7. LAND SOILS AND GEOLOGY

7.1 Introduction

7.1.1 Background and Objectives

Hydro-Environmental Services (HES) was engaged by MKO Ireland (MKO) to provide a description and assessment of the residual direct and indirect effects of the peat extraction and ancillary activities at Lemanaghan Bog (the 'Application Site') on the soil and geological environment, from 1988 to the present day. This chapter will also assess the potential effects of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan for the Application Site as part of the Remedial Phase following the cessation of peat extraction in June 2020.

As stated in Chapter 4 Description of Development, July 1988 is the baseline environment as this is the year in which the EIA Directive (Directive 85/337/EEC) was required to be transposed into Irish Law. There is no legal requirement to complete a rEIAR on any of the activities occurring at the Application Site prior to the required transposition of the EIA Directive. Nevertheless, for completion, we provide a brief overview of the activities occurring at the Application Site from 1950 and the onset of site preparation up to July 1988. The baseline land, soils and geological environment in the year 1988 is then described in detail along with a description of peat extraction and ancillary activities from 1988 to the cessation of peat extraction in June 2020, the management of the Application Site since June 2020, and the activities intended to be carried out at the Application Site into the future.

This chapter presents:

- An assessment of effects of the peat extraction and ancillary activities on the land, soils and geological environment;
- The baseline sensitivity of the receiving land, soils and geological environment has been assessed based on the baseline site conditions occurring in 1988;
- The effects on the receiving land, soils and geological environment have been assessed over 3 no. Phases of the life cycle of the Project. These phases include the 'Peat Extraction Phase' (July 1988 – June 2020), the 'Current Phase' (June 2020 – present day) and the 'Remedial Phase' as described in Chapter 4 Description of Development;
- The monitoring and control measures that were implemented during the Peat Extraction Phase from July 1988 to June 2020;
- The monitoring and control measures during the Current Phase (June 2020 to present day)
- The proposed mitigation measures associated with the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan (Remedial Phase); and,
- The residual effects along with the cumulative effects from the proposed Lemanaghan Wind Farm and other relevant projects in the vicinity of the Application Site.

7.1.2 Statement of Authority

Hydro-Environmental Services (HES) are a specialist geological, hydrological, hydrogeological and environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and is located in Dungarvan, County Waterford.

Our core areas of expertise and experience includes soils, subsoils and geology. We routinely complete impact assessments for land, soils and geology, hydrology and hydrogeology for a large variety of project types including wind farms and renewable energy projects on peatlands.

This chapter of the rEIAR was prepared by Michael Gill, Conor McGettigan and Nitesh Dalal.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 22 years' environmental consultancy experience in Ireland. Michael has completed numerous geological, hydrological and hydrogeological impact assessments of wind farms and renewable projects in Ireland. For example, Michael has worked on the EIARs for Oweninny WF, Cloncreen WF, and Yellow River WF, and over 120 other wind farm related projects across the country. Michael has also worked on rEIARs for Cleanrath WF, 41 no. Bord na Móna bogs, the Ballivor Bog Group, and also for a number of quarry sites.

Conor McGettigan (BSc, MSc) is an Environmental Scientist with 4 years' experience in the environmental sector in Ireland. Conor holds an M.Sc. in Applied Environmental Science (2020) and a B.Sc. in Geology (2016) from University College Dublin. Conor routinely prepares the land, soils and geology chapters of environmental impact assessment reports for developments on peatlands. Conor assisted in the preparation of the land, soils and geology chapter of the rEIAR completed for the substitute consent application for the peat extraction activities at the Ballivor Bog Group.

Nitesh Dalal (B.Tech, PG Dip., MSc) is an Environmental Scientist with over 7 years' experience in environmental consultancy and environmental management in India. Nitesh holds a M.Sc. in Environmental Science from University College Dublin (2024), a PG Diploma in Health, Safety and Environment from Annamalai University, India (2021) and B.Tech. in Environmental Engineering (2016) from Guru Gobind Singh Indraprastha University, India (2016).

7.1.3 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as summarised in Section 2.4 of Chapter 2: Background of the rEIAR. Consultation responses relating to the land, soils and geological environment were received from the Environmental Protection Agency and Geological Survey of Ireland. A summary of the response is below. Further details are outlined in Section 2.4.2 of this rEIAR.

Environmental Protection Agency

A scoping request was sent to the Environmental Protection Agency (EPA) on the 30th August 2022 and again, due to the passage of time, on the 21st June 2024. The responses state that the agency is of the opinion that the scope and level of detail included in the rEIAR should, at minimum:

- Address the matters raised in the responses received from Health Services Executive (HSE) (note that no specific response related to land, soils and geology was provided by the HSE);
- Have regard to the IPC Licence conditions, in particular the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan (this rehabilitation plan for the Application Site is assessed in the Remedial Phase of the Project presented in Section 7.5.2.3);
- Consideration should be given to the inclusion of any bog areas in an enhanced rehabilitation scheme e.g. Peatlands Climate Action Scheme (PCAS) (note that PCAS is not proposed at the Application Site);
- Have regard to relevant water quality data (addressed in Chapter 8: Hydrology and Hydrogeology); and,
- Have regard to the EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (refer to Section 7.1.5 below).

Geological Survey of Ireland

A scoping request was sent to the Geological Survey of Ireland (GSI) on the 30th August 2022 and again on the 21st June 2024. A response was received on the 7th September 2022 which comprised the following:

- List of relevant available datasets;
- The GSI acknowledged that the Clonmacnoise Esker County Geological Site is located adjacent to the Application Site but that there is no impact on the integrity of the current heritage site by the Project (please refer to Section 7.3.8);
- Recommend referring to GSI Groundwater Databases for the identification of areas of high to extreme groundwater vulnerability (this is addressed in Chapter 8: Hydrology and Hydrogeology of this rEIAR); and,
- Requested copy of reports detailing any site investigations carried out.

The above response was reiterated in GSI's response to the second scoping request on the 3rd July 2024.

7.1.4 Relevant Legislation

The rEIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU. The requirements of the following legislation are complied with:

Planning and Development Acts, 2000 (as amended);
Planning and Development Regulations, 2001 (as amended);

- 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);
- S.I. No. 296/2018 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018;
- S.I. No. 4/1995: The Heritage Act 1995, as amended; and,
- European Communities (Environmental Impact Assessment) Regulations 1989 to 2006.

7.1.5 Relevant Guidance

The land, soils and geology chapter of this rEIAR was prepared having regard, where relevant, to guidance contained in the following documents:

- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (2013): Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Guidelines for Planning Authorities and An Coimisiún Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018); and,
- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU), (European Union, 2017).

7.2 Methodology

7.2.1 Desk Study

A desk study of the Application Site and the surrounding area was completed in early 2021 to collect all relevant geological data. The initial desk study was completed in advance of site walkover surveys and site investigations. The desk study was checked and updated, where necessary, in April and May 2025. The desk study included consultation with the following data sources:

- Integrated Pollution Control Licence (IPC) Boora Bog Group (Ref: P0500-01) Environmental Protection Agency, Appendix 4-1;
- Bord na Móna Lemanaghan Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan (2024), Appendix 4-2;
- Annual Environmental Reports 2000-2024 (Appendix 4-3[1]);
- IPC Licence P0500-01 Application (Available at EPA Headquarters on request);
- Inspection of production records at Lemanaghan Works;
- Aerial Maps from 1973 to 2020, Appendix 4-4;
- Bord na Móna Annual Reports which contain information relevant to the Application Site such as peat depth databases and drainage;
- Bord na Móna Lidar data;
- Corine Land Cover and Land Cover Change Maps (https://land.copernicus.eu/en);
- Environmental Protection Agency soils and subsoils mapping (www.epa.ie);
- Geological Survey of Ireland – Geological databases (www.gsi.ie); and,
- Bedrock Geology 1:100,000 Scale Map Series. Geological Survey of Ireland (GSI, 2003).

7.2.2 Monitoring and Site Investigation Data

HES completed site inspections and walkover surveys at the Application Site as part of this remedial Environmental Impact Assessment (rEIAR) and to inform the proposed Lemanaghan Wind Farm planning application. These site investigations comprised of peat probing, geological mapping and detailed walkover surveys completed by HES on 8th July 2021, 1st and 7th August 2024 and 17th April 2025. These site investigations and surveys were completed by Michael Gill, Conor McGettigan and Nitesh Dalal (please refer to Section 7.1.2 for qualifications and experience).

In addition to the site investigations completed by HES, several additional site investigations have been completed at the Application Site to further inform this rEIAR and the proposed Lemanaghan Wind Farm application. These site investigations included peat probing investigations completed by MKO on 24th September and 31st October 2024, and 5th February 2025. Fehily Timoney and Company (FTC) completed walkover surveys and peat probing investigations at the Application Site on 7th September 2022. In addition, 3 no. phases of trial pit investigations have been completed at the Application Site by FTC (6th to 9th April 2021, 25th October 2023 and 25th September 2024) and Irish Drilling Ltd (23rd to 28th March 2022, and 24th to 26th October 2023). IDL also drilled 10 no. boreholes at the Application Site between 8th and 24th November 2023.

The combined geological dataset collated by HES, FTC and IDL has been used in the preparation of this rEIAR Chapter.

In summary, site investigations to address the land, soils and geology chapter of the rEIAR include the following:

[1] *Annual Environmental Reports (2018-2024) can be found at the following link: https://leap.epa.ie/licence-profile/P0500/compliance*

- Detailed walkover surveys of the Application Site completed by HES, MKO and FTC;
- A total of 722 no. peat probes have been completed at the Application Site by HES, MKO and FTC;
- Logging of subsoil exposures across the Application Site where mineral soils and peat profiles are exposed;
- Mineral subsoils and peat were logged according to BS: 5930 and Von Post Scale respectively; and,
- Ground investigations completed by FTC and IDL comprising of 63 no. trial pits and 10 no. boreholes.

Site specific data obtained by HES, FTC and MKO was supplemented with recent and historic site-specific data supplied by the Applicant. These data include habitat, soils/land, lidar and topographic maps for the Application Site. The maps are included in the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan attached as Appendix 4-2. The Applicant have also provided volumes of peat extracted for the Application Site that are utilised in the preparation of this rEIAR Chapter.

7.2.3 Impact Assessment Methodology

Using information from the desk study and data from the site investigations, an assessment of the importance of the soil and geological environment within the Application Site is assessed using the criteria set out in Table 7-1 (NRA, 2008).

Table 7-1 Estimation of Importance of Soil and Geology Criteria (NRA, 2008).

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.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.
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.	Contaminated soil on site with previous heavy industrial usage. Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site). Well drained and/or highly fertility soils. Moderately sized existing quarry or pit Marginally economic extractable mineral resource.
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.	Contaminated soil on site with previous light industrial usage. Small recent landfill site for mixed Wastes. Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.
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.	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes.

Importance	Criteria	Typical Example
	Volume of peat and/or soft organic soil underlying site is small on a local scale.	Poorly drained and/or low fertility soils. Uneconomically extractable mineral Resource.

The EPA Guideline criteria (EPA, 2022) for the assessment of likely significant effects require that likely effects are described with respect to their extent, magnitude, quality (i.e. negative, positive or neutral), significance, probability, duration, frequency, reversibility, and transfrontier nature (if applicable). The descriptors used in this environmental impact assessment report are those set out in the EPA (2022) Glossary of effects as shown in Chapter 1 Introduction of this rEIAR.

In order to provide an understanding of this descriptive system in terms of the geological/hydrological environment, elements of this system of description of effects are related to examples of potential likely significant effects on the geology and morphology of the receiving environment, as listed in Table 7-2.

Table 7-2: Impact descriptors related to the receiving environment.

Impact Characteristics		Potential Geological and Hydrological Impacts
Quality	Significance	
Negative only	Profound	Widespread permanent impact on: The extent or morphology of a cSAC. Regionally important aquifers. Extents of floodplains. Mitigation measures are unlikely to remove such impacts.
Positive or Negative	Significant	Local or widespread time-dependent impacts on: The extent or morphology of a cSAC / ecologically important area. A regionally important hydrogeological feature (or widespread effects to minor hydrogeological features). Extent of floodplains. Widespread permanent impacts on the extent or morphology of an NHA/ecologically important area. Mitigation measures (to design) will reduce but not completely remove the impact – residual impacts will occur.
Positive or Negative	Moderate	Local time-dependent impacts on: The extent or morphology of a cSAC / NHA / ecologically important area. A minor hydrogeological feature. Extent of floodplains. Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends
Positive, Negative or Neutral	Slight	Local perceptible time-dependent impacts not requiring mitigation.
Neutral	Imperceptible	No impacts, or impacts which are beneath levels of perception, within normal bounds of variation, or within the bounds of measurement or forecasting error.

7.2.4 Study Area

The study area for the land, soils and geological environment is limited to within the Application Site boundary. There was no potential for the Peat Extraction Phase or the Current Phase of the Project to affect the land, soils and geological environment outside of the Application Site. Furthermore, there is no potential for the Remedial Phase of the Project to affect the land, soils and geological environment outside of the Application Site.

7.2.5 Limitations and Difficulties Encountered

A complete record of annual peat extraction volumes from the Application Site is not available.

Peat extraction commenced at the Application Site in 1960 and ceased in June 2020. Bord na Móna have provided records of the annual peat extraction volumes for 38 years of this 60-year period. However, there are several periods of time for which no peat extraction volumes are available. The years for which no data is available include 1960 to 1971, 1984 to 1991, 2019 to June 2020. With regard to the Peat Extraction Phase (July 1988 to June 2020), no data is available for 4 no. full years (1989, 1990, 1991 and 2019) of this 32-year period. There is also no data available for July to December 1988 or January to June 2020.

In order to provide a complete assessment, estimates of extraction volumes have been made for the years for which no data is available. The estimations are based off data from years for which data is available. The average extraction volumes from the available data was used to estimate the extraction volumes for the years for which no data is available. Further details are provided in Chapter 4 Description of the Development and in Section 7.3.4.2.

7.3 Establishing the Baseline Environment

7.3.1 Site Location

Lemanaghan Bog ("the Application Site") is a large Bord na Móna bog which forms part of the Boora Bog Group. The Application Site comprises an area of 1,111ha within which bog drainage works began in 1950 followed by the commencement of peat extraction from 1960. The Application Site is located in County Offaly, 2.5km southwest of Ballycumber, 3.5km to the northeast of Ferbane, 7.8km southwest of Clara, and 8.7km south of Moate. The Application Site extends across several townlands which are listed in Table 1-1 of Chapter 1. The Application Site measures approximately 5.5km in length from north to south, and approximately 6.6km from east to west, at its widest point. Grid Reference co-ordinates for the approximate centre of the Application Site are E216096, N228101 (Irish National Grid Coordinates).

The Application Site is connected by rail link to the Bellair South Bog to the north and to the Blackwater Bog Group to the west. The R436 Regional Road passes along much of the southern boundary. Derrynagun and Curraghalassa bogs are both located south of the road R436. The N62 National Road skirts the extreme western tip of the Application Site. The L7002 local road passes through the northern part of the site and cuts off the northernmost sector. The current main access points to the Application Site includes an existing entrance off the N62 National Road and along the R436 into the Lemanaghan Works site, adjacent to the Application Site to the south.

7.3.2 Topography

7.3.2.1 Original Topography

The topography across the Application Site prior to the onset of peat extraction and ancillary activities (1950) is estimated to have been 54-79mOD (metres above Ordnance Datum). These elevations are higher than those observed today, with the remnant areas of high bog located around the perimeter of the Application Site resembling pre-development ground elevations more closely. The estimations of pre-development topography have been deduced from the presence of benchmarks noted on historical 25" OSI mapping (1897-1913) and Cassini 6" (1940s) maps of the local area. No detailed elevation survey of the bog is available from before peat extraction and ancillary activities began by the Applicant.

7.3.2.2 1988 Baseline Topography

Historically, the topographic profile of the Application Site was higher than that observed today with the topographic changes varying from across the site depending on the extraction history of the specific area of Lemanaghan Bog (refer to Chapter 4). The Application Site would have experienced some topographic decrease associated with the initial drainage of the bog and the associated subsidence. Regan et al. (2019) observed continued subsidence of 4-6mm/year of a bog surface due to groundwater drainage, while Grzywna (2017) also recorded a subsidence rate of 6mm in a drained peatland. Further decreases in topography would have resulted from the subsequent peat extraction which commenced in 1960. As detailed in Section 4.3.3 of Chapter 4, Bord na Móna records indicate that approximately 904,128 tonnes of peat were extracted from the Application Site for the period between 1960 to June 1988 inclusive. The topography of the Application Site is estimated to have been approximately 54-66mOD by 1988.

7.3.2.3 Current Topography

The current topography of the Application Site is relatively flat with an elevation range of between approximately 46 and 60mOD. Topography at the Application Site has been modified through the peat extraction and ancillary activities including associated drainage works. Today the highest elevations are found at headlands and remnant peat banks which create a boundary berm, forming a basin effect within the former extraction areas of the bog. These remnant peat banks and headlands provide an approximation (albeit drained and subsided) of the original ground elevations which existed across the Application Site prior to the commencement of any peat extraction and ancillary activities.

7.3.3 Land (Land take)

7.3.3.1 Land - Historical Change Summary

The primary change to land at the Application Site associated with peat extraction and ancillary activities occurred during the initial drainage of the bog and the removal of vegetation in advance of peat extraction. Drainage ditches were inserted into the surface of the bog and drained the upper surface of the bog by lowering the local peat water table (full details on the drainage implemented at the Application Site are provided in Chapter 4). At this time, ancillary features were constructed including railway lines, canteens, mobile and fixed fuel tanks, and the Lemanaghan Works adjacent to the Application Site. After the site was drained, vegetation was removed from the bog surface, leaving only bare peat fields between the drains. During the Peat Extraction Phase of the peat extraction and ancillary activities only minimal soils/land change occurred and may have involved a change in the type of peat extraction i.e. sod or milled peat extraction. During peat extraction, minor topographic changes have occurred annually due to the removal of peat from active peat extraction areas.

Land take and any land changes at the Application Site have been investigated using available aerial imagery dating from 1973 to the most recently available imagery (2020). Annual Bord na Móna Reports were also consulted to help develop the timeline of changes across the Application Site. The observed changes in land and land take at Lemanaghan Bog are discussed in the following paragraphs.

The first site preparation works comprising of site drainage and the clearance of vegetation commenced at the Application Site in 1950. An aerial image from 1973 shows that a large area of approximately 409.5ha in the centre of the Application Site had been drained and was subject to peat extraction by this time. A small area (approximately 5.6ha) of the Application Site had been drained but was not subject to peat extraction. Meanwhile, the remainder of the Application Site (approximately 683.6ha) had not been drained by 1973 and would have still been active raised bog.

Inspection of aerial imagery and Bord na Móna records show that the vast majority (approximately 968.7ha) of the Application Site had been drained by 1988 and was subject to peat extraction. Meanwhile, an area of approximately 65.1ha in the north of the Application Site, to the north of the local road, had been drained but had not yet been subject to peat extraction. Several smaller areas around the perimeter of the Application Site had not been drained at this time (61.2ha).

By 1995 peat was also being extracted from the area in the north of the Application Site which had only been drained by 1988. Aerial images from 2004 and 2020 also show that the vast majority of the Application Site was subject to peat extraction during this time. Inspection of aerial imagery also shows several NE-SW strips of land, of a similar orientation to the field drains, in the southwest of the bog which were no longer subject to peat extraction. Based on site walkover surveys these areas correspond with areas of cutover bog which has begun to revegetate. Sufficient time has elapsed between the cessation of peat extraction in these areas to allow for revegetation to commence. Peat extraction ceased across the entire Application Site in June 2020, and much of the site still comprises of bare cutover peat fields.

Several small areas of bog around the perimeter of the Application Site were neither drained nor subject to peat extraction by 1988. These areas largely remained intact and have not been drained due to their peripheral location around the Application Site.

Table 7-3 presents the key dates in relation to the peat extraction and ancillary activities at the Application Site.

Table 7-3: Peat Extraction Activity Timeline at the Application Site

Bog Name	Bog Area (ha)	Site Preparation (removal of vegetation and drainage insertion)	First Production Year	Cessation of Peat Extraction
Lemanaghan Bog	1,111	1950	1960	June 2020

7.3.3.2 Land - Pre-Peat Extraction (1950)

It is assumed that prior to the onset of drainage and peat extraction and ancillary activities, which first occurred in 1950, the Application Site was covered by an active raised bog, with the surface being wet, acidic and deficient in plant nutrients, with open Sphagnum-dominated vegetation. Raised bogs are accumulations of deep acid peat where peat can range from 3-12m deep.

7.3.3.3 Land - 1988 Baseline

As described in Chapter 4, by 1988 the land use and landcover at Lemanaghan Bog was well established as industrial peat extraction. The majority of the Application Site was fully drained and

subject to peat extraction (i.e. 968.7ha or ~87% of land cover), milled peat extraction was underway, and railway infrastructure was in place. The main access point to the Application Site was off the Regional Road R436 to the south of the Application Site, into the Works area. The Lemanaghan Works was located adjacent to the south of the Application Site, where it is still located at present day. Railway infrastructure, machine passes and access tracks and silt ponds and drains were also established at the Application Site at this time.

Aerial imagery indicates that by July 1988, approximately 968.7ha of the Application Site was subject to milled peat extraction. Thus, the main landcover type at this time was cutover peat. Drainage was already installed, predominantly in a northwest-southeast orientation. Railway infrastructure was laid in the bog (since the 1950s), terminating at the Works building located in the south of the Application Site, just off the R436 Ballycumber road, where it is still located today. Lemanaghan Works comprised a canteen, storage sheds, maintenance buildings, a harvester repair bay, car parking facilities and a refuelling area.

As stated previously, an area of approximately 65.1ha (in the north of the Application Site) had been drained but the vegetation had not been cleared from this area. Some smaller areas of remnant raised bog existed around the periphery of the Application Site and had not been drained. The total area which had not been drained was 61.2ha or 6.8% of the Application Site.

The Application Site included 9 no. artificial silt ponds, 9 no. surface water discharge points and 8 no. gravity flow surface water outflows which remain in-situ today. These surface water outfall locations discharge directly into the Lemanaghan Stream and Brosna River.

7.3.3.4 Land – Current Condition

Corine land cover maps (2018) (www.epa.ie) show that the Application Site is predominantly comprised of 'peat bogs', located in a largely agricultural area. Landcover in the surrounding area is mapped as 'agricultural pastures' while small areas of 'transitional woodland scrub' are mapped along the northern and eastern boundaries of the Application Site. A small area of 'coniferous forestry' is located to the south. Meanwhile, Corine also map an area of 'land principally occupied by agriculture with significant areas of natural vegetation' in the interior of the bog. This corresponds to the location of a mineral soil island which does not form part of the Application Site boundary.

Land and landcover in the Application Site was verified during site walkover surveys and from inspection of recent aerial photography and Bord na Móna habitat mapping. Peat extraction ceased at the Application Site in June 2020. All stockpiles had been removed from the Application Site in 2024. The decommissioning works relating to the railway network within the Application Site are estimated to be completed in 2025. Land use at the Application Site now comprises primarily of bare cutaway peat with developing pioneer vegetation.

Maps of the Applicant's historic peat extraction areas (refer to Section 4.5 in Chapter 4 of the rEIAR) for 2020 indicate that 699ha was subject to peat extraction whilst peat was not being extracted from 354.2ha of bog which had been drained. According to this map, the areas where peat extraction first ceased, towards the south and southwest of the Application Site, corresponds with the areas which are beginning to revegetate. The majority of these areas are also shown to not have been subject to peat extraction in 2004 peat extraction mapping.

7.3.4 Peat/Soils and Subsoils

7.3.4.1 Current Environment

7.3.4.1.1 *Desk Study*

The published Teagasc soils map (www.gsi.ie) for the local area shows that cutover/cutaway peat is mapped almost exclusively across the Application Site. There are some very small, localised pockets of mainly basic peaty poorly drained mineral soils (BminPDPT) and basic poorly drained mineral soils (BminPD) mapped within the Application Site. Soils mapped in the surrounding lands comprise largely of basic deep well drained mineral soil (BminDW) to the north and west, basic shallow well drained mineral soil (BminSW) to the east and cutover peat to the south. Mineral alluvium (AlluvMIN) is mapped along many of the local watercourses in the surrounding lands, with significant alluvium deposition along the Brosna River to the south and east of the Application Site.

The published GSI subsoils map (www.gsi.ie) shows that the Application Site in underlain predominantly by cut over raised peat (Cut). The GSI also map some small, isolated pockets of gravels derived from limestone (GLs) and till derived from limestones (TLs). The island of agricultural land surrounded by the Application Site is mapped to be underlain by tills derived from limestones (TLs) and bedrock outcrop or subcrop (Rck). Subsoils in the surrounding lands are mapped largely as cutover peat, tills derived from limestone and gravels derived from limestone. Meanwhile, some esker sands and gravels are also mapped to the northeast. Alluvium subsoils are mapped ~1.5km to the south of the Application Site and 400m to the east along the Brosna River and its tributaries. An area of lake marl (Mrl) is also mapped approximately 700m to the southeast in the townland of Derrynagun.

A map of the local subsoil cover is attached as Figure 7-1.

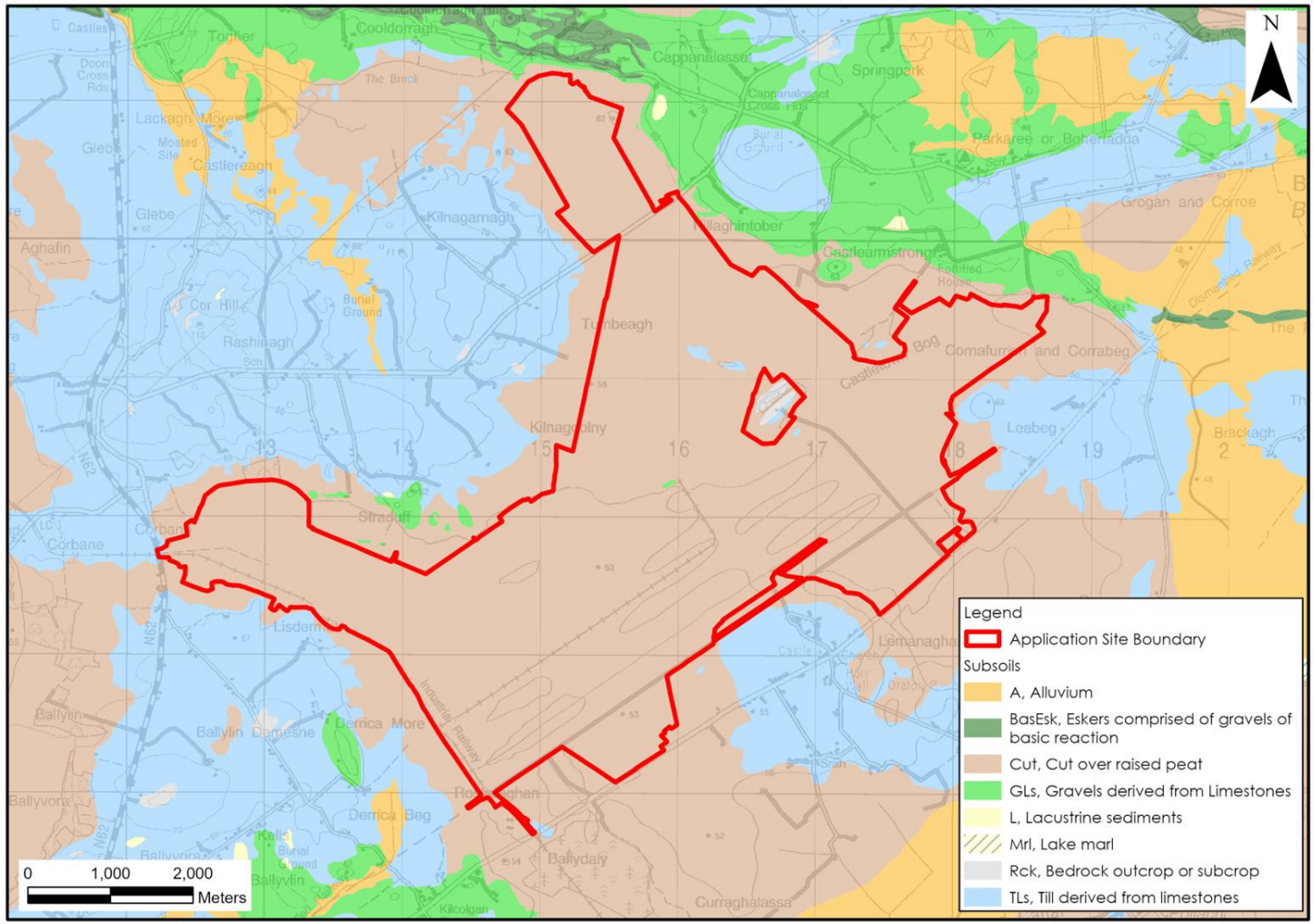

Figure 7-1: Local Subsoils Map

7.3.4.1.2 Site Specific Data

The soils and subsoils present at the Application Site have been verified during site walkover surveys and intrusive site investigations completed as part of site investigations for the proposed Lemanaghan Wind Farm application.

Peat Probing

A total of 722 no. peat probes have been completed at the Application Site. This comprehensive dataset was gathered over several phases of site investigations completed between 2021 and 2025. HES completed a total of 94 no. peat probes in 2021 and an additional 19 no. probes in 2024. MKO completed a total of 303 no. peat probes in 2024 and 25 no. probes in 2025. Meanwhile, FTC completed 281 no. peat probes in 2022. This entire dataset is presented and discussed below.

Peat depth intervals recorded across the site are shown on the histogram presented as Figure 7-2. A total of 722 no. peat probes have been completed at the Application Site by HES, MKO and FTC. The combined peat probe dataset shows that peat depths across the Application Site range from 0.1 to >6m with an average peat depth of 2m.36% of peat depth probes recorded peat depths of 1.0m to 2.0m, and 23% of peat depth probes recorded peat depths of 2.0m to 3.0m. The remaining 20% of probes recorded peat depths of between 3.0 to 6.2m. All peat probe locations are shown on Figure 7-3.

Subsoils encountered during the peat probing investigations comprised predominantly of grey, gravelly lacustrine clay which was occasionally found to be overlain by a creamy shelly marl. Other sub-peat subsoils encountered included grey silty or gravelly CLAY, silty, gravelly SAND with some probes terminating on a hard base (interpreted to be gravels or cobbles). Further details on sub-peat subsoils were obtained from the intrusive investigations, comprising of trial pits and boreholes, which are described below and in Appendix 7-1 (FT, 2025).

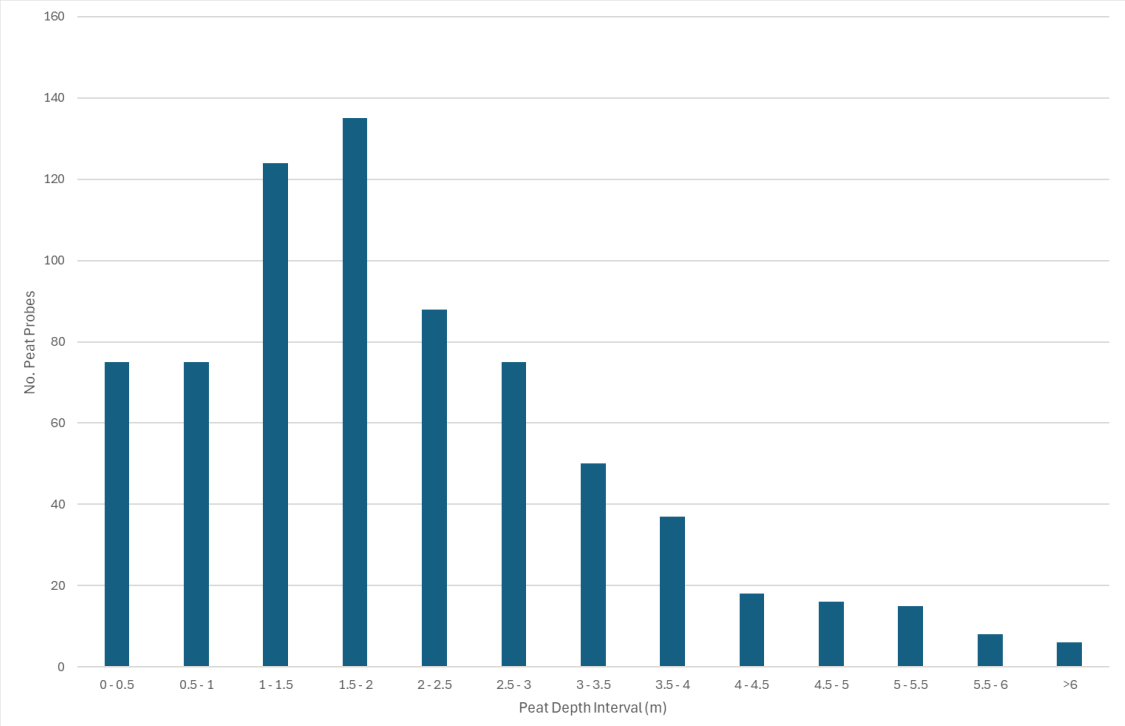

Figure 7-2: Residual Peat Depths at the Application Site (HES, FT and MKO peat probes))

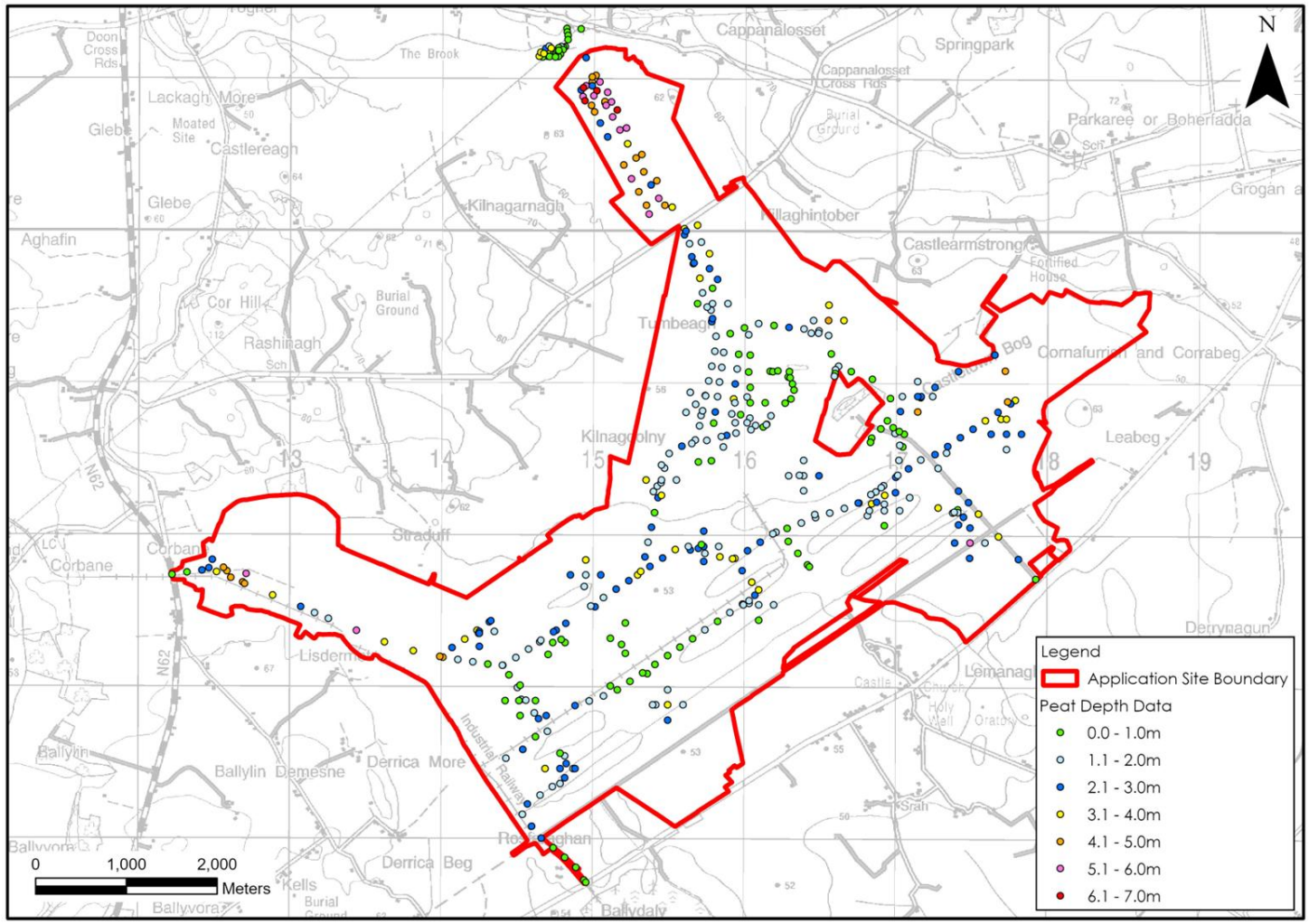

Figure 7-3: Recorded peat depths across the Application Site based on peat probes

Trial Pits and Boreholes

A total of 63 no. trial pits have been excavated at the Application Site across 3 no. phases of site investigations. A total of 28 no. trial pits were excavated in 2021 by FTC, with 19 no. trial pits excavated in 2022 by IDL. An additional 16 no. trial pits were excavated at the Application Site by IDL in 2023. IDL also drilled 10 no. boreholes at the Application Site in 2023. The location of the trial pits and boreholes are shown in Figure 7-4.

The trial pits extended to a maximum depth of 4.9mbgl (metres below ground level). Peat was encountered in all trial pits with peat depths ranging from 0.2 to 4.9mbgl. Glacial tills were generally found to underlie the peat deposits and were typically described in the logs as consisting of bluish grey, slightly sandy, SILTY/CLAY and/or silty clayey SANDS and GRAVELS and/or slightly gravelly sandy SILT/CLAY with cobbles and boulders. Trial pit logs are included in Appendix 7-I (FT, 2025).

The boreholes ranged in depth from 8.5 to 19.2mbgl. Ground conditions encountered during the borehole drilling comprised of peat overlying glacial till overlying bedrock. Summary data for the boreholes are included in Appendix 7-1.

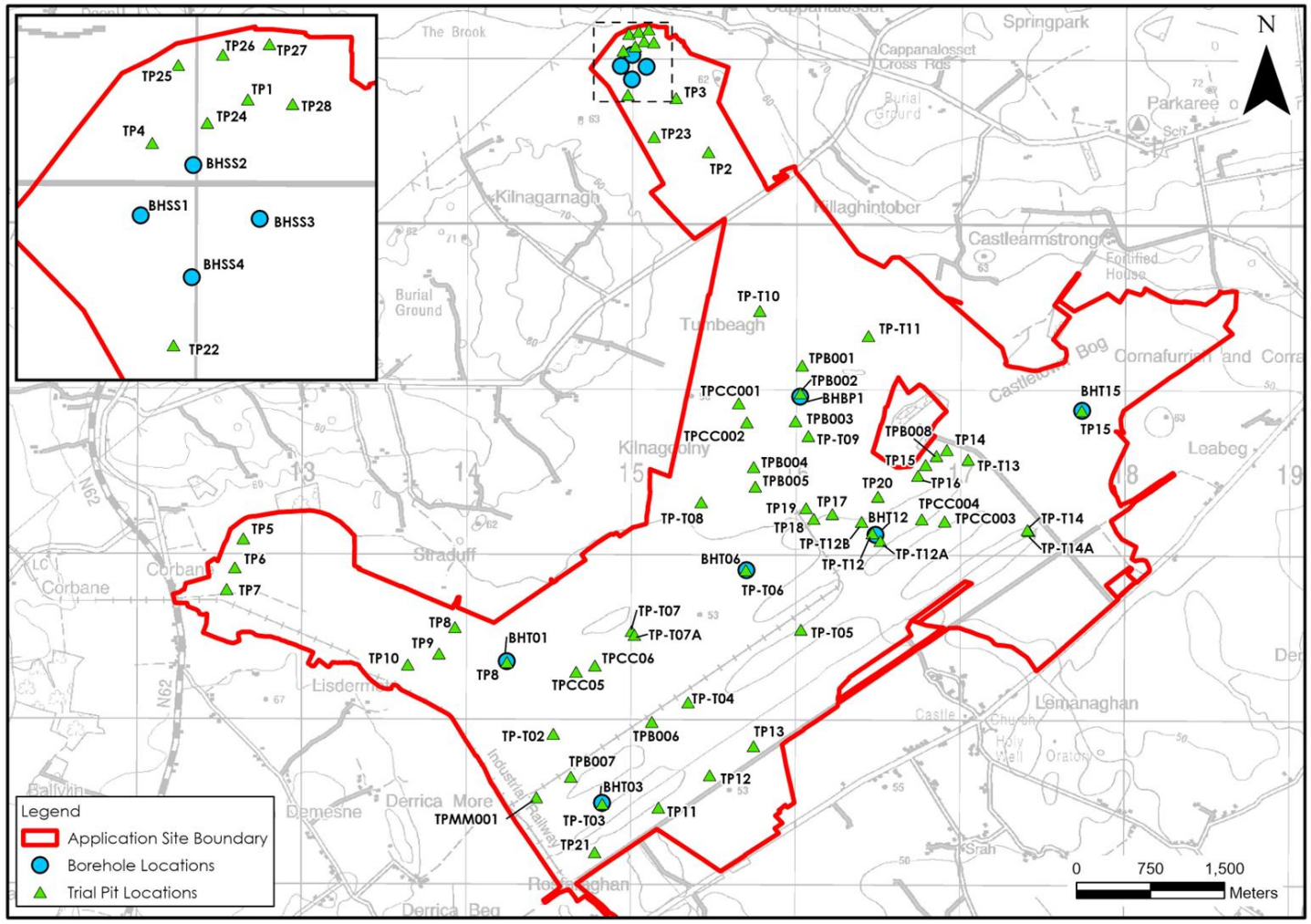

Figure 7-4: Site Investigation Locations (Trial Pits and Boreholes)

7.3.4.2 Peat Extraction

Peat extraction commenced at the Application Site in 1960. Sod peat extraction occurred at Lemanaghan Bog from 1960 to 1984 when milled peat extraction commenced. Bord na Móna peat extraction records were consulted in order to quantity the volume of peat which has been removed from the Application Site. Note that records of the volume of peat extracted from the Application Site are not available for every year. For the years where there were no extraction volumes recorded, the average extraction volumes from other years were used to estimate the volume of peat extracted. This is detailed in the subsequent sections and in Chapter 4.

The volumes of peat removed from the Application Site varied from year to year with a general and gradual increase with time as more of the Application Site was developed and became available for peat extraction. Fluctuations in peat extraction volumes are generally attributable to weather conditions in any given year, with wetter weather resulting in lower volumes of peat extraction due to poorer ground conditions for operating machinery, and poorer peat drying conditions; conversely, dryer weather usually resulted in higher volumes of peat extraction due to better ground and drying conditions.

As seen in Figure 7-5, a significant jump in peat extraction occurred in 1984 where sod peat extraction was replaced by milled peat extraction. According to Bord na Móna records and estimates for the years where no data is available, the total volume of peat extracted from the Application Site was 4,255,376 tonnes. The greatest volume of peat produced in any given year was 175,628 tonnes, removed in 2013.

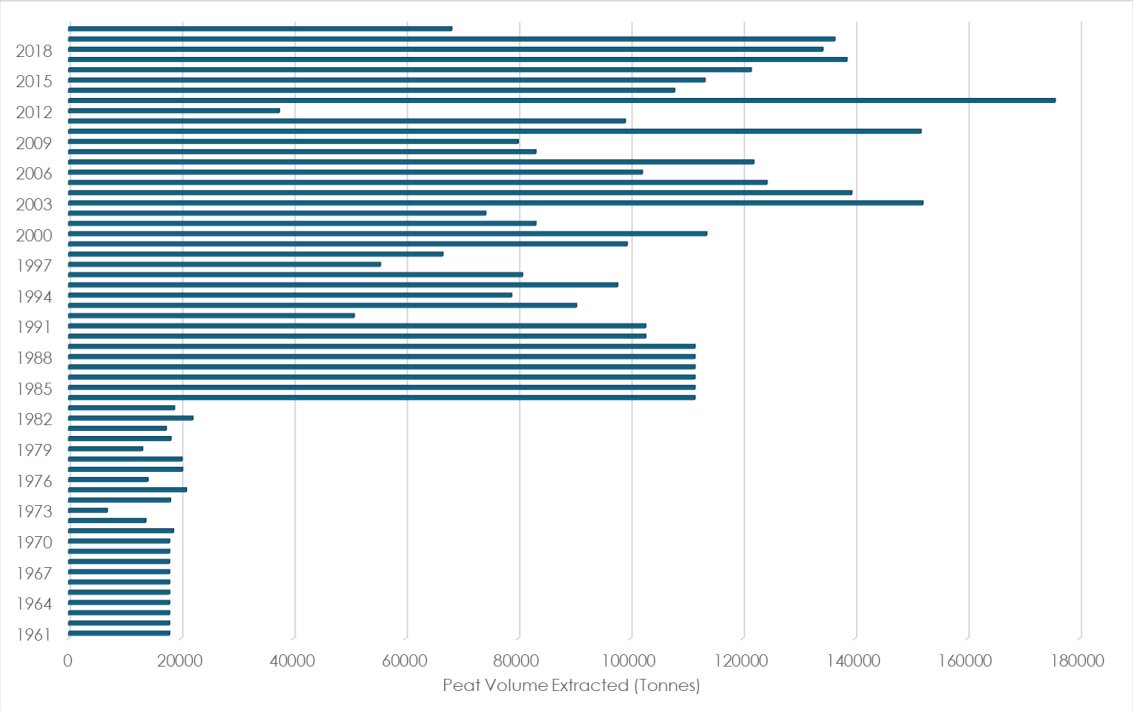

Figure 7-5: Peat Volume (tonnes) extracted annually from the Application Site (1960 – June 2020)

7.3.4.2.1 Peat Extraction 1960-June 1988

Peat extraction commenced at the Application Site in 1960. Bord na Móna records indicate that approximately 904,128 tonnes of peat (sod and milled combined) were extracted from the Application Site for the period 1961 to June 1988 inclusive. Based on figures supplied by Bord na Móna relating to peat tonnage extracted (1960 – June 1988), the volume of peat removed from the Application Site was

calculated in cubic metres based on a bulk estimate of 1.2m^3/tonne. During this time period the tonnage of peat removed equates to 1,084,954m^3.

Sod Peat Extraction

Sod peat extraction commenced at the Application Site in 1960. It is noted that sod peat extraction records are only available from 1971 to 1984. For the years for which sod peat extraction volumes are available, the year with the greatest extraction volume was 1982 when 22,101 tonnes of peat was extracted. The year with the lowest extraction volume was 1973 (6,885 tonnes).

In order to estimate the total volume of sod peat extracted, an average of the 1971 to 1984 sod peat extraction volumes (excluding the 1973 low production year) was used to calculate the sod peat extraction volumes for 1961 to 1970 (17,967 tonnes/year). Meanwhile, on the basis that peat extraction only commenced at the Application Site in 1960, it is assumed that the volumes generated in 1960 were not significant and not comparable to the volumes generated in subsequent years.

In total, Bord na Móna records indicate that approximately 402,328 tonnes of sod peat was extracted from the Application Site for the period 1961 to 1984 inclusive.

Sod peat extraction ceased at the Application Site in 1984.

Milled Peat Extraction

It is assumed that milled peat extraction commenced in 1984. In 1986 milled peat from Lemanaghan bog was first delivered off site to Ferbane Power Station. Extraction volumes for milled peat are not available during the period from 1984 to 1988 inclusive. The first records of milled peat extraction at the Application Site are available from 1992. In order to estimate the total volume of milled peat extracted prior to July 1988, an average of the 1992 to 1995 milled peat extraction volumes was used to estimate the extraction volumes for 1984 to 1988 (111,512 tonnes/year).

7.3.4.2.2 *Peat Extraction Phase: July 1988 – June 2020*

As indicated in Figure 7-5 above, peat extraction was well established at the Application Site by July 1988.

Bord na Móna records indicate that approximately 3,351,248 tonnes of peat (milled) were extracted from the Application Site for the period July 1988 to June 2020. This equates to 4,021,498m^3 of peat.

It is noted that no peat extraction records are available for the period 1988-1991 inclusive or for 2019 or 2020. For the years for which peat extraction volumes are available, the year with the greatest extraction volume was 2013 when 175,628 tonnes of peat was extracted. The year with the lowest extraction volume was 2012 (37,516 tonnes).

In order to estimate the total volume of peat extracted during this time period, an average of the 1992 to 2018 peat extraction volumes was used to calculate the peat extraction volumes for 1988, 1989, 1990 and 1991. The average peat extraction volumes for 2017 and 2018 were used to estimate the peat extraction volume in 2019. Meanwhile, the estimated 2019 peat extraction volume was halved to estimate the volume extracted between January and June 2020 prior to the cessation of peat extraction.

The peat milling process involves the top 10-15mm of the peat extraction production field surface being removed during any given harvests. In a typical year, a total of 12 no. harvests (weather dependent) would be completed, which would equate to 12–18cm of peat being removed each year. When this is applied to the 32-year period from 1988-2020, it can be estimated that ~3.8 – 5.8m of peat was removed from any production field which was utilised throughout this period. However, it is unlikely that certain

fields were utilised throughout this period and therefore the depth of peat removed across the Application Site is likely to be less than the 3.8 – 5.8m range.

7.3.5 Bedrock Geology

7.3.5.1 Desk Study

The GSI (www.gsi.ie) map several bedrock geological formations to underlie the Application Site.

The bedrock geology of the local area is characterised by the presence of a large anticlinal structure, known as the Ferbane Inlier. Devonian Kiltorcan-type Sandstones of this body form the core of this major northeast southwest trending anticlinal structure. The sandstones are overlain to the northwest and southeast by Dinantian Sandstones, Shales and Limestones which are in turn overlain by Dinantian Lower Impure Limestones.

The anticlinal fold axis of the Ferbane Inlier is mapped underlying the south of the Application Site. Here the GSI map the presence of the Devonian Old Red Sandstones (Devonian Kiltorcan-type sandstones) which form the core of this structure and are comprised of red conglomerates, sandstones and mudstones. The GSI map these sandstones to be overlain by the Navan Beds (Dinantian Sandstones, Shales and Limestones) which consist of dark limestone, mudstone and sandstone. The Navan Beds are in turn overlain by the Ballysteen Formation (Dinantian Lower Impure Limestone). This bedrock geological formation is comprised of dark muddy limestone and shale.

A major fault, known as the Ferbane Fault, is mapped along the northwestern side of the inlier (trending northeast to southwest) downthrowing the succession to the northwest of the fault. This major fault is mapped below the centre of the Application Site and juxtaposes the Waulsortian Limestones against the older Navan Beds and Ballysteen Formations. The Waulsortian Limestones (Dinantian Pure Unbedded Limestones) comprise of massive, unbedded lime-mudstones and underlies the northwest of the Application Site. The Ferbane Fault is itself displaced by several smaller northwest to southeast trending faults.

The GSI do not map the presence of any karst features within the Application Site. The closest mapped karst features include a swallow hole and a spring located approximately 300m and 500m east of the Application Site respectively in the townland of Castlearmstrong. The GSI also record the presence of superficial solution features in the townland of Ballyfin, approximately 2km west of the Application Site.

The GSI do not map any bedrock outcrop within the Application Site. Some small areas of bedrock outcrop on the mineral island located within Lemanaghan Bog. This mineral soil island is not included in the Application Site boundary.

7.3.5.2 Site Specific Data

No bedrock was encountered in any of the 63 no. trial pits completed at the Application Site which extended to a maximum depth of 4.9mbgl. However, it is noted that 3 no. trial pits were terminated due to obstructions, described as large boulders or possible rock. These obstructions were recorded at depths of 2 to 4mbgl.

The 10 no. boreholes drilled by IDL extended to depths ranging from 8.5 to 19.2mbgl. Bedrock was encountered at depths ranging from 1.7 to 14.6mbgl with an average of 9.3mbgl. Weathered rock described as stiff, sandy gravelly silt with gravels comprised of fine-grained limestone was encountered at depths of 9.8, 12.9 and 14.6mbgl in 3 no. boreholes. Meanwhile, competent bedrock was recorded in 8 of the boreholes and was typically described as very strong thinly bedded grey and dark grey silty bioclastic fine and medium grained Limestone. The borehole logs are included as Appendix 7-1.

A bedrock geology map of the area is attached as Figure 7-6.

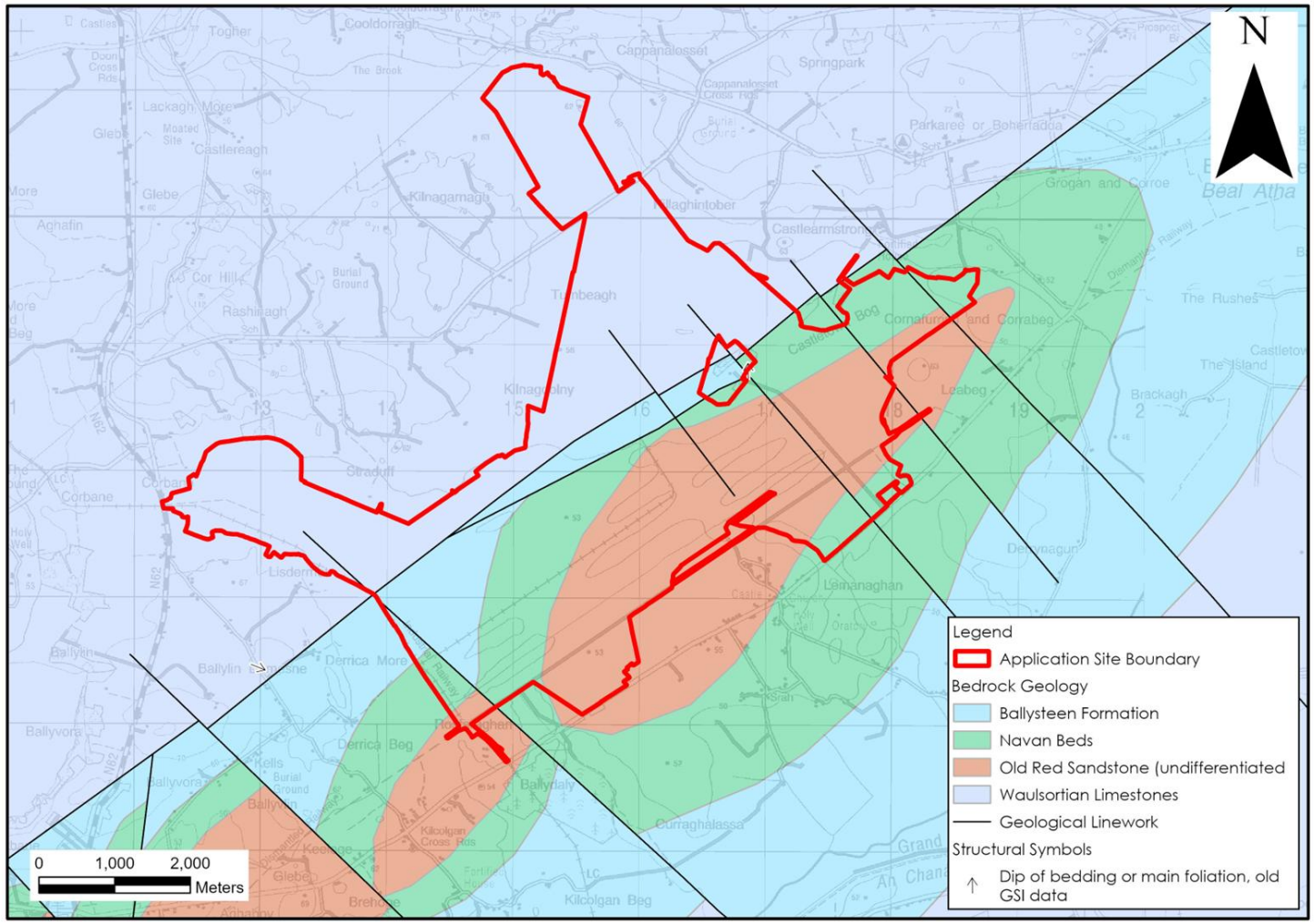

Figure 7-6: Bedrock Geology Map

7.3.6 Soil Contamination

According to the EPA online mapping (www.epa.ie), there are no licenced waste facilities or landfill sites within the Application Site or its immediate environs. The closest EPA mapped waste facility is Ballydonagh Landfill located in excess of 9km to the northwest of the Application Site.

An Integrated Pollution Control (IPC) Licence (P0500-01) was granted to the Applicant on in May 2000 for the extraction of peat at the Boora Bog Group. Condition 7 referred to Waste Management whereby all hazardous waste materials (oils, oil filters, batteries etc) were required to be disposed of by licenced waste contractors.

The EPA do not map any other Industrial Emissions Licensing (IEL) facilities or Integrated Pollution Control (IPC) facilities in the area of the Application Site. The closest mapped IEL facility is the ESB Power Generation facility located at Cloghan (Ferbane), Co. Offaly (P0695). This facility is situated approximately 6km southwest of the Application Site.

The GSI do not map the presence of any historic quarries or pits within the Application Site. Several historic gravel pits dating from the early to mid-20th century are located in the lands surrounding the Application Site. Several historic pits are located to the southwest of the Application Site along the R436 and to the northeast of the Application Site in the townland of Castlearmstrong. A gravel pit dating from the mid to late 19th century is also mapped to the north of the Application Site in the townland of Straduff.

During the site walkover surveys completed as part of the site investigations for the proposed Lemanaghan Wind Farm application, no areas of particular contamination concern were identified within the Application Site. Some minor fly-tipping was noted along the edge of access tracks.

7.3.7 Economic Geology

The GSI Online Minerals Database accessed via the Public Data Viewer (www.gsi.ie) shows a small number of historic quarries and pits in the lands surrounding the Application Site as described above in Section 7.3.6. However, none of these historic extraction sites are located within the Application Site.

The GSI (www.gsi.ie) record the presence of a mineral locality in the townland of Kilnagoolny, where deposits of marl are mapped within the Application Site. This mineral occurrence is further described by the GSI as "*shelly marl seen in section in Lemanaghan Bog. Over 51cm thick. Underlain by alluvial clays and sand*". The presence of shelly marl corresponds with the marl encountered by HES during the peat probing investigations. There are no other mineral localities mapped within the Application Site.

The closest GSI mapped (www.gsi.ie) active sand and gravel pit is located to the southwest of Ferbane and 5km to the southwest of the Application Site. Several other active sand and gravel pits are also located to the northwest of the Application Site in the townland of Clonfinlough. These pits are located approximately 5.6km, 5.5km and 7.5km from the Application Site respectively. The GSI do not map the presence of any active bedrock quarries in the local area.

The GSI online Aggregate Potential Mapping Database (www.gsi.ie) shows that the crushed rock aggregate potential of the Application Site ranges from 'Very Low' to 'High'. The vast majority of the south and east of the Application Site is mapped as having 'Very Low' potential for a bedrock quarry. Meanwhile, the northwest is mapped predominantly has having 'Moderate' potential. The Ferbane Fault delineates that boundary between the areas of 'Very Low' and 'Moderate' potential. Meanwhile, a very small area of the Application Site, adjacent to the island of agriculture land, is mapped as having 'High' potential for a bedrock quarry. The bedrock underlying the Application Site could be classified

as 'Medium' importance (refer to Table 7-1). The bedrock could be used on a "sub-economic" local scale for construction purposes. The bedrock has not been used in the past at the Application Site for this purpose, likely because of the covering of peat and glacial till overburden in the area.

Furthermore, the vast majority of the Application Site is not located within an area mapped for granular aggregate potential (i.e. potential for gravel reserves). Only very small, isolated areas adjacent to the island of agricultural land are mapped as having 'Low' to 'Moderate' potential. The overlying peat deposits at the Application Site could be classified as 'Low' importance as the peat is not designated in this area and is degraded in most places as a result of industrial peat extraction and drainage. Refer to Table 7-1 for definition of these criteria.

7.3.8 Geological Heritage Sites

There are no geological heritage sites within the Application Site (www.gsi.ie).

The closest geological heritage site is Clonmacnoise Esker (Site Code: OY008) is located between Lemanaghan Bog and Bellair South Bog and approximately 95m to the north of the Application Site boundary. This site is a County Geological Site (CGS) and is recommended for designation as a Natural Heritage Area (NHA). According to the Offaly County Geological Site Report for this CGS (available at www.gsi.ie) this site is important as it is the longest esker system in the country and is an example of a relict subglacial conduit.

Other geological heritage sites within 5km of the Application Site include Ballylin Mushroom Rock CGS (Site Code: OY002) and Clara Bog (Site Code: OY005), located approximately 1.25km to the west and 4.2km to the east of the Application Site respectively. Clara Bog is recommended for designation as an NHA. Meanwhile, Endrim Mushroom Rock CGS is located approximately 3.8km to the west.

Table 7-4 below presents summary details of the geological heritage sites within 5km of the Application Site. A map of local geological heritage sites is attached as Figure 7-7.

Table 7-4: Regional Geological Heritage Sites within 5km of the Application Site

Site Code	Site Name	IGH Theme	Description
OY002	Ballylin Mushroom Rock	IGH1	A Mushroom Rock – isolated upstanding rock in a wheat field
OY008	Clonmacnoise Esker	IGH7	The Clonmacnoise Esker and surrounding sands and gravels includes an exceptionally large accumulation of sands and gravels deposited both under the ice sheet and at its margin as the ice withdrew westwards across Offaly at the end of the last Ice Age. The esker forms part of the larger Ballinasloe-Split Hills-Clonmacnoise-Clara Esker System, which extends from Galway, through Offaly, and into Westmeath, and is the traditional route defined as the 'Eiscir Riada' in ancient Irish Folklore
OY005	Clara Bog	IGH7	An expansive area of raised peat bog situated 2km south of Clara town.
OY017	Endrim Mushroom Rock	IGH7	A Mushroom Rock – isolated upstanding rock in a grass field.

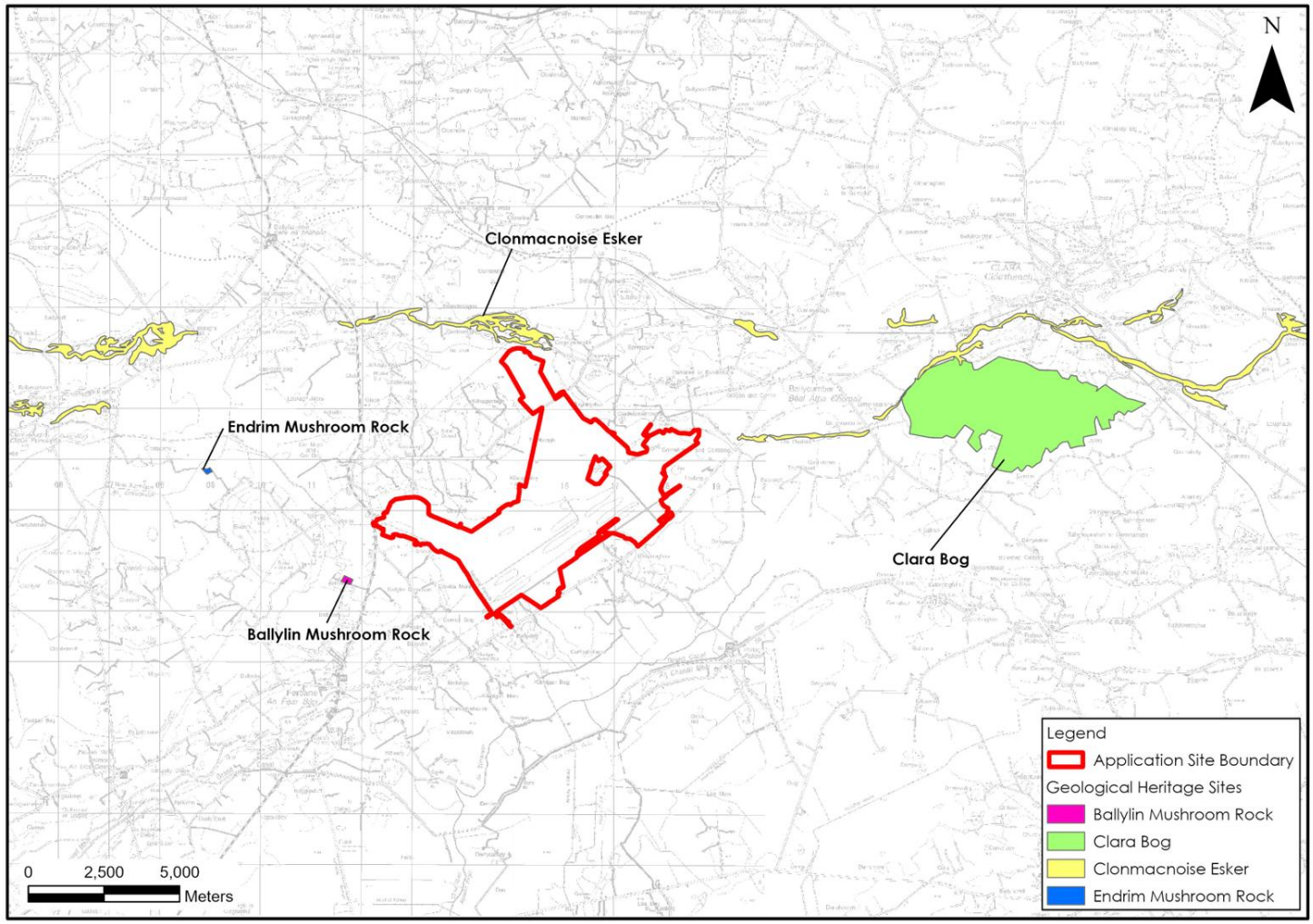

Figure 7-7: Geological Heritage Areas

7.3.9 Peat Stability

The Applicant's records do not document the occurrence of any historic landslides at the Application Site. Similarly, the GSI's online database (www.gsi.ie) does not report any historic landslides within the Application Site or in the surrounding lands. The closest GSI mapped landslide event, dated from 1954, is near Derries Bridge on Pollagh Bog, approximately 3km south of the Application Site.

The GSI Landslide Susceptibility Map (www.gsi.ie) classifies the probability of a landslide occurring at the Application Site as Low. This is due to the site's lowland setting and flat topography. Peat failures and landslides are more likely to occur in upland setting where there is sloping ground and high rainfall rates.

A qualitative assessment of geohazards at the Application Site has been completed and is presented in Table 7-5. The assessment reviews any local historical failures, residual slopes within the Application Site and the residual peat depth. The assessment presents an evaluation of slope failure risks associated with the Application Site. We note that all of Application Site is drained, and that peat extraction has now ceased. All of the former extraction areas have very low ground slope levels, they occur within low-lying enclosed basins, and these in combination with the historical and continued drainage reduces the peat failure risks significantly.

Table 7-5: Summary of Geohazards

Bog Name	Local Geohazards	Ground Slopes (°) (5%ile/80%ile)	Average Residual Peat Depths (m)	Slope Failure Risks
Lemanaghan Bog	None recorded	0 / 8.11	2.00	Negligible

7.4 Characteristics of the Project

7.4.1 Peat Extraction Phase (July 1988 – June 2020)

A full description of the Project and all works completed at the Application Site post-dating July 1988 are described in detail in Chapter 4.

During this time period, milled peat extraction occurred at the Application Site. Milled peat extraction requires good solar drying conditions and can occur anytime from April onwards once suitable drying conditions are present. There are 4 no. stages involved in the process of milled peat extraction outlined below:

- Milling – Involves breaking the top 10-15mm of the peat surface into peat crumbs by powered milling drums which are towed behind tractors. This layer of milled peat has a moisture content of ~80%.
- Harrowing – The peat crumbs are left to dry after milling. To assist the drying process, the loose peat is harrowed and turned over. The harrow consists of a series of spoons which are towed behind a tractor.
- Ridging – Once the peat has dried to 45-55% moisture content it is gathered into ridges in the centre of each production field. The ridger consists of a pair of blades towed in an open V behind a tractor, which channels the loose crop into a ridge.
- Harvesting – This is the final stage in the milling process. Each ridge is lifted by a harvester and transferred and dropped on top of the adjoining fields ridge, until 5 ridges have been accumulated together forming a peat storage stockpile. These stockpiles are

covered until ready for use. There are approximately 12 harvests a year, depending on weather conditions.

As part of the development of the bog for milled peat extraction, parallel surface water drains were created at intervals of 15m, with the section of bog between the drains referred to as production fields. The fields are slightly convex to facilitate runoff into drainage channels and to prevent surface water ponding. The drains fall towards the headland, located at the ends of the production fields. The drains are piped across the headland, allowing machinery to pass from one field to the next. The drainage network then continues to a series of silt ponds prior to discharging to a local watercourse. By 1988, milled drainage had already been inserted across much of the Application Site. Only small areas around the perimeter of the Application Site had not been drained at this time.

The peat extraction areas were served by a railway line which was moved around the Application Site as different areas came in and out of production. During this period several level crossings, rail underpasses, and other infrastructure were constructed at the Application Site to support peat extraction operations. Welfare facilities were also provided across the Application Site. These typically took the form of small buildings and temporary structures to provide workers on peat extraction fields a clean area to take lunch/tea breaks and provide welfare facilities. While facilities were available at the Lemanaghan Works offices, these smaller outposts were situated across the Application Site to provide easier access to workers further away from the central works buildings. A welfare facility located in the centre of the Application Site comprised a 6m by 11m building covering approximately 52m^2, in Lemanaghan Bog in the townland of Lemanaghan, Co. Offaly. The facility includes a septic tank and provided welfare facilities for workers at the Application Site during the Peat Extraction Phase. This facility was constructed between 2004 and 2009.

In terms of environmental monitoring, control and monitoring measures have been implemented at the Application Site since May 2000 in accordance with IPC Licence conditions (Refer to Section 4.8). Prior to 2000, control measures were also implemented with respect to silt control, storage and maintenance of machinery, refuelling and waste management (refer to Section 4.3.5).

7.4.2 Current Phase (June 2020 – Present Day)

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

During this period, activities at the Application Site have included the removal of stockpiled peat, with no peat extraction occurring. All stockpiles had been removed from the Application Site by 2024. The decommissioning works relating to the railway network within the Application Site are estimated to be completed in 2025.

The drainage infrastructure, silt ponds and surface water discharge locations continue to be in operation and to be maintained as per the IPC Licence requirements. The silt ponds are maintained in accordance with Condition 6 of the IPC Licence, which states that all drainage from boglands is discharged via appropriately designed silt ponds which are desilted twice a year. The silt arising from these operations is either stockpiled a safe distance from drainage features or spread onto production fields.

Environmental monitoring continues during the Current Phase of the Project in accordance with IPC Licence conditions.

7.4.3 Remedial Phase

It is currently proposed to implement a site-specific Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan at the Application Site. This rehabilitation is required in

order to fulfil the requirements of Condition 10.2 of the IPC Licence No. P0500-01. Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan, attached as Appendix 4-2, will be subject to consultation as well as input from the EPA prior to their implementation across the Application Site.

The objective of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan is to stabilise and rehabilitate the peat bog within the Application Site. The plan uses 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 Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan for the Application Site will be undertaken using standard best practices (refer to Appendix III of the Cutaway Bog Decommissioning and Rehabilitation Plan included as Appendix 4-2).

Prior to the finalisation of and submission of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan to the EPA, 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. The Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan which outlines the proposed rehabilitation for the Application Site has been prepared. The most appropriate rehabilitation approach is chosen for individual areas of the bog reflecting local ecological and hydrological factors. Further details can be found in the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan in Appendix 4-2.

The Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan comprises short-term planning actions, short-term practical actions and long-term actions. The initial short-term planning actions will involve seeking approval of the rehab plan from the EPA. In addition, detailed site plans of how the various rehabilitation measures will be applied will be developed and a review of all issues and constraints which may affect how the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan will be completed. The short-term planning actions will also ensure that all activities associated with the rehab plan will be completed in accordance with the requirements of the IPC Licence. Several short-term actions will be completed in the first 2 years following EPA approval of the rehab plan. These actions will include drain blocking and monitoring of the rehabilitation measures. Silt ponds will continue to function during this phase. Longer term actions (>3 years) include the evaluation of the success of the short-term rehabilitation measures and undertake further remediation where necessary. Long-term monitoring, aftercare and maintenance will be completed until the IPC Licence is surrendered. It is understood that during this phase of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan , silt ponds will be assessed and decommissioned if necessary.

Much of the work associated with the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan will occur during the initial stages of the plan. Once drain blocking and other measures have been implemented the operational activities will comprise non-intrusive ecological and hydrological monitoring and may also include minimal maintenance and repair works.

7.5 Assessment of Significant Effects and Control/Mitigation Measures

7.5.1 Do Nothing Scenario

As outlined in the EPA Guidelines (May 2022), the description of 'Do-Nothing Effects' relates to the environment as it would be in the future should the Project not be carried out. As discussed in Section 3.2.1, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1, peat extraction activities commenced at the Application Site in 1950 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Under this 'Do-Nothing' option, the IPC Licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'do-nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'do-nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and ancillary activities have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the "Do Nothing" option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC Licence requirements, a Cutaway Bog Decommissioning and Rehabilitation Plan will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of this plan is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

7.5.2 Identification of Impacts

7.5.2.1 Peat Extraction Phase (July 1988 – June 2020)

The Peat Extraction Phase of the Project includes peat extraction and ancillary activities undertaken from July 1988 to the cessation of peat extraction in June 2020.

7.5.2.1.1 *Soils/land*

Changes to soils/land have been investigated at the Application Site between July 1988 and June 2020 (refer to Section 7.3.3). Due to the nature of peat extraction and ancillary activities, the primary land change occurs during the initial site preparation works where drainage and the removal of vegetation in preparation for the peat extraction operations. Peat extraction and ancillary activities had replaced (land take) a vast expanse of raised bog at the Application Site with large areas of drained bare peat fields by July 1988. The greatest effect of the peat extraction and ancillary activities on soils/land would have occurred during the original drainage and clearance of vegetation in advance of the commencement of peat extraction at the Application Site in 1960. During these site preparation works the bog would have experienced a relatively abrupt change in land cover from raised bog prior to drainage to bare peat fields. Therefore, the greatest land take associated with the peat extraction and ancillary activities at the Application Site pre-dated 1988.

By 1988 peat extraction and ancillary activities were already well established across the Application Site. Therefore, by 1988 the soils/land at the Application Site had already been significantly altered and ancillary structures already in place. In 1988 approximately 968.7ha (~87% of the Application Site) would have comprised of industrial peat extraction with landcover consisting of drained bare or vegetated peat fields separated by field drains. Meanwhile, an additional 65.1ha of the Application Site has already been drained but vegetation clearance had not yet been completed and peat extraction was not ongoing. Only small areas of remnant raised bog existed around the periphery of the Application Site (61.2ha or 6.8% of the Application Site).

Any changes in soils/land which post-date the initial drainage and removal of vegetation would have been imperceptible in comparison to the original changes which predate 1988. Slight annual topographic changes (~0.1-0.2m/year) associated with peat extraction and ancillary activities will have occurred in the extraction areas during the Peat Extraction Phase.

Pathway: Drainage, removal of acrotelm, removal of vegetative surface and extraction of peat.

Receptor: Soils/land.

Assessment of effects in the absence of control measures: Even in the scenario where no control measures were implemented there would not have been a significant change to the soils/land in terms of land take or topography. By July 1988, the vast majority of the Application Site had already been drained and cleared of vegetation. The peripheral areas which were not drained by July 1988 represented a very small proportion of the Application Site. Topographic changes would have occurred throughout this phase associated with the peat extraction. The effect on soils/land in the absence of control measures would have been similar to the residual effect described in Section 7.5.3.1.1 *i.e.* a

negative, direct, moderate, permanent effect on the soils/land at the Application Site, and is Not Significant.

Control Measures:

No known control measures for land and soils/land exist in the context of the activity being assessed here, other than working on the Applicant's owned land, and implementing peat extraction and ancillary activities in an established operational system.

7.5.2.1.2 *Peat and Peat Subsoils*

Peat extraction and ancillary activities were undertaken at different levels of intensity throughout the Peat Extraction Phase. The total volume of peat removed from the Application Site from July 1988 to the June 2020 is estimated to 3,351,248 tonnes (4,021,498m^3 with an average of 125,672m^3 extracted per year).

During an average year of milled peat extraction approximately ~12 – 18cm of peat has been removed from the peat extraction fields. This equates to approximately 3.8 – 5.8m of peat during the Peat Extraction Phase. This is likely to be an overestimate as no extraction field would have remained in production for the entire Peat Extraction Phase (i.e. certain extraction fields would have been bypassed at different times and for various reasons). Furthermore, certain years would have had lower yields due to poor weather conditions.

Pathway: Extraction/excavation.

Receptor: Peat and peat subsoils.

Assessment of effects in the absence of control measures: Due to the very nature of peat extraction, and ancillary activities , a significant effect on peat and subsoils occurred. The significant effect results from the permanent removal of peat from the Application Site resulting in a loss of peat depth. However, by July 1988, peat extraction and ancillary activities was already well established at the Application Site, with an estimated 904,128 tonnes of peat having been removed from the Application Site before July 1988. The effect on peat and peat subsoils in the absence of control measures would have been similar to the residual effect described in Section 7.5.3.1.2 *i.e.* negative, direct, moderate, permanent effect on peat and peat subsoils at the Application Site, and is Not Significant. The effect is moderate as peat extraction was consistent with the July 1988 baseline environment.

Control Measures:

Pre-IPC Licence:

As detailed in Section 4.3.5 in Chapter 4 of this rEIAR, with the exception of silt control (which from 1974 was subject to a formal management program as discussed in Section 4.3.5.8 in Chapter 4), formal documentation outlining dedicated measures referred to as control measures practised on site from 1950 - July 1988 are not available. However, based on personal communication with a retired Bord na Móna manager, the following measures below were enacted at the Application Site as part of daily, monthly, and annual bog management and operations and were outlined in the 1999 IPC Licence application.

Due to the nature of the operations ongoing at the site, there were no control measures to prevent or minimise the removal of peat from the site. Best practice procedures and control measures have been implemented to both protect peat from contamination (see Section 7.5.2.1.3) and from erosion by air and water.

The following management measures were implemented for peat sediment control/dust suppression:

- Stockpiles were compacted on either side by large rollers drawn by tractors;
- Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat;
- Extraction was avoided during windy weather;
- Headlands were kept clean and loose peat removed;
- Low driving speeds for machinery were used along dusty headlands; and,
- Road crossings were kept clean.

At this time Bord na Móna were also implementing several control measures in order to minimise the impact of peat extraction and ancillary activities on surface water quality including:

- Internal drains were cleaned on a regular basis in suitable weather. This was completed to remove sludge from the bottom of ditches, allowing them to retain full functionality. The sludge was disposed of by spreading it on the adjacent production fields;
- Drain maintenance was carried out using ditchers, ensuring that these drains were fit for purpose;
- Drain maintenance was carried out mainly prior to and post the harvesting season (i.e. between March and October);
- Visual inspection of surface water pumps daily;
- Operational check of surface water pumps biweekly;
- Service of surface water pumps monthly;
- Silt ponds were utilised to control the amount of sediment being discharged at outfalls. At this time, silt ponds were designed for an upper limit of 100mg/l suspended sediment;
- Silt ponds were upgraded in the 1990s to cater for the settling of sufficient amount of silt. This often included the construction of a second silt pond adjacent to the first, which was used as a backup and to facilitate desludging of the primary pond; and,
- Silt ponds were de-sludged twice per annum.

Active IPC Licence:

With the implementation of the IPC Licence in 2000, the control measures implemented previously by the Applicant were updated and expanded to include:

- The avoidance of harvesting during windy weather;
- Headlands were kept clean and free of loose peat;
- The covering of stockpiles with polythene sheets;
- Drains were protected and maintained free of excessive peat;
- Machinery did not drag loose peat into drains;
- Outfalls were controlled to minimise silt discharge; and,
- The avoidance of excavations during windy weather.

These control measures specifically pertain to preventing the erosion of exposed peat by both wind and water and therefore aim to protect both air and water quality (refer to Chapter 5: Population and Huma Health, Chapter 8: Hydrology and Hydrogeology and Chapter 9 Air Quality for full details).

7.5.2.1.3 Contamination of Soil by Leakages and Spillages

Accidental spillage during refuelling of machinery and plant (static and mobile) with petroleum hydrocarbons was 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. Hydrocarbon has a 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.

Discharges from wastewater systems (septic tanks) at office buildings, and workshops could potentially have caused surface water and groundwater contamination. Activities and features associated with peat extraction and ancillary activities include railway lines, machine passes, canteen structures, work sites, mobile fuel tanks, fixed fuel tanks, and end user sites. These potential effects (i.e. the potential for contamination of peat, subsoils and bedrock from the spillage of hydrocarbons of the release of wastewater) existed at the Application Site and Lemanaghan Works. However, it is understood from a review of available AERs (Annual Environmental Reports submitted to the EPA under the IPC Licence) that no significant pollution events/spills to groundwater have occurred since 2000 (surface water is dealt with separately in this rEIAR). It was also deduced that there were no significant peat contamination issues arising prior to 2000 as these would have been mentioned and assessed in the EPA Licence Application documentation and there are no records of such occurrences.

Pathway: Infiltration through pore space in peat, subsoil and bedrock.

Receptor: Peat, subsoil and bedrock.

Assessment of effects in the absence of control measures: In the absence of the IPC Licence control measures relating to the refuelling and the storage of hydrocarbons, the effect could potentially have been greater than the residual effect described in Section 7.5.3.1.3, but to the best of our knowledge there was no evidence of significant contamination at the Application Site, and if there was a spill if would have be localised and would likely have been absorbed by the environment at a local scale. The effect could potentially have been a - negative, moderate, direct, long-term, unlikely effect on peat, subsoils and bedrock, and is Not Significant.

Control Measures:

Pre-IPC Licence:

As detailed in Section 4.3.5 in Chapter 4 of this rEIAR, with the exception of silt control (which from 1974 was subject to a formal management program as discussed in Section 4.3.5.9 in Chapter 4), formal documentation outlining dedicated measures referred to as control measures practised on site from 1950 - July 1988 are not available. Based on personal communication with a retired Bord na Móna manager, the following measures below were enacted at the Application Site as part of daily, monthly, and annual bog management and operations and were outlined in the 1999 IPC Licence application. 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 Application Site:

- All peat harvesting machinery were stored at the Lemanaghan Works at the end of each workday.
- All machinery were regularly inspected and serviced.
- All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components.
- A self-contained machine parts washer was located at the Workshop.
- All refuelling and vehicles maintenance was undertaken at the Lemanaghan Works depot.
- If on-site refuelling was required, it was done so with a mobile fuelling unit.
- In the event of a spill, the General Manager was immediately informed of the incident.
    - The spill was assessed by the General Manager for potential risk to the health and safety of employees and the potential environmental consequences.

- A spill would be sourced, isolated and contained with polystyrene booms or dry peat (moisture content of 10%).
- All effort should be made to prevent the spill from entering a storm drain or nearest outfall.
- Once the spill has been contained, a suitable absorbent (dry peat) is to be used to soak the spillage.
- All possible ignition sources such as electoral equipment, naked lights, machinery should be removed from the area. Any combustibles in the spill area should be removed.
- Follow up action measures taken must include the implementation of appropriate remedial work to prevent such a spillage recurring in the future.
- In the event of a significant spillage, the General Manager must 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 disposal and battery collection contractors respectively.
- All washing from the self-contained machine parts washer was collected within a sludge tank at the Lemanaghan Works.

Active IPC Licence:

These control measures were upgraded 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 this 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.

7.5.2.1.4 Peat Stability

Peat instability or failure refers to a significant mass movement of a body of peat that would have a negative effect on individual bogs and potentially the surrounding environment. Peat instability could have occurred during development of bog drainage or ancillary activities associated with peat extraction, e.g. rail movements that occurred due to the Project. The significant effects of peat failure at the Application 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.

Pathway: Peat slide/Landslide.

Receptor: People, land and infrastructure.

Assessment of effects in the absence of control measures: Even in the scenario where no control measures were implemented there would not have been a significant effect relating to peat instability due to the low lying and flat nature of the Application Site. Peat slides are usually associated with areas of upland blanket bog located on sloping land, and peat flows are more common on lowland raised bogs. There is no historical record of any peat flow at Lemanaghan Bog. The effect on people, land and infrastructure due to instability in the absence of control measures could potentially have been similar to the residual effect described in Section 7.5.3.1.4 *i.e.* no effect, and is Not Significant.

Control Measures:

Generally, the only recorded landslides which relate to peat instability on raised bogs have occurred during the initial stages of bog drainage. The GSI or Bord na Móna records do not document the occurrence of any peat slides within the Application Site. The Application Site has active and extensive drainage systems. 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. 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 Bord na Móna personnel;
- The drainage systems around the bog were maintained and managed by Bord na Móna throughout the duration of the Peat Extraction Phase (July 1988 –June 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).

7.5.2.1.5 *Construction of Supporting Infrastructures and Buildings*

From July 1988 to June 2020, activities at the Application Site were not solely limited to peat extraction and ancillary activities. During this time period several supporting infrastructures and facilities were constructed to aid the peat extraction and ancillary activities. These works included the construction of a Welfare Facility (60m^2) in the townland of Lemanaghan (constructed between 2004 and 2009), construction of 3 no. level crossings (2 no. adjacent to the Application Site boundary and 1 no. level crossing within the Application Site boundary across the L7002), and construction of 3 no. rail underpasses adjacent to the Application Site boundary (2 no. constructed in 1993). Please note that the rail underpasses were consented but are assessed here for completion due to their association with the peat extraction and ancillary activities at the Application Site. The greatest risks associated with these supporting infrastructures was potential contamination of the soils and subsoils from hydrocarbon spillage during the construction works. In the absence of control measures the release of untreated wastewater from the Welfare Facility would also have had the potential to contaminate local soils and subsoils.

However, these developments had a small footprint in the context of the entire Application Site. Additionally, the construction of these infrastructure would have been completed over a relatively short time. Therefore, the potential for these developments to affect land, soils/land, soils, subsoils and

bedrock is much reduced when compared with the potential effects associated with the peat extraction and ancillary activities which were ongoing during this time period (Section 7.5.2.1.1 to Section 7.5.2.1.4).

Pathway: Excavation of soils/subsoils, infiltration of contaminants through pore space in peat, subsoil and bedrock.

Receptor: Land, soils/land, peat subsoils and bedrock.

Assessment of effects in the absence of control measures: Even in the scenario where no control measures were implemented there would not have been a significant effect relating to the construction of the supporting infrastructure due to its small scale in comparison to the overall Application Site. The effect on land, soils/land, peat, subsoils and bedrock in the absence of control measures could potentially have been similar to the residual effect described in Section 7.5.3.1.5 *i.e.* a negative, slight, direct, short-term, likely effect, and is Not Significant.

Control Measures:

Bord na Móna received planning permission for the many of the above developments and these developments were constructed in accordance with the conditions set out in their respective permissions.

The Welfare Facility, constructed between 2004 and 2009, was constructed in accordance with best practice measures. Tried and tested, best practice measures with regards to hydrocarbons and refuelling were implemented during the construction of this facility in line with IPC Licence requirements. These control measures are detailed in Section 7.5.2.1.3 above. Furthermore, there was no discharge of untreated wastewater associated with these welfare facilities. Wastewater was discharged to an on-site septic tank with the effluent discharged to a percolation system through the peat prior to discharge to ground. During this phase, the septic tank was inspected and de-sludged annually by a licenced contractor to ensure that the treatment system worked efficiently.

7.5.2.2 Current Phase (June 2020 – Present)

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

7.5.2.2.1 *Soils/land*

Following the cessation of peat extraction in June 2020, land use at the Application Site is no longer classified as industrial peat extraction. The land that was in subject to peat extraction up to that time became available for re-vegetation and natural colonisation.

Maps of the Applicant's historic peat extraction and ancillary activities areas for 2020 indicate that 699ha was subject to peat extraction whilst peat was no longer being extracted from 354.2ha of former peat extraction fields.

However, given the relatively short time period which has elapsed since the conclusion 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. The pioneer cutaway habitats correlate with the areas where peat extraction ceased first (i.e. the 354.2ha which was not subject to extraction in 2020, with much of this area also not subject to extraction in 2004).

Pathway: Extraction of peat and drainage works.

Receptor: Land and Soils/land.

Assessment of effects in the absence of control measures: Even in the scenario where no control measures were implemented there would not have been a significant positive change to the soils/land with the cessation of peat extraction activities. The effect on soils/land from the cessation of peat extraction would have been the same as the residual effect described in Section 7.5.3.2.1 *i.e.* a positive, direct, significant, permanent effect on soils/land at the Application Site, and is Significant.

Control Measures:

Any works during this time period have been completed under Licence from the EPA and Bord na Móna's Environmental Management System.

The area of land owned by Bord na Móna remains the same.

No specific control measures were required.

7.5.2.2.2 *Peat and Peat Subsoils*

No peat extraction has occurred since the cessation of the Applicant's peat extraction in June 2020. Stockpiled peat has been removed from the Application Site, with the last stockpiles removed in 2024.

Therefore, no significant change has occurred in terms of peat depths/residual peat during the Current Phase.

Pathway: Extraction/excavation.

Receptor: Peat and peat subsoils.

Assessment of effects in the absence of control measures: Even in the scenario where no control measures were implemented there would not have been any effects on peat and peat subsoils as peat extraction ceased in June 2020. The effect would have been the same as the residual effect described in Section 7.5.3.2.2 i.e. no residual effect, and is Not Significant.

Control Measures:

No control measures were required as peat was not excavated from the site during the Current Phase. The measures outlined in Section 7.5.2.1.2 to prevent the erosion of peat continue to be in operation in accordance with IPC Licence Conditions.

7.5.2.2.3 *Contamination of Soil by Leakages and Spillages*

Despite the cessation of peat extraction at the Application Site, there is still some limited activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at the Lemanaghan Works and in the welfare facility at the centre of the site remain occupied and discharges from wastewater systems (septic tanks) have the potential to cause surface water and groundwater contamination. These risks are the same as those outlined in Section 7.5.2.1.3 but to a lesser extent due to the lower volumes of plant, machinery and workers operating at the Application Site during the Current Phase.

Pathway: Infiltration through pore space in peat, subsoil and bedrock.

Receptor: Peat and subsoil, bedrock.

Assessment of effects in the absence of control measures: In the absence of the IPC Licence control measures relating to the refuelling and the storage hydrocarbons, the effect could potentially have been greater than the residual effect described in Section 7.5.3.2.3, but to the best of our knowledge there

was no evidence of significant contamination at the Application Site, and if there was a spill if would have be localised and would likely have been absorbed by the environment at a local scale. The effect could potentially have been a - negative, slight, direct, long-term, unlikely effect on peat and subsoils and bedrock, and is Not Significant.

Control Measures:

Measures that mitigated against contamination of peat, subsoil and bedrock are outlined in Section 7.5.2.1.3 and are currently being adhered to at the Application Site. These control measures significantly decrease the risk of soil contamination. These control measures have been implemented as part of compliance with IPC Licence conditions across the Application Site. No further control measures, beyond that implemented to date, are deemed necessary. The existing wastewater services have been in operation for years with no reported issues.

7.5.2.2.4 *Peat Stability*

No peat extraction has occurred since the cessation of the Applicant's peat extraction in June 2020. Therefore, no significant change in topography and/or drainage has occurred during the period.

The risk of peat failure at the Application Site remained very low with no change observed from Section 7.5.2.1.4.

Pathway: Peat slide/Landslide.

Receptor: People, land and infrastructure.

Assessment of effects in the absence of control measures: Even in the scenario where no control measures were implemented there would not have been a significant effect relating to peat instability to peat instability due to the low lying and flat nature of the Application Site. Peat slides are usually associated with areas of upland blanket bog located on sloping land, and peat flows are more common on lowland raised bogs. There is no historical record of any peat flow at Lemanaghan Bog. The effect on people, land and infrastructure due to instability in the absence of control measures could potentially have been similar to the residual effect described in Section 7.5.3.2.4 *i.e.* no residual effect, and is Not Significant.

Control Measures

No further control measures, beyond that implemented and outlined in Section 7.5.2.1.4 are deemed necessary.

7.5.2.3 Remedial Phase

This section presents an assessment of likely significant effects resulting from the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan for the Application Site on the land, soils and geological environment.

7.5.2.3.1 *Soils/Land*

As discussed in Section 8.6.2.3.1 of Chapter 8 Hydrology and Hydrogeology, the overall aim of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan is to put the bog on a trajectory towards becoming naturally functioning peatlands. One of the main criteria which will be used to define the success of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan will be the stabilisation of the Application Site that underwent peat extraction and ancillary activities.

Natural colonisation is likely to form the basis for stabilisation of the current bare peat fields. Former peat extraction areas across the Application Site have already re-vegetated naturally so it would be expected that the current bare peat fields present today would develop in a similar manner. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. It will take some time for stable naturally functioning habitats to fully develop at Lemanaghan Bog. It is not expected that the Application Site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat. Furthermore, only a small proportion of the bog has potential to develop Sphagnum-rich habitats. Nevertheless, re-wetting across the entire bog, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

This will result in a positive change in land and soils/land across the Application Site. Land cover will change from bare peat fields to an array of scrub, woodland, wetland and peatland communities. However, the Application Site is unlikely to ever revert to the original raised bog which existed prior to the commencement of peat extraction and ancillary activities.

Pathway: Natural colonisation, rewetting measures and targeted revegetation.

Receptor: Land and Soils/land

Pre-Mitigation Potential Effect: The pre-mitigation potential effect is considered to be a positive, direct, moderate, permanent, likely effect on soils/land within the Application Site, and is Not Significant.

Mitigation Measures:
Any works undertaken as part of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan will be completed in compliance with the Licence from the EPA with the Applicant reporting to the EPA until the IPC Licence is surrendered.

The Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan caters to the requirements of Lemanaghan Bog. Given that the objectives of the rehabilitation plan are to place the Application Site on a trajectory towards becoming a naturally functioning peatland, no mitigation measures are required except that the bog rehabilitation will be restricted to within the footprint of the Application Site.

7.5.2.3.2 *Peat and Peat Subsoils*

As discussed above, the overall aim of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan is to put the Application Site on a trajectory towards becoming a naturally functioning peatland. One of the main criteria which will be used to define the success of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan will be the stabilisation of the former peat extraction areas.

This stabilisation will be achieved primarily through natural colonisation of the former peat extraction areas. These bare peat fields will likely develop in a similar manner to the areas of the Application Site which have been out of production for some time and have begun to revegetate. The revegetation and rewetting of the Application Site will prevent surface erosion of peat which currently occurs on areas of bare peat.

Despite the best practice measures to be implemented as part of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan it is unlikely that the entire site will return to the same level of active peat forming conditions which likely existed at the Application Site prior to commencement of peat extraction operations.

Pathway: Natural colonisation, rewetting measures and targeted revegetation.

Receptor: Peat and peat subsoils.

Pre-Mitigation Potential Effect: The pre-mitigation potential effect is considered to be a positive, direct, moderate, permanent, likely effect on peatland within the Application Site, and is Not Significant.

Mitigation Measures:
Any works undertaken as part of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan will be completed as required by the Licence from the EPA with Bord na Móna reporting to the EPA until the IPC Licence is surrendered.

7.5.2.3.3 *Contamination of Soil by Leakages and Spillages*

During the Remedial Phase there will be some activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. This activity will be greatest during the initial stages of rehabilitation when works associated with rewetting and revegetation such as drain blocking will be completed. Once this work has been completed there will only be very limited activity at the Application Site which will mainly comprise of non-intrusive monitoring and minimal repairs to peat blockages and or additional fertilization to aid the development of successional communities.

Pathway: Infiltration through pore space in peat, subsoil and bedrock.

Receptor: Peat and subsoil, bedrock.

Pre-Mitigation Potential Effect: The pre-mitigation potential effect is considered to be a negative, slight, direct, long-term, unlikely effect on peat, subsoils and bedrock, and is Not Significant.

Mitigation Measures:

The following environmental control measures will be implemented during the Remedial Phase in order to mitigate against leaks and spills:

- All machinery will be regularly checked and maintained prior to arrival at the site;
- Fuelling and lubrication of equipment will only be completed in designated areas and away from surface water features;
- Vehicles will never be left unattended during refuelling;
- All refuelling will occur in mobile fuel bowsers;
- Only dedicated, trained and competent personnel will complete refuelling operations;
- Tank and drum storage areas will be bunded to 110% capacity of the largest tank or drum within the bunded area to prevent any spills;
- Storage tanks for bowsers and generators will be double skinned;
- Waste oil and fluids will be collected in leak proof containers and removed from the site for disposal;
- Spill kits will be kept on site; and,
- All activities will be completed in accordance with current 'best practice' procedures.

7.5.2.3.4 *Peat Stability*

The Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan aims to revegetate and rewet the Application Site. Generally, the only recorded landslides which relate to peat instability on raised bogs have occurred during the initial stages of bog drainage. No additional peat will be removed from the Application Site, or no drainage will be implemented during the Remedial Phase.

The risk of peat failure at the Application Site will remain very low with no change observed from Section 7.5.2.1.4.

Pathway: Peat slide/Landslide.

Receptor: People, land and infrastructure.

Pre-Mitigation Potential Effect: Even in the scenario where no mitigation measures are implemented there would not be any significant risk of peat instability due to the low lying and flat nature of the Application Site and the lack of any significant earthworks or peat disturbance during the Remedial Phase. The pre-mitigation potential effects are considered to be a negative, direct, imperceptible, permanent, unlikely, effect, and is Not Significant.

Mitigation/Monitoring:

No further mitigation, beyond that implemented and outlined in Section 7.5.2.1.4 are deemed necessary.

7.5.3 Residual Effect

7.5.3.1 Peat Extraction Phase (July 1988 – June 2020)

7.5.3.1.1 *Soils/land*

Following the initial drainage, vegetation removal and cutting which occurred across much of the Application Site prior to July 1988, the operations between July 1988 and June 2020 would not have resulted in any significant changes to land cover and there would have been no significant additional land take. The only effects in these areas postdating July 1988 are minor annual topographic changes associated with peat removal for the majority of the Application Site.

The residual effect post July 1988 was a negative, direct, moderate, permanent effect on the soils/land and topography at the Application Site, and is Not Significant.

7.5.3.1.2 *Peat and Peat Subsoils*

Peat extraction and ancillary activities by their very nature will have a significant effect on peat and subsoils. The operations involve the permanent removal of peat from the Application Site for energy production purposes resulting in a loss of peat depth at the Application Site. However, by 1988, peat extraction and ancillary activities was already well established at the Application Site, with an estimated 904,128 tonnes of peat having been removed from the Application Site before July 1988. Therefore, the continued removal of peat during the Peat Extraction Phase (July 1988- June 2020) was consistent with the baseline trends which existed in 1988. For these reasons the residual effect was a negative, direct, moderate, permanent effect on peat subsoils at the Application Site, and is Not Significant.

7.5.3.1.3 *Contamination of Soil by Leakages and Spillages*

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. No adverse effect has occurred. From review of the available AER reports it is understood no significant fuel spills or wastewater discharges have occurred to groundwater prior to or since 2000. Proven and effective measures to mitigate the risk of spills and leaks have been implemented by Bord na Móna at the Application Site. These control measures break the pathway between the potential source and the receptor. The residual effect was a - negative, imperceptible, direct, long-term, unlikely effect on peat and subsoils and bedrock, and is Not Significant.

7.5.3.1.4 Peat Stability

No peat instability was recorded at the Application Site during the Peat Extraction Phase.

No residual effect on peat, subsoils and bedrock, and is Not Significant.

7.5.3.1.5 Construction of Supporting Infrastructures and Buildings

Due to the small scale of the supporting infrastructures within the wider the Application Site the residual effect was a negative, direct, imperceptible, short-term effect on soils/land, peat and peat subsoils and a negative, direct, imperceptible long-term, reversible effect on land (associated with loss of land due to footprint of infrastructure), and is Not Significant.

7.5.3.2 Current Phase (June 2020 – Present Day)

7.5.3.2.1 Soils/land

A significant effect to the land/soil environment occurred following the cessation of the peat extraction at the Application Site in June 2020. The residual effect on soils/land was a positive, direct, significant, permanent effect on soils/land at the Application Site, and is Significant.

Therefore, the residual effect on landcover and topography during this time period was imperceptible.

7.5.3.2.2 Peat and Peat Subsoils

No residual effect on peat/subsoils.

7.5.3.2.3 Contamination of Soil by Leakages and Spillages

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective control measures to mitigate the risk of spills and leaks have been implemented. No adverse effect has occurred. From review of the available AER reports it is understood that no significant fuel spills or wastewater discharges have occurred to groundwater since June 2020.

Therefore, residual effect was a negative, imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock, and is Not Significant.

7.5.3.2.4 Peat Stability

No peat instability was recorded at the Application Site during the Current Phase.

No residual effect on peat/subsoils, and is Not Significant.

7.5.3.3 Remedial Phase

7.5.3.3.1 Soils/land

The residual effect on land and soils/land following the implementation of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan that is currently proposed is a positive, direct, moderate, permanent effect on Land and Soils/land, and is Not Significant.

7.5.3.3.2 Peat and Peat Subsoils

The residual effect on peat following the implementation of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan that is currently proposed is a positive, direct, moderate, permanent effect on peat as it will be wetter and closer to its natural condition with increases in vegetation cover across the Application Site, and is Not Significant.

7.5.3.3.3 Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry

Proven and effective measures to mitigate the risk of spills and leaks will be implemented. With the implementation of these mitigation measures the residual effect will be a negative, direct, imperceptible, short-term, unlikely effect on peat and subsoils and bedrock, and is Not Significant.

7.5.3.3.4 Peat Stability

No residual effect on existing peat stability.

7.5.4 Significance of Effects

7.5.4.1 Peat Extraction Phase (July 1988 – June 2020)

7.5.4.1.1 Soils/land

For the reasons outlined above, it is considered that there were no significant effects on soils/land (in terms of land-take) as a result of the peat extraction and ancillary activities from July 1988 to June 2020 as the activity was consistent with emerging trends at the Application Site.

7.5.4.1.2 Peat and Peat Subsoils

For the reasons outlined above, it is considered that there has been a moderate effect on the peat soils and subsoils at the Application Site as a result of the peat extraction and ancillary activities. The effects were in line with the baseline merging trends and are therefore considered to be Not Significant.

7.5.4.1.3 Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry

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

7.5.4.1.4 Peat Stability

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.

7.5.4.1.5 Construction of Supporting Infrastructures and Buildings

For the reasons outlined above, and with the implementation of the building works in accordance with the planning permissions and/or best practice measures, it is considered that there has not been a significant effect on the soils/land, peat soils and subsoils at the Application Site as a result of the construction of the supporting infrastructure.

7.5.4.2 Current Phase (June 2020 – Present Day)

7.5.4.2.1 *Soils/land*

For the reasons outlined above no significant effects on land (to date, but it will change in vegetation cover over time), but there is a significant effect on soils/land, having changed from industrial peat extraction to recovering peatland habitats over an area of ~354.2ha in June 2020.

7.5.4.2.2 *Peat and Peat Subsoils*

For the reasons outlined above no significant effects on peat and peat subsoils has occurred during the Current Phase.

7.5.4.2.3 *Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry*

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on peat, subsoil and bedrock have occurred as a result of contamination during the Current Phase.

7.5.4.2.4 *Peat Stability*

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 due to peat instability during the Current Phase.

7.5.4.3 Remedial Phase

7.5.4.3.1 *Soils/land*

For the reasons outlined above, it is considered that there will be a significant positive effect on land and soils/land as a result of the Remedial Phase.

7.5.4.3.2 *Peat and Peat Subsoils*

For the reasons outlined above, it is considered that there will be a significant positive effect on peat as a result of the Remedial Phase.

7.5.4.3.3 *Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry*

For the reasons outlined above, it is considered that there will be no significant effects as a result of soil contamination during the Remedial Phase.

7.5.4.3.4 *Peat Stability*

For the reasons outlined above, it is considered that there will be no significant effects as a result of the Remedial Phase.

7.5.5 Cumulative and In-Combination Effects

7.5.5.1 Peat Extraction Phase (July 1988 – June 2020)

The geological impact assessment undertaken above in this chapter outlines those significant effects that have occurred within the Application Site as a result of the Peat Extraction Phase of the Project.

Due to the localised nature of the works associated with the peat extraction and ancillary activities within the Application Site, the potential for significant cumulative effects with other local developments (located outside the site, including forestry, agricultural development, turbary peat extraction) on the land, soils and geological environment would have been imperceptible.

Minor third party and private sod peat cutting was occurring at the periphery of the Application Site during this time period (July 1988 – June 2020). Given that there were no turbary plots within the Application Site there was no potential for cumulative effects with respect to the land, soils and geological environment.

The Peat Extraction Phase (July 1988 - June 2020) advanced the peat extraction and ancillary activities, and site preparation works which were completed previously at the Application Site between 1950 and 1988. The cumulative effect of the Peat Extraction Phase with the works completed prior to 1988 was the removal of 4,255,376 tonnes of peat from the Application Site (904,128 tonnes prior to July 1988 and 3,351,248 tonnes between July 1988 and June 2020). Therefore, there was a significant cumulative effect on peat and peat subsoils within the Application Site.

7.5.5.2 Current Phase (June 2020 – Present Day)

The geological impact assessment undertaken above in this chapter outlines those significant effects that have occurred within the Application Site as a result of the Current Phase of the Project.

The potential for significant cumulative effects with other local developments (located outside the Application Site (i.e. forestry, agriculture, and turbary peat extraction) on the land, soils and geological environment would have been imperceptible.

Due to the activity at the site being limited to decommissioning works during the Current Phase as described in Chapter 4, the potential for cumulative effects arising from the development are significantly decreased in comparison to the Peat Extraction Phase.

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

7.5.5.3 Remedial Phase

Due to the localised nature of the proposed works associated with the Remedial Phase within the Application Site boundary, the potential for significant cumulative effects with other local developments on the land, soils and geological environment will be imperceptible. There will be very limited movement of peat during the implementation of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan, and all proposed works will be local to the Application Site. The implementation of the measures in the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan for the Application Site will either coincide with or postdate the construction of the proposed Lemanaghan Wind Farm if this wind energy application is permitted. Even if the construction of the wind farm development and the decommissioning and rehabilitation works overlap there will be no significant effects on the land, soils and geological environment. Detailed, tried and tested, best practice mitigation measures for the protection of the lands, soils and geological environment are prescribed in the EIAR for the wind farm development and as stated above, there will be very limited

movement of peat associated with the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan.

The only way the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan could have cumulative effects with other off-site projects and plans is via the drainage and off-site surface water network, and this hydrological pathway is assessed in Chapter 8.

7.5.5.4 Overall Cumulative Assessment

Due to the localised nature of the works associated with the peat extraction and ancillary activities within the Application Site, the potential for significant cumulative effects with other local developments on the land, soils and geological environment would have been imperceptible. In summary:

- Peat extraction works have ceased;
- Any works associated with the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan are small and localised within the Applicant's lands;
- The volumes of peat to be moved during the proposed wind farm development will be small in comparison to the large volumes of residual peat remaining on Application Site (peat depths at the Application Site range from 0 to >6m with an average peat depth of 2m); and,
- Any identified off-site developments do not overlap with any of the Applicant's lands and therefore cannot have a cumulative effect on Soils and Geology.

No cumulative effects on soils and geology with off-site projects can occur as there can be no overlapping outside of Bord na Móna land.

It is intended to utilise the Application Site for both peatland remediation and wind energy infrastructure to facilitate environmental stabilisation of the bog group and the optimisation of climate action benefits.

Lemanaghan DAC, a joint venture between SSE Renewables and Bord na Móna (BnM) (i.e the Applicant) are proposing a wind energy development consisting of 15 turbines with an overall blade to tip height of 220m at the Application Site. A separate EIAR and accompanying NIS are being undertaken for the proposed Lemanaghan Wind Farm development. At the time of writing, the planning application for this development has not yet been submitted to An Coimisiún Pleanála. There will be a slight cumulative effect on Land, Soils and Geology with the proposed Lemanaghan Wind Farm, but the effect is limited by the small footprint of the infrastructure associated with the proposed wind farm relative to the overall Application Site area.

For the reasons outlined above, and with the implementation of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan there will be no significant cumulative effects on the Land, Soils and Geology environment during the Remedial Phase. The cumulative assessment confirms that there was a significant cumulative effect with the Peat Extraction Phase and the works completed previously at the Application Site between 1950 and 1988. The cumulative effect was the removal of 4,255,376 tonnes of peat from the Application Site (904,128 tonnes prior to July 1988 and 3,351,248 tonnes between July 1988 and June 2020).

7.5.6 Conclusions

Lemanaghan Bog (the "Application Site") is a large Bord na Móna bog which forms part of the Boora Bog Group. The Application Site comprises an area of 1,111 (ha). The Application Site is located in County Offaly,2.5km southwest of Ballycumber, 3.5km to the northeast of Ferbane, 7.8km southwest of Clara, and 8.7km south of Moate. The current topography of the Application Site is relatively flat with an elevation range of between approximately 46 and 60mOD (metres above Ordnance Datum).

The baseline for the assessment of peat extraction and ancillary activities at the Application Site is July 1988, and the Peat Extraction Phase covers the period between July 1988 and June 2020. Applicant commenced works at Lemanaghan Bog with the commencement of drainage in 1950. By 1988 peat extraction and ancillary activities were well established at the Application Site.

From a land, soils and geology perspective, the main effects occurred during the early stages of drainage and peat extraction when the acrotelm (topmost living peat layer) was removed and the extraction of the peat (catotelm) began. These site preparation works had been completed across the vast majority of the Application Site prior to July 1988 and any subsequent activities in these areas would not have resulted in any significant changes, with the only effects resulting from minor annual topographic changes associated with peat removal, and other excavations associated with drainage maintenance. The peat extraction and ancillary activities post-dating July 1988 are therefore not considered to have resulted in a significant negative effect on the land, soils and geological environment.

The Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan for the Application Site has also been assessed. The plan will typically involve the rewetting and revegetation of the drained bog. The plan will have a positive effect on the soils/land across the Application Site, with rewetting of bare peat areas. The Application Site will never return fully to the original raised bog which was present before commencement of the peat extraction and ancillary activities but the implementation of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan will have a positive effect of land and soils/land, and on the coverage of vegetation at ground level when compared to the 1988 baseline condition of the lands.

The assessment confirms that there was a significant cumulative effect between the Peat Extraction Phase and the works completed previously at the Application Site between 1950 and 1988. The cumulative effect was the removal of 4,255,376 tonnes of peat from the Application Site (904,128 tonnes prior to July 1988 and 3,351,248 tonnes between July 1988 and June 2020). No cumulative effects will result from the implementation of Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan, nor from the proposed Lemanaghan Wind Farm development at the Application Site. Effects on the land and soils environment will only occur as direct effects, local to the point of extraction/excavation, and therefore cannot extend beyond the boundary of the Application Site.