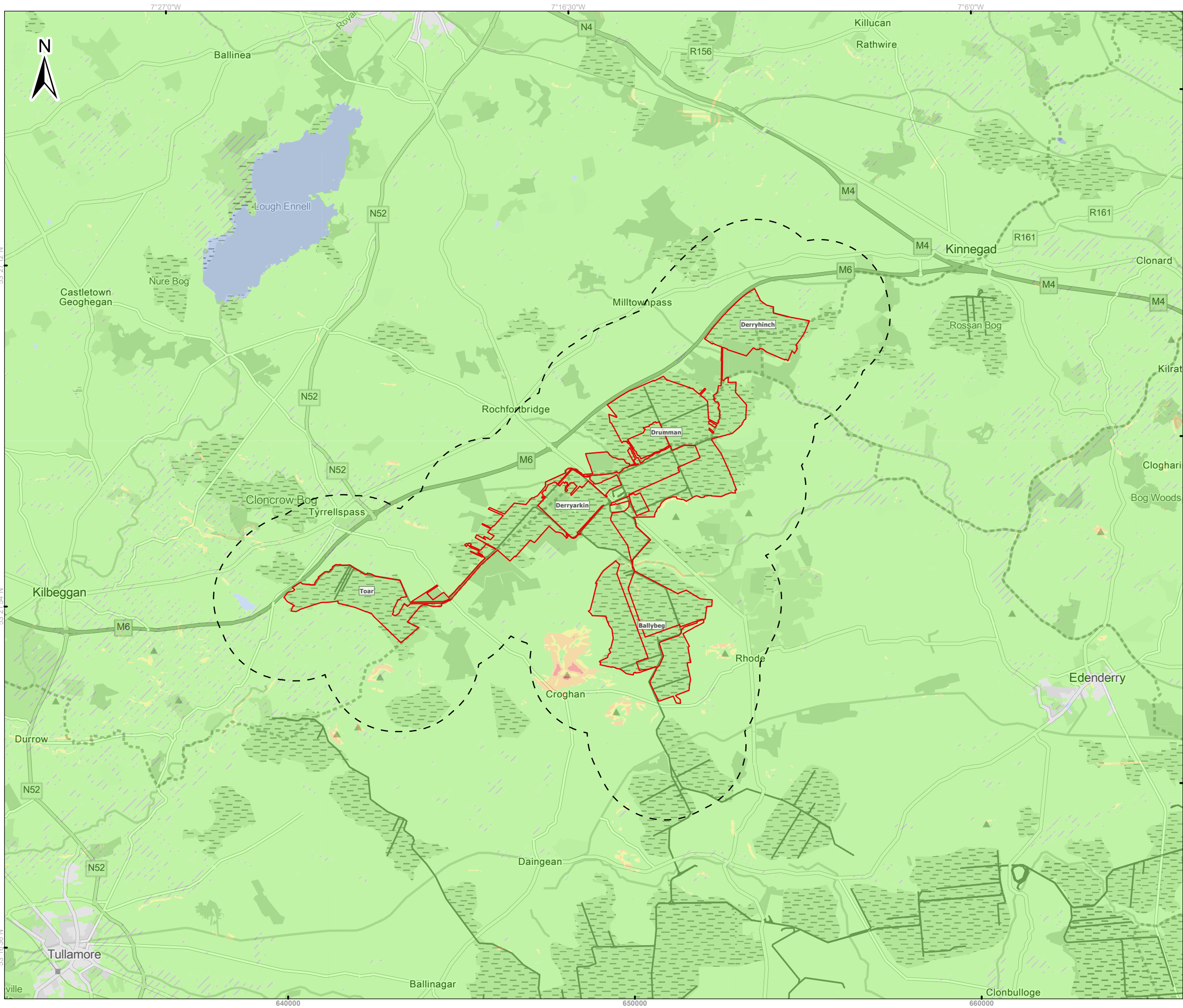
Given that the Application Site is relatively flat lying and that the peat across the site has generally been drained and worked, the risk of slope or peat instability associated with the extent of the site is low.

As the Application Site was extracted for approximately 30 years prior to 1988, the residual peat depths across the Application Site in 1988 were reduced and the bogs were drained with shallow slopes. No peat slide/slope failures occurred during the period from 1988 to present day.

A qualitative assessment of geohazards at each of the five bogs has been completed and is presented in Table 8-10. The assessment reviews any local historical failures, residual slopes within each bog, and residual peat depths at each bog. The assessment presents an evaluation of slope failure risks associated with each bog unit. Each of the bogs are drained, and peat extraction has now ceased. Each of the bogs have very low ground slope levels within the extraction areas, they occur within low-lying enclosed basins, and these in combination with the historical and continued drainage reduces the peat failure risks significantly.

**Table 8-10: Assessment of Geohazards**

| Bog Name   | Local Geohazards | Slope Failure Risks |
|------------|------------------|---------------------|
| Derryarkin | None recorded    | Negligible          |
| Ballybeg   | None recorded    | Negligible          |
| Toar       | None recorded    | Negligible          |
| Drumman    | None recorded    | Negligible          |
| Derryhinch | None recorded    | Negligible          |



**Legend**

- Application Site
- 2km Buffer
- Landslide Susceptibility**
  - Low
  - Low (inferred)
  - Moderately Low
  - Moderately High
  - High
  - Made
  - Water

0 1.5 3 Kilometers

|                                                           |            |                                                                                                                                         |     |       |
|-----------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----|-------|
| <b>Spatial Reference</b><br>Datum: IRENET95<br>EPSG: 2157 |            | <b>Copyrights:</b><br>Sources: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri, © |     |       |
|                                                           |            |                                                                                                                                         |     |       |
|                                                           |            |                                                                                                                                         |     |       |
| A                                                         | 10/09/2026 | First issue                                                                                                                             | K.K | B.K   |
| Rev                                                       | Date       | Description                                                                                                                             | By  | Chkd. |

Client:

Project:

Derrygreenagh Substitute Consent

Title:

Figure 8-5:  
Land Susceptibility Map

Scale @ A3: 1:100,000

|              |             |                |
|--------------|-------------|----------------|
| Prepared by: | Checked by: | Date:          |
| K.Kale       | B.Kasonde   | September 2026 |

Tel: +353-(0)1-8030406  
Email: info@tobin.ie  
www.tobin.ie

TOBIN Consulting Engineers will not be liable for any use of this document for any purpose other than that for which it was originally prepared and provided. Except where specifically and explicitly agreed in writing by TOBIN Consulting Engineers as copyright holder, no part of this document may be reproduced, or transmitted in any form and this document shall not be relied upon by any third party for any purpose.

|                            |        |
|----------------------------|--------|
| Map Ref:                   | Draft: |
| 12334-010-LDS.S-S.BO-TOB-A | A      |

## 8.4 CHARACTERISTICS OF THE DEVELOPMENT

A full description of the development and all works completed at the Application Site is provided in Chapter 4.

By 1988, peat extraction activities and all ancillary works were well established at the Application Site. All bogs were fully drained and milled peat extraction was the only form of peat extraction taking place across the Application Site in 1988. In the late 1960s, a trial of Fódín peat extraction was undertaken at the Application Site. Fódín peat was a form small sod peat product produced from milled peat bogs. This trial was not sufficiently productive, and the practice ceased shortly after its commencement.

The following ancillary infrastructure was established at the site by July 1988:

- Railway infrastructure (all bogs within the Application Site);
- Silt ponds and drains (all bogs within the Application Site); and
- Pumping stations (at Ballybeg Bog).

Derrygreenagh Works, (also referred to as ‘the Works’), provided a central location for support services to the Application Site and other adjacent bogs within the Derrygreenagh Bog Group, and includes workshops, offices and welfare facilities such as toilets and a canteen. The Works are located outside the Application Site and are located on the eastern side of the R400, approximately 4 km southeast of Rochfortbridge, Co. Westmeath. There remains existing rail infrastructure at Derrygreenagh Works which was used to access Drumman Bog, however, this falls outside the application boundary.

There is also an existing Bord na Móna workshop located approximately 580 m southwest of the access to the Derryarkin sand and gravel extraction pit, west of the R400. The workshop has fuel and chemical storage facilities including oil store and tanks, oil traps and silt pond. This workshop is located outside the application boundary.

Derrygreenagh Works is still used as a satellite works location for machinery repair and material storage for the bogs within the Derrygreenagh Bog Group. Other smaller local holding areas were situated in various locations across the Application Site, which were used as temporary storage and repair facilities, convenient for the workers

The peat extraction activities and all ancillary works areas were served by railway lines which connected the various bogs in the Application.

From 1958 to 2020 milled peat was extracted at the Application Site. For the extraction of milled peat, parallel open drains were cut at 50 ft. (approx. 15.2 m) centres which divided the peat extraction area into fields 45 ft. (13.7 m) wide. Typically, the field drains were from 800 to 2,000 yards (approx. 700 to 1,800 m) 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 30 m) 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. 1.4 m) and a top width of approx. 5’ 0” (approx. 1.52 m).

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. A further method of peat stockpiling, known as the “Haku method”, was used on the Application Site, which involved transporting the milled peat via trailer to large, centralised stockpiles, where peat was stored until it was required for use. When the peat extraction season was over, the stockpiles were covered to keep the peat dry unless the peat was scheduled for immediate transportation from the site.

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 10-15 mm of the surface of each field was broken into peat crumbs by powered milling drums towed behind agricultural tractors. 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. 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 two to five times per peat crop, depending on 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, additional harrowing was often required.
- 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.
- Extraction 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.

It is estimated that approximately 892,308 tonnes of milled peat was extracted annually at the Application Site between 1958 and July 1988, with deliveries of stockpiled peat to Rhode Power Station and Croghan Briquette Factory occurring from 1960 and 1961, respectively. While Rhode Power Station and Croghan Briquette Factory commenced production of electricity and briquettes in 1960 and 1961 respectively, milled peat extraction started earlier in 1958 to ensure that there was sufficient supply in stockpiles in the event of future bad harvests due to weather. Moreover, the Fóidín system had been trialled briefly in 1967.

It is estimated that between the commencement of peat extraction at the Application Site in 1958 and July 1988, approximately 21,551,625 tonnes of milled peat was extracted.

Table 8-5 presents a summary of the weight of peat extracted (in tonnes) and calculated volumes of peat extracted (m<sup>3</sup>). A bulk estimate of 1.2 m<sup>3</sup>/tonne was used to calculate volumes of peat removed.

During this time period (1958 to 1988) approx. 25.8 million m<sup>3</sup> of peat was removed. The peat milling process involves the top 10-15 mm of the peat extraction field surface and broken into peat crumbs by powered milling drums towed behind agricultural tractors.

The extraction-stockpiling cycle is referred to as a 'harvest', with each group of ten fields generally producing 12 harvests per year. When this is applied to the 31-year period from 1958 – 1988, it can be estimated that ~0.1 m of peat per year on average was removed from production fields throughout this period. However, it is unlikely that certain fields were utilised throughout this period and therefore the depth of peat removed is likely to be less than 4 m.

#### 8.4.1 Peat Extraction Phase (July 1988- June 2020)

Drainage was installed in all bogs, and railway infrastructure was laid and maintained on all bogs as required. During the Peat Extraction Phase, the deepening and maintenance of drainage channels continued beyond 1988, up until the cessation of peat extraction in 2020. Machinery used for drainage works would have been largely the same as that described in Chapter 4 Project Description, with ever-improving engine efficiency in tractors and excavators.

Peat extraction and ancillary activities continued at different times and at different levels of intensity from 1988 to June 2020. One of the key factors in the extraction rate was the prevailing weather conditions.

Milled peat extraction was the only form of peat extraction taking place across the Application Site from 1988 until June 2020, outlined briefly below and described fully in Chapter 4.

As outlined in Chapter 4, a trial of Fóidín peat extraction was undertaken at the Application Site in the late 1960s. Fóidín peat was a form small sod peat product produced from milled peat bogs. This trial was not sufficiently productive, and the practice ceased shortly after its commencement.

Between July 1988 and 2020, an average of 173,799 tonnes of peat were extracted each year, with a total of 5,735,371 tonnes extracted at the Application Site between July 1988 and the cessation of peat extraction in 2020.

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 Rhode Power Station up to 2003 and Croghan Briquette Factory until 2000.

Following the cessation of peat extraction, any remaining stockpiled peat at the Application Site was systematically transferred to Ballivor Horticultural Works, Derrinlough Briquette Factory, Lough Ree Power Station, West Offaly Power Station, Cúil na Móna Horticultural Works, Edenderry Power Station, and other third-party horticultural peat customers.

#### 8.4.2 Current Phase (June 2020 – Present Day)

The Current Phase includes all activities carried out at the Application Site from the cessation of peat extraction June of 2020 to the present day.

During this period, activities at the Application Site have been limited to the removal of stockpiled peat with no peat extraction activities or ancillary works occurring.



Ongoing decommissioning at the Application Site has included the removal of peat stockpiles which was completed in 2021 along with the planned decommissioning of infrastructure, as outlined in Chapter 4. Approximately 20.6 km of rail track was located within the Application Site boundary. To date, 3.71km rail has been removed. The rail infrastructure will be decommissioned as part of the wider decommissioning programme under the IPC Licence. Decommissioning activities for each of the five bogs within the Application Site are detailed in Appendix 4.3 of Chapter 4.

In accordance with the IPC Licence, waste items are - and will continue to be - removed from the Application Site for recycling or disposal, using professional licenced contractors as required under Condition 7.2. Waste management records are, and will continue to be, maintained in full compliance with Condition 7.3.

### 8.4.3 Remedial Phase

The Draft Cutaway Bog Decommissioning and Rehabilitation Plans for each of the five bogs have been developed for the Application Site (i.e., Derryhinch, Drumman, Derryarkin Ballybeg and Toar Bogs), refer to Appendix 4-3 of Chapter 4 for details. These rehabilitation plans are required in order to fulfil the requirements of Condition 10.2 of the IPC Licence. Each Decommissioning and Rehabilitation Plan, as per Condition 10 of the IPC Licence will be subject to agreement with the EPA. It is the intention of Bord na Móna to rehabilitate the bogs in a phased approach under the requirements of the IPC Licence.

Each plan contains within a detailed ecological report and GIS mapping pack. The key objective of Bord na Móna's peatland rehabilitation is environmental stabilisation. The plans use bespoke interventions designed to firstly stabilise the environment and secondly to rehabilitate the site as much as possible by placing the existing peatland environments on a path towards naturally functioning peatlands. The rehabilitation of the bogs will support biodiversity e.g., plants, insects, bird and mammals, and the formation of wetland habitats. In addition, peatland rehabilitation will bring a range of benefits to the local community via improvements in the local landscape, and it is also complying with national policies and strategies regarding the reduction of carbon emissions, supporting biodiversity and enhancing water quality. It is anticipated it will take up to 30 years for naturally functioning wetland and peatland ecosystems to fully re-establish.

Each individual bog comprising the Application Site has its own unique history of peat extraction activities and all ancillary works operations, therefore the most appropriate rehabilitation approach is bog-specific reflecting local ecological and hydrological factors. Consequently, each bog has its own exclusive Cutaway Bog Decommissioning and Rehabilitation Plan.

The intervention measures include drain blocking. This will encourage natural colonisation of cutaway areas and will establish a more suitable hydrological/hydrogeological regime for the development of bog habitats. 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. 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.

Rehabilitation works have commenced on the Application Site already in the form of natural revegetation and re-colonisation, as described in Appendix 4.3 and in Table 4-7 of Chapter 4. Further rehabilitation work will commence immediately following the full decommissioning of the Application Site.

To inform the final rehabilitation plan for each bog, both national and local stakeholders, including neighbours whose land adjoins the relevant bog units and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation. All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed and the final draft of plans will contain a review of the consultation.

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

## 8.5 ASSESSMENT OF SIGNIFICANT EFFECTS

### 8.5.1 Do-Nothing

As outlined in the EPA Guidelines (May 2022), the description of 'Do-Nothing/Future Baseline Effects' relates to the environment as it would be in the future had the project not be carried out.

A description on the approach to the 'Do-Nothing Scenario' in this remedial EIAR is presented in Section 2.11 of Chapter 2 (remedial EIA Methodology). All the associated infrastructure (e.g. railway infrastructure, silt ponds and drains, pumping stations etc.) were present at the Application Site prior to 1988.

In the event that industrial peat extraction activities had ceased in/prior to 1988 (the baseline environment year for this assessment) a total of 6,882,445 m<sup>3</sup> of peat would not have been harvested from the Application Site. The topographic changes associated with the removal of this volume of peat would not have arisen and the topography across much of the Application Site would be greater (<1 to c. 4 m) than it is today. However, small scale private turbary activities would likely have occurred outside the margin of the bogs and along access tracks. Any resulting changes in topography would have been very localised in nature and around the accessible edges of the bogs.

Under the do-nothing scenario, as there was no licence in place, the EPA decommissioning and rehabilitation plans would not have occurred. The EPA was established post 1988, following the enactment of the S.I. No. 7 of 1992 *Environmental Protection Agency Act 1992*. Other land uses may have occurred under the do-nothing scenario as a result of the cessation of peat extraction, including increased areas of commercial forestry and agricultural lands.

Areas of the Application Site which already comprised bare peat extraction fields would have been gradually recolonised by vegetation (scrub) and commenced natural rewetting (due to drains becoming blocked over time). Today, former peat extraction fields across the site have re-vegetated naturally so it is reasonable to assume that if peat extraction had ceased in 1988, the bare peat fields would have re-vegetated. In this scenario, the site would likely be covered in a mosaic of heath, scrub and woodland habitats.

However large-scale peat extraction has occurred at this site and ceased in the summer of 2020. There is no intention to carry out further peat extraction for energy or commercial use at this site in the future and therefore the option of continuing peat extraction has been discounted and does not arise.

Under the Current Phase, there is limited activity on the site (i.e., ongoing decommissioning activities and settlement pond maintenance), but a Decommissioning and Rehabilitation Plan will be implemented as required by EPA Licence P0501-01. In the case that the rehabilitation plan was not implemented, it is likely that the lands would evolve in an uncontrolled way and would continue to naturally revegetate over time. This is already occurring in several areas of the site which have been out of peat extraction for a considerable time prior to 2020. However, if the bogs were to evolve in an uncontrolled fashion the potential positive environmental effects (primarily hydrological and ecological effects) would not be fully realised or realised in a timely manner. If the rehabilitation plan is not implemented the effect of the cessation of peat extraction activities on the land, soils and geological environment would be positive in nature primarily in relation to the revegetation of the bare peat fields. In the Do-Nothing/Future Baseline scenario the likely effect on land, soils and geology is Slight, Positive and Long-Term effect.

Had peat extraction not taken place since 1988, it is assumed that the bog would have been utilised for alternative land uses, possibly additional forestry with small-scale agriculture, biodiversity, low-density one-off housing and small-scale turf cutting.

## 8.5.2 Peat Extraction Phase (1988- June 2020)

The Peat Extraction Phase of the Application Site includes all works undertaken from 1988 to the cessation of peat extraction in the summer of 2020.

### 8.5.2.1 Effects on Land (Change of Land Use)

Land and land-use changes at the Application Site were reviewed between 1988 and 2020 (refer to Section 8.3.3). Due to the nature of peat extraction activities, the primary land change occurs during the initial site preparation works (1950s) where drainage and the removal of vegetation in preparation for the peat extraction operations. Therefore, the greatest change of land use associated with the peat extraction works at the Application Site predated 1988. By 1988 commercial peat extraction by Bord na Móna was well established at the Application Site.

Drainage first occurred at the Application Site in 1950, with peat extraction beginning in 1958. Therefore, by 1988 the soils/land at these bogs had already been significantly altered and ancillary infrastructure already in place. In 1988 these areas were utilised for industrial peat extraction with landcover consisting of drained bare or vegetated peat fields separated by field drains. Slight annual topographic changes (~0.1 m/year) associated with peat extraction will

have occurred in the extraction areas at the Application Site. The effect of the excavation of the peat on soils, geology and land did not result in a loss of peat habitat due to the disturbance of bare peat.

The baseline sensitivity of the receiving Land use has been assessed as Low on the basis of the no removal of active raised bogs or remnant raised bogs (post-1988) in the context of the Application Site. Based on the low sensitivity, low magnitude of change of land use during the Peat Extraction Phase, the potential effects on land use change are not significant and medium term.

#### ***8.5.2.2 Effect on Contamination of Soil***

Accidental spillage during refuelling of machinery and plant (static and mobile) with petroleum hydrocarbons is a pollution risk. The accumulation of small spills of fuels and lubricants during routine plant use can also be a significant pollution risk over time. Hydrocarbons have high toxicity to humans, and all flora and fauna, including fish and is persistent in the environment. Large spills or leaks have the potential to result in significant effects (i.e., contamination of peat, subsoils and pollution of the underlying aquifer) on the geological and water environment.

There was no widespread contamination of soil at the Application Site as the machinery and equipment were well maintained and that if any spills did occur, they were localised. If the correct preventative measures were not put in place leakages and spillages could have altered the peat and soil geochemistry.

Discharges from the wastewater system (septic tanks) at the office buildings, and at the extraction centres and maintenance workshops could potentially have caused surface water and groundwater contamination. However, following review of available AER (Annual Environmental Reports submitted to the EPA under the IPC licences) it can be concluded that no significant pollution events/spills to groundwater have occurred since 2000 (surface water is dealt with separately in this remedial EIAR). Furthermore, following a review of the available data on the EPA website in relation to pollution and water quality of the surface water features at the bogs, had such an event occurred prior to the year 2000, the effects were either insignificant or slight and short-term.

#### ***8.5.2.3 Effect on Geological Heritage***

There are no Geological Heritage sites within the Application Site. Based on the review of the information there is no potential for impact on geological heritage at the site.

#### ***8.5.2.4 Effect on Peat Stability and Failure***

Disturbance of natural peatland can lead to an increased risk of peat instability and failure. Peat instability or failure refers to a significant mass movement of a body of peat that would have an adverse effect on individual bogs such as the Application Site and potentially the surrounding environment. Some minor peat instability could have occurred during initial development of bog drainage or ancillary activities associated with peat extraction. The significant effects of peat failure at the site could have resulted in:

- Death or injury to personnel;
- Damage to machinery;
- Damage or loss of infrastructure;

- Drainage disruption by blockage of drainage pathway by relocated peat;
- Contamination of watercourses, water supplies by particulates; and,
- Degradation of the peat environment by relocation of peat.

Based on the absence of peat stability issues, the potential effects on peat stability are negligible.

### 8.5.3 Current Phase (June 2020 – Present)

The Current Phase of the Project encompasses the period of time between the cessation of peat extraction at the site in the summer of 2020 to the Present day.

#### 8.5.3.1 Effect on Land and Land-Use

Following the cessation of peat extraction in June 2020, land use at the Application Site is no longer classified as industrial peat extraction. The bogs are no longer the site of extensive peat extraction, and the Current Phase of peat extraction activities will have a positive effect on land and land-use.

To date, 3.71km of rail has been removed. The remaining rail infrastructure will be decommissioned as part of the wider decommissioning programme under the IPC Licence.

The decommissioning of the bog from peat extraction activities will have positive effects on land use in terms of facilitating alternative uses and sustainable energy development on these peatlands, for example the proposed development of a wind farm, as outlined in Section 4.10 of Chapter 4.

In terms of the land itself the Current Phase will have a slight positive effect on the landscape of the bog as peat layers are no longer being stripped for extraction and redundant infrastructure around the bogs will be removed. There are no significant effects during the Current Phase on land and land-use.

#### 8.5.3.2 Effect on Contamination of Soil

The Current Phase is underway across the Application Site and is being carried out in accordance with Condition No. 10.1.1 of the IPC Licence. Bord na Móna is required to:

*“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”.*

Despite the cessation of peat extraction at the Application Site, there is still limited activity at the site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at Derrygreenagh Works remain occupied and discharges from wastewater systems (septic tanks) etc. have the potential to cause surface water and groundwater contamination. As outlined in Chapter 4, Section 4.4, 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 Derrygreenagh Works (outside the Application Site boundary), and refuelling procedures were upgraded to comply with licensing requirements in 2000.

These risks are the same as those outlined in Section 8.5.2.1 but to a lesser extent due to the lower volumes of plant, machinery and workers operating at the site during the Current Phase.

Based on the absence of significant contamination events at the Application Site, the effects were insignificant or slight, short-term and reversible.

#### ***8.5.3.3 Effect on Geological Heritage***

There are no Geological Heritage sites within the Application Site. Based on the review of the information there is no potential for significant effects on geological heritage at the site.

#### ***8.5.3.4 Effect on Peat Stability and Failure***

Disturbance of natural peatland can lead to an increased risk of peat instability and failure. No peat extraction has occurred at the Application Site since the cessation of peat extraction in 2020. Therefore, no significant change in topography and/or drainage has occurred during the period. The removal of ancillary infrastructure e.g., the railway track, has the potential for minor disturbances to peat stability. The rail track will be removed however the railway embankment will remain in place, therefore there is no effect. However, there are no records of any landslides in relation to peat failure or instability to date and it is highly unlikely that the removal of ancillary infrastructure would cause any perceptible changes to peat stability given the low-lying/flat nature of the local topography.

Hence, it is concluded that the ongoing Current Phase of the peat extraction activities has not significantly impacted peat stability at the Application Site. The effect on peat stability and failure as a result of the Current Phase is negligible as no instability has occurred.

### **8.5.4 Remedial Phase**

This section presents an assessment of likely significant effects resulting from Bord na Móna's proposed rehabilitation plans for the Application Site on the land, soils and geological environment.

#### ***8.5.4.1 Change of Land Use***

Industrial peat extraction has now ceased. The climate benefits associated with the rehabilitation of the peatlands will make a significant contribution to achieving the State's carbon emission reduction targets.

The optimum habitats on the site are a mosaic of wetlands, scrub and heaths/peatlands. As the former raised bogs are basin peatlands, will not revert to raised bog peatlands in the short to medium term (5-15 years). Peatlands and peatland habitats require >30 years to re-establish.

One of the main criteria which will be used to define the success of the rehabilitation plans will be the stabilisation of the former peat extraction areas. The peatland stabilisation will be achieved primarily through natural colonisation of the former peat extraction activities and all ancillary works fields.

The potential effect is considered to be not significant, positive, direct, long-term, certain effect on land use. On this basis no mitigation is required. Any works undertaken as part of the rehabilitation plans will be completed in compliance with the licence from the EPA until the IPC Licence is surrendered.

#### **8.5.4.2 Effect on Contamination of Soil**

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with many types of development. Proven and effective measures to mitigate the risk of spills and leaks were implemented at the Application Site. The management of fuel on site is in accordance with the EPA licence. These control measures break the pathway between the potential source and the receptor. The residual effect is considered to be, imperceptible, direct, short-term, unlikely adverse effect on peat and subsoils and bedrock. Fuel tanks will be decommissioned and removed as part of the IPC licence conditions.

For the reasons outlined above, and with the implementation of the control measures it can be concluded that there are no significant effects on peat, subsoil and bedrock. Bord na Móna will continue to comply with the existing IPC licence conditions.

#### **8.5.4.3 Effects on Geological Heritage**

No significant effects were identified. There are no geological heritage sites present on the site. No additional mitigation is required.

#### **8.5.4.4 Effect on Peat Stability and Failure**

The Remedial Phase aims to stabilise and revegetate the surface of the peat. Rehabilitation activities do not involve the removal of peat from the Application Site. The risk of peat failure at the Application Site will remain very low.

There were no significant long-term effects at the bogs on peat stability. The effect on peat stability and failure during the Current Phase of the Application Site was negligible and there were no records of peat instability recorded in the bog. No additional mitigation is required.

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on peat stability.

## **8.6 CONTROL/MITIGATION AND MONITORING MEASURES**

The impact assessment of this remedial EIAR identifies where an aspect of the project was likely to give rise to significant environmental effects and identifies any control and/or monitoring measures that were put in place in order to avoid effects or reduce them to acceptable levels where possible. The assessment also identifies the requirement for any additional mitigation and/or monitoring measures.

### **8.6.1 Peat Extraction Phase (1988-2020)**

#### **8.6.1.1 Effects on Land (Land Use Change)**

No known control measures for land and soils/land exist in the context of the activity being assessed here, other than working on Bord na Móna's land, and undertaking peat extraction in an established peat extraction area.

Peat extraction ceased at the site in June 2020 and much of the Application Site has begun to naturally revegetate.

### 8.6.1.2 Effect on Contamination of Soil

#### Pre-IPC Licence:

As described in Chapter 4, with the exception of documentation for silt control (which from 1974 was subject to a formal management program), there is no formal documentation outlining dedicated control measures implemented on site prior to 2000.

However, as outlined in Chapter 4, Section 4.5.4, personal communication with former employees of Bord na Móna reveals a suite of management measures which were in effect across the site. The following best practice procedures were implemented at the site pre-2000 in order to prevent the occurrence of hydrocarbon leakages and spillages at the site:

- All peat extraction machinery were stored at the Derrygreenagh Works at the end of each workday.
- All machinery were regularly inspected, serviced by dedicated staff.
- The 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 and grease components to minimise dust and particle release.
- A self-contained machine parts washer was located at the Derrygreenagh Works.
- Refuelling and vehicles maintenance was undertaken at the Derrygreenagh Works.
- When machinery required refuelling on the Application Site, it was carried out by a mobile (rail or tractor-transported) fuelling unit which travelled out from the Derrygreenagh Works to the bog where the machinery was located.
- In the event of a spill:
  - The General Manager was immediately informed of the incident.
  - 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;
  - If there was a risk of explosion, all personnel were required to be evacuated from the area;
  - The spill was sourced, isolated and contained with polystyrene booms or dry peat (moisture content of 10%);
  - All efforts were made to prevent the spill from entering a storm drain or nearest outfall;
  - Once the spill had been contained, a suitable absorbent (e.g., dry peat) was to be used to soak the spillage;
  - All possible ignition sources such as electrical equipment, naked lights, machinery were removed from the area. Any combustibles in the spill area were removed;
  - Follow up action measures taken includes the implementation of appropriate remedial work to prevent such a spillage recurring in the future; and,
  - In the event of a significant spillage, the General Manager was required to notify the local authority.
- All waste oil and break fluids drained from machinery were collected in drums and emptied into a waste oil storage tank which were transported off-site by a licenced disposal contractor.
- All used oil and fuel filters and used batteries were collected by licenced waste disposal and battery collection contractors respectively.
- All washing from the self-contained machine parts washer was 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.
- 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.

#### Post IPC licence:

Bord na Móna Energy Limited was granted an IPC Licence (Reg. No. P0501-01) for the Derrygreenagh Bog Group (within which the Application Site is located) in April 2000. A copy of the IPC Licence is provided in Appendix 4-1.

The control measures were upgraded and expanded to comply with the IPC Licence conditions in 2000:

- Effective spill/leak management of mobile fuelling units.
- Replacement (and remediation where necessary) of all underground fuel tanks.
- There shall be no other emissions to water of environmental significance.
- All tank and drum storage areas shall be rendered impervious to the materials stored therein. In addition, tank and drum storage areas shall, as a minimum be bunded.
- Drainage from bunded areas shall be diverted for collection and safe disposal.
- The integrity and water tightness of all the bunding structures and their resistance to penetration by water or other materials stored therein shall be tested and demonstrated by the licensee to the satisfaction of the Agency and shall be reported to the Agency within eighteen months from the date of grant of the licence and every two years thereafter.
- The loading and unloading of fuel oils shall be carried out in designated areas protected against spillage and leachate run-off. While awaiting disposal, all materials shall be collected and stored in designated areas protected against spillage and leachate run-off.
- With the exception of roof water, all surface water discharges from workshop areas shall, be fitted with oil interceptors.
- An inspection for leaks on all flanges and valves on over-ground pipes used to transport materials other than water shall be carried out weekly.
- Inspections and monitoring of wastewater systems and associated discharges in accordance with the IPC licence.
- The removal and safe disposal of waste oil and oil contaminated soil from the scrap storage area at Derrygreenagh Works.
- Maintain in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

#### *8.6.1.3 Effects on Geological Heritage*

No significant effects on geological heritage were identified, therefore no mitigation is required.

#### *8.6.1.4 Effect on Peat Stability and Failure*

There are no records of peat instability on the Application Site or surrounding area. Neither GSI nor Bord na Móna records document the occurrence of peat slides or evidence of peat instability or failure within the Application Site throughout the duration of peat extraction. Since the baseline assessment year of 1988, an active and extensive drainage design has been in place.



The residual peat depths across much of the Application Site are shallow, and slopes are small, so the risk of large-scale peat failure is negligible. Mitigation/control and management measures that have been implemented relating to peat stability include:

- All drainage works were completed by experienced and competent operatives;
- All works were designed and overseen by experienced and qualified personnel;
- The drainage design around the 5 bog units was maintained and managed by Bord na Móna throughout the duration of the Peat Extraction Phase (1988 – 2020);
- and Bord na Móna implemented their own best practice drainage maintenance pre-2000 when these were updated to comply with IPC licence conditions in 2000 (refer to Chapter 4).

### 8.6.2 Current Phase (2020– Present Day)

#### Control Measures

Measures that mitigated and will continue to mitigate against contamination of peat, subsoil and bedrock are outlined in Section 8.6.1 and are currently being adhered to at the Application Site. These mitigation measures reduce the risk of soil contamination. These measures/controls have been implemented as part of compliance with IPC licence conditions across the Derrygreenagh Bog Group, including the Application Site. No further mitigation, beyond that implemented to date, are deemed necessary. The existing wastewater services at the Application Site have been in operation for years with no reported issues.

### 8.6.3 Remedial Phase

#### Mitigation Measures

Measures that mitigated and will continue to mitigate against contamination of peat, subsoil and bedrock are outlined in Section 8.6.1 and are currently being adhered to at the site. These mitigation measures reduce the risk of soil contamination. These measures/controls have been implemented as part of compliance with IPC licence conditions across the Derrygreenagh Bog Group, including the Application Site. No further control measures / mitigation, beyond that implemented to date, are deemed necessary. The existing wastewater services at the Application Site have been in operation for years with no reported issues.

## 8.7 RESIDUAL EFFECT

### 8.7.1 Peat Extraction Phase (1988 – June 2020)

#### 8.7.1.1 *Change of Land Use*

##### **Residual Effect**

A change to the land/soil environment occurred following the cessation of the peat extraction, with natural revegetation of peat extraction areas gradually taking place across the Application Site. Some areas previously in production in 1988 had revegetated by 2020. The residual effect on soils/land of this natural revegetation in the Peat Extraction Phase can be classified as medium term and not significant.

The residual effect on areas still in subject to peat extraction by 2020 is imperceptible.

##### **Significance of Effects**

For the reasons outlined above there are no significant effects on landcover and topography, but there is a significant positive impact on soils/land, having changed from industrial peat extraction to recovering peatland/scrub and wetland habitats.

#### 8.7.1.2 *Effect on Contamination of Soil*

##### **Residual Effect**

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with many types of development. Proven and effective measures to mitigate the risk of spills and leaks were implemented by the Application. These control measures break the pathway between the potential source and the receptor. The residual effect is considered to be imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock. No evidence of contamination was identified on site.

##### **Significance of Effects**

For the reasons outlined above, and with the implementation of the control measures it can be concluded that there have not been significant effects on peat, subsoil and bedrock.

#### 8.7.1.3 *Effects on Geological Heritage*

No significant effects were identified. There are no geological heritage sites present on the site.

#### 8.7.1.4 *Effect on Peat Stability and Failure*

##### **Residual Effect**

There were no significant long-term effects from peat extraction at the bogs on peat stability. There were no records of peat instability recorded in the Application Site. The effect on peat stability and failure during the extraction phase of the Application Site was negligible.

##### **Significance of Effects**

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on people, land and infrastructure have occurred.

## 8.7.2 Current Phase (June 2020 to present day)

The Current Phase of the Project encompasses the period of time between the cessation of peat extraction activities and all ancillary works at the Application Site in June 2020 to the present day.

### 8.7.2.1 *Change of Land Use*

Following the cessation of peat extraction in June 2020, land use at the Application Site for industrial peat extraction ceased. Peat stockpiles and loose peat on the active peat extraction areas were removed and the area was allowed to undergo re-vegetation and natural colonisation. Areas where the mineral soil are exposed and areas of surface water drains have begun to recolonise first. Recolonisation of bare peat areas has begun with pioneer species such as rush and scrub.

However, given the relatively short time period which has elapsed since the full cessation of peat extraction, there has been no significant change in land cover to date, with much of the Application Site containing bare peat fields or pioneer open cutaway habitats.

#### Significance of Effects

For the reasons outlined above, it can be concluded that there have not been significant effects on peat, subsoil and bedrock.

### 8.7.2.2 *Effect on Contamination of Soil*

#### Residual Effect

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with many types of development. Proven and effective measures to mitigate the risk of spills and leaks were implemented at the Application Site. The management of fuel on site is in accordance with the IPC licence. These control measures break the pathway between the potential source and the receptor. The residual effect is considered to be imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock.

#### Significance of Effects

For the reasons outlined above, and with the implementation of the control measures it can be concluded that there have not been significant effects on peat, subsoil and bedrock.

### 8.7.2.3 *Effects on Geological Heritage*

No significant effects were identified. There are no geological heritage sites present on the site.

### 8.7.2.4 *Effect on Peat Stability and Failure*

#### Residual Effect

There were no significant long-term effects at the Application Site on peat stability. The effect on peat stability and failure during the Current Phase is negligible and there are no records of peat instability during this phase.

### Significance of Effects

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on people, land and infrastructure have occurred.

## 8.7.3 Remedial Phase

This section presents an assessment of likely significant effects resulting from Bord na Móna's rehabilitation plans for the Application Site on the land, soils and geological environment.

### 8.7.3.1 *Change of Land Use*

Industrial peat extraction has now ceased. The climate benefits associated with the rehabilitation of the peatlands will make a significant contribution to achieving the State's carbon emission reduction targets.

The optimum habitats on the Application Site are a mosaic of wetlands, scrub and heaths/peatlands. As the former raised bogs are basin peatlands, it is unlikely that the overall area will revert to raised peatlands in the short to medium term.

One of the main criteria which will be used to define the success of the rehabilitation plans will be the stabilisation of the former peat extraction activities and all ancillary works areas. The peatland stabilisation will be achieved primarily through natural colonisation of the former peat extraction activities and all ancillary works fields.

The residual effect is considered to be moderate (not significant), direct, long-term, likely effect on land use.

### 8.7.3.2 *Effect on Contamination of Soil*

#### Residual Effect

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with many types of development including rehabilitation works. Proven and effective measures to mitigate the risk of spills and leaks were implemented by Bord na Móna. The management of fuel on site will be in accordance with the IPC licence. These control measures break the pathway between the potential source and the receptor. The residual effect is considered to be imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock.

### Significance of Effects

For the reasons outlined above, and with the implementation of the control measures it can be concluded that there have not been significant effects on peat, subsoil and bedrock.

### 8.7.3.3 *Effects on Geological Heritage*

No significant effects were identified. There are no geological heritage sites present on the site.

#### **8.7.3.4 Effect on Peat Stability and Failure**

##### **Residual Effect**

There will be no significant long-term effects on peat stability at the Application Site. The effect on peat stability and failure during the Remedial Phase are considered to be negligible.

##### **Significance of Effects**

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on people, land and infrastructure have occurred.

### **8.8 CUMULATIVE AND INDIRECT EFFECTS**

As outlined in Section 2.9 of Chapter 2 the projects considered in relation to the potential for cumulative effects, and for which all relevant data was reviewed, include existing and historical large-scale developments in operation surrounding the Application Site was carried out to identify those projects with the potential to have had a cumulative effect on the environment during the assessment period, i.e., since 1988. This included developments which were constructed prior to 1988 but were operational between 1988 and the present day at the same time as the peat extraction works, as well as developments which were built after 1988 and operational at the same time as peat extraction activities.

#### **8.8.1 Peat Extraction Phase**

Given the localised nature of activities during the Peat Extraction Phase, which occurred within the Application Site boundary, the potential for significant effects on other projects including those outlined in Section 2.9 of Chapter 2, on land, soils and geology would have been imperceptible.

The Peat Extraction Phase constituted a continuation of development which commenced at the Application Site in 1950. The cumulative effect of the Peat Extraction Phase with the works completed prior to 1988 was the removal of peat from the Application Site (prior to 1988 and between 1988 and 2020) – See Table 8-5. Therefore, there was a significant cumulative effect on soils within the Application Site.

#### **8.8.2 Current Phase**

There has been no peat extraction during the Current Phase. Activities at the Application Site have been limited primarily to stockpile removal and environmental monitoring, and as such the potential for cumulative effects arising from the Project are significantly decreased in comparison to the Peat Extraction Phase. Based on a review of the consents associated with the projects outlined in Section 2.9 of Chapter 2, the implementation of the conditions attached to those consents will ensure there will be no cumulative significant adverse effects on the land, soils and geological environment from the Current Phase in combination with other relevant developments

As such no significant cumulative effects on the land, soils and geological environment have arisen or will arise during the Current Phase of the Project.

### 8.8.3 Remedial Phase

Given the localised nature of activities during the Remedial Phase, which will occur within the Application Site boundary, the potential for significant effects on other projects including those outlined in Section 2.9 of Chapter 2, on land, soils and geology will be imperceptible. There will be very limited movement of peat associated with the implementation of the Draft Cutaway Bog Decommissioning and Rehabilitation Plans, and all works will occur wholly within the Application Site.

Based on a review of the consents associated with the projects outlined in Section 2.9 of Chapter 2, the implementation of the conditions attached to those consents will ensure there will be no cumulative significant adverse effects on the land, soils and geological environment arising from the Remedial Phase in combination with other relevant developments. As such no significant cumulative effects on the land, soils and geological environment have arisen or will arise during the Remedial Phase of the Project.

#### Future Uses of the Application Site

The Derrygreenagh Bog Group, and in particular the Application Site, is an important natural asset and has the potential to play a strategic role in meeting national climate action targets, which have become all the more significant in light of the Climate Action and Low Carbon Development (Amendment) Act 2021, the Climate Action Plan 2025, the Climate Change Performance Index 2024, and the Change Advisory Council's Annual Report 2026. 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 BnM's vision to assist in achieving a climate neutral Ireland by 2050, it is intended to utilise the Application Site for both peatland rehabilitation and wind energy infrastructure and to facilitate environmental stabilisation of the Application Site and the optimisation of climate action benefits.

The proposed Derrygreenagh Wind and Solar project will not impact or change the overall goals and outcomes of the proposed rehabilitation plans. It is the intention of the BnM to integrate the peatland rehabilitation measures with the proposed future renewables project. The key objectives of environmental stabilisation and re-wetting of the cutaway areas will occur between and surrounding the proposed windfarm infrastructure. The EIAR for the proposed Derrygreenagh Wind and Solar project will detail issues related to peat management during construction.

The Cutaway Bog Decommissioning and Rehabilitation Plans which will be included with the planning application for the Derrygreenagh Wind and Solar project will detail how the Application Site will be rehabilitated alongside the construction and operation of the Derrygreenagh Wind and Solar project, should that project be consented. Further details of this proposed Derrygreenagh Wind and Solar project can be obtained at the project website (<https://bnmenergypark.ie>).

The future rehabilitation of the bogs at the Application Site will have a cumulative positive effect on land, soils and geology with the proposed future uses of the lands for renewable energy and enhanced rehabilitation. The proposals for future land uses have been accounted for, to the

extent that information is available, in the preparation of the Draft Rehabilitation Plans for the bogs which are included in Appendix 4-3 of this remedial EIAR.

For the reasons outlined above, and with the implementation of the Decommissioning and Rehabilitation Plan, there will be no significant negative cumulative effects with regards to land, soils and geology. It is considered that there will be a long-term slight positive effect on land use arising from the rehabilitation of the bogs and the future development of the subject lands.

## 8.9 MAJOR ACCIDENTS AND DISASTERS

Major Accidents and Disasters assessment considers the potentially significant effects of a development on the environment as a result of its vulnerability to, or introduction of, risks of major accidents and/or disasters. It is clear from the EIA directive that a major accident and/or natural disaster assessment should be mainly applied to Control of Major Accident Hazards (COMAH) sites, SEVESO sites or nuclear installations. The proposed project is not a COMAH or nuclear installation, however the assessment is included for completeness. The potential for a significant peat slide is negligible at the site and no peat slides occurred between 1988 and 2020.

It can be concluded that the risk of accidents associated with this Project is low and did not cause unusual, significant, or adverse effects on the soils and geology environment during the Peat Extraction Phase, Current Phase or Remedial Phase.

## 8.10 REFERENCES

- Aecom (2024). Derrygreenagh Power Station Planning Application (Reference 19.319023) – EIAR Documents including Site Investigation Report and Risk Assessment
- Institute of Geologists Ireland (IGI) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- Environmental Protection Agency (May 2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (September 2015): Draft - Advice Notes on Current Practice (in the preparation of Environmental Impact Statements);
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006; and,
- Environmental Protection Agency (2006): Environmental Management in the Extractive Industry (Non-Scheduled Minerals).

## Appendix 8-1      SITE INVESTIGATIONS LOCATION REPORT

