

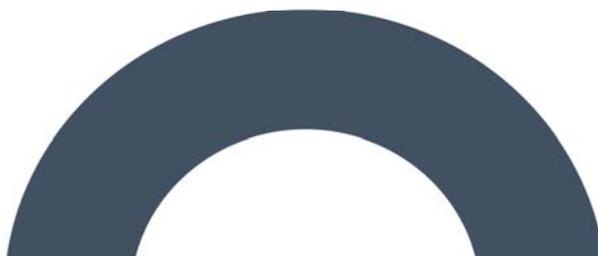


APPENDIX 4-6

**ASSESSMENT OF FORESTRY
REPLACEMENT LANDS**

Assessment of Forestry Replacement Lands

Coole Wind Farm
Development, Co.
Westmeath





DOCUMENT DETAILS

Client: **Coole Wind Farm Ltd**

Project Title: **Coole Wind Farm Development, Co. Westmeath**

Project Number: **200445**

Document Title: **Assessment of Forestry Replacement Lands**

Document File Name: **Replanting Assessment F - 2021.03.08 - 200445**

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Rev	Status	Date	Author(s)	Approved By
01	Final	08.03.2021	EOS/LK	MW

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Appendix 1 – Technical Approval Document

1. INTRODUCTION

1.1 Introduction

This report has been prepared by McCarthy Keville O'Sullivan Ltd. (MKO) on behalf of Coole Wind Farm Ltd., who intends to apply to An Bord Pleanála for planning permission to construct a wind energy development and all associated infrastructure in the townland of Coole and adjacent townlands, in Co. Westmeath.

In line with the Forest Service's published policy on granting felling licenses for wind farm developments, areas permanently cleared of forestry for turbine bases, access roads, and any other wind farm-related uses will have to be replaced by the planting of forestry at an alternative location. The Forest Service policy requires replanting on a hectare for hectare basis for the footprint of the turbines and the other infrastructure developments.

A total of 16.36 hectares of new forestry will therefore be replaced as a condition of any felling licence that might issue in respect of the proposed wind energy development. Replanting is a requirement of the Forest Service and is primarily a matter for the statutory licensing processes under the Forestry Act 2014 that are under the control of the Minister for Agriculture, Food and the Marine and the Forest Service. Please refer to Section 4.3.16 in Chapter 4 of this EIAR for further detail on felling requirements.

The replacement of forestry can occur anywhere in the State subject to licence. Bare replacement lands are therefore required to be obtained by the applicant and ringfenced for the replacement of forestry felled as part of the construction of wind energy developments. These lands are subject to an application for Technical Approval by the Forest Service. Should technical approval be granted, the lands can be left bare until a felling licence for the wind farm to which they are linked has been acquired. Bare replacement lands can also be planted ahead of a felling licence being acquired for the wind farm as long as they are held specifically for the purpose of replacing forestry felled as part of the wind farm development.

A potential replanting site for the proposed Coole wind farm felling requirement has been identified in County Roscommon. These lands have been granted Forest Service Technical Approval for afforestation (see Appendix 1 for technical approval document) and these or similarly approved lands will be used for replanting should the proposed wind farm receive planning permission.

1.2 Report Structure

The main sections of this report are presented as follows:

- > Section 2: Project Background and Description
- > Section 3: Planning Policy and Planning History
- > Section 4: Impact Assessment Methodology
- > Section 5: Biodiversity
- > Section 6: Land, Soils and Geology
- > Section 7: Hydrology and Hydrogeology
- > Section 8: Landscape
- > Section 9: Cultural Heritage
- > Section 10: Air, Climate and Noise
- > Section 11: Population & Human Health
- > Section 12: Material Assets



In this report, the replacement lands are assessed in combination with any existing, permitted or proposed developments located in the immediate vicinity of the replacement lands. The replacement land is assessed in combination with the proposed Coole Wind Energy Development in Chapters 5 to 14 of the EIAR.

2. PROJECT BACKGROUND AND DESCRIPTION

2.1 Background

2.1.1 Replanting Approval

Replanting or off-site afforestation is a requirement of the Forestry Act 2014 and its consent is regulated under the Forestry Regulations 2017 (SI 191/2017 which set out the provisions for licensing for afforestation.

Approval for afforestation is not granted by the Forest Service on lands where there is the potential for significant environmental impacts.

The lands addressed in this document have been granted Technical Approval by the Forest Service for afforestation.

To afforest any land where the area involved is greater than 0.1 ha requires the approval of the Minister for Agriculture, Food and the Marine, under the 2017 Regulations. The application for approval is known as Pre-Planting Approval – Form 1 and is subject to the following procedures:

- The application is referred to the relevant Forest Service Inspector for assessment and recommendations;
- If there are any environmental considerations identified, the application is referred to the relevant external body, e.g. National Parks and Wildlife Services, National Monuments Service, Regional Fisheries Boards, Local Authorities, etc., for consideration;
- If the proposed development is greater than 25 hectares the application is referred to the relevant Local Authority;
- If the site is greater than 2.5 hectares the application is advertised on the Department’s website; and
- If the site is greater than 50 hectares an Environmental Impact Assessment and planning permission are required (Part 3, Article 5 (2)(c) of S.I. 191/2017).

The Pre-Planting Approval – Form 1 requires a wide range of details in relation to the proposed area to be forested. Notwithstanding the size of the proposed application, the environmental considerations which must be answered/considered for the approval are listed in Table 2-1 below. The Pre-Planting Approval – Form 1 notes that, if present, all items listed may require the Department of Agriculture, Food and the Marine (DAFM) to consult with prescribed bodies, while those in bold type may require the DAFM to undertake public consultation.

Table 2-1 Environmental Considerations in Afforestation Applications for Approval - Form 1

	Environmental Considerations
1	Water Quality
1.1	Is the area designated potentially acid sensitive by this Department (DAFM)?
1.2	Is the area >5 ha and sensitive for fisheries?
1.3	Is the area non-sensitive for fisheries and >40 ha?
1.4	Is the area >10 ha and within a catchment area of a Local Authority designated water scheme?
2	Designated Habitats
2.1	Is the area within a NHA, pNHA, SAC, SPA or National Park?

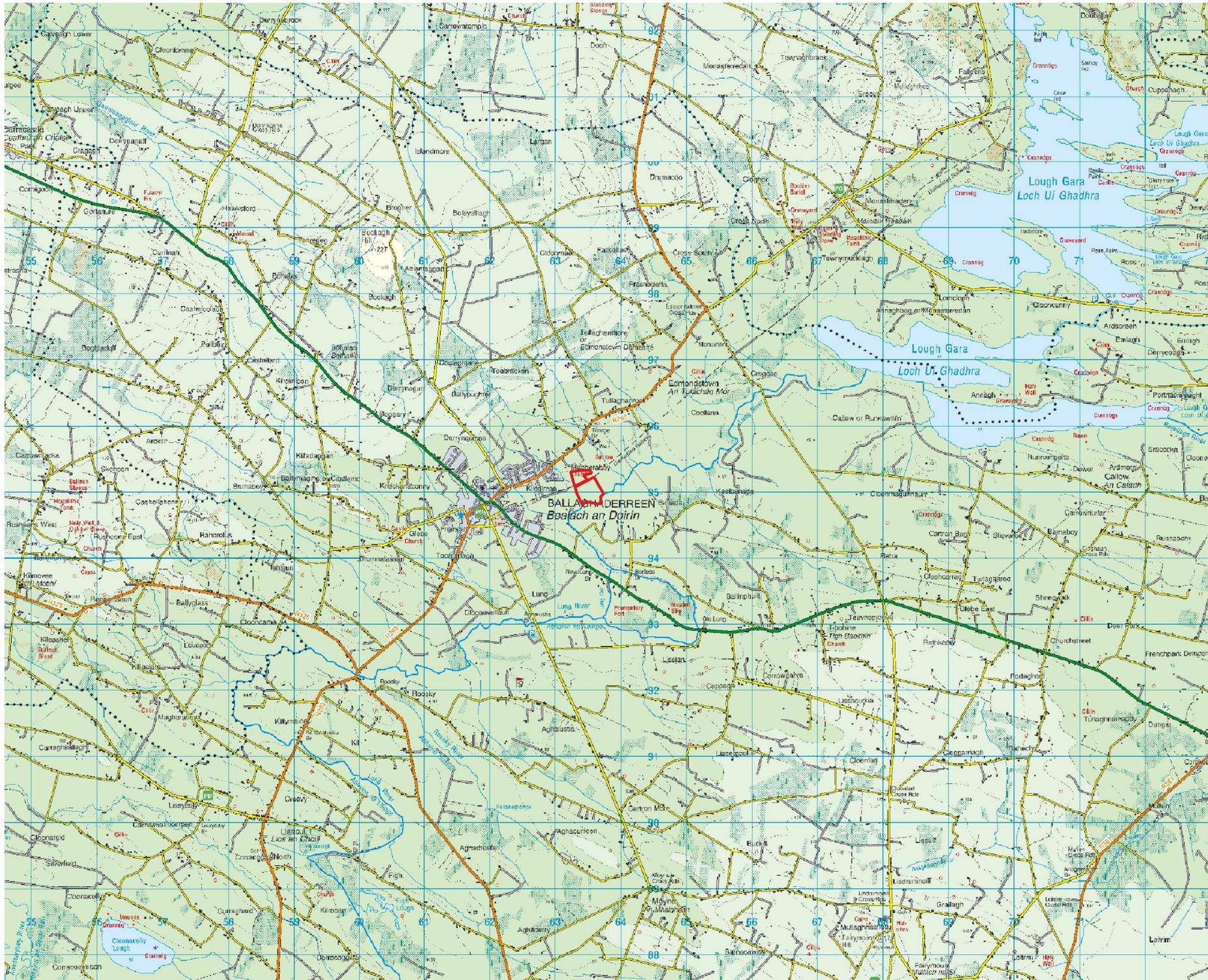
	Environmental Considerations
2.2	If the area is within a NHA, is a completed notifiable Action Form/ Action Requiring Consent Form (consent from National Parks and Wildlife Service) included?
2.3	If the area within a Hen Harrier SPA, will operations occur between the 1 st of April and the 15 th August inclusive?
2.4	Is the area within a NPWS referral zone for NHA, pNHA, SAC or SPA?
2.5	Is the area within 3 km upstream of a NHA, pNHA, SAC, SPA or National Park?
2.6	Is the area within a Fresh Water Pearl Mussel 6 km zone? If yes, the Forestry and Fresh Water Pearl Mussel Requirements Forms A and B should be included with the Application
2.7	Is the area within a Freshwater Pearl Mussel Catchment?
2.8	Does the area contain a current REPS plan habitat?
3	Archaeology
3.1	Does the area contain an archaeological site or feature with intensive public usage?
3.2	Does the area contain or adjoin a listed archaeological site or monument?
4	Landscape
4.1	Is the area within a prime scenic area in the County Development Plan?
4.2	Are there any other High Amenity Landscape considerations?
5	Size for Notification to Local Authority
5.1	Is the area greater than 25 ha?
6	Other Environmental Considerations
6.1	Specify

2.2 Proposed Replanting Lands

A potential replanting site has been identified, and any replanting associated with the proposed development will take place at this or similarly Technically Approved lands. The potential site has been assessed as part of the Afforestation Approval – Form 1 process described above, and has obtained Technical Approval for Afforestation from the Forest Service.

The replanting site is located in the townland of Magheraboy, Co. Roscommon, approximately 1.4km to the east of Ballagherreen town centre. The site is accessed via the R293 Regional Road to the north of the site. The site location is presented in Figure 2-1.

The total approved area for afforestation, as per the Technical Approval document, is approximately 16.53 hectares ('Proposed Site'), which is currently dominated by grazed wet grassland. The Lung River flows in a easterly direction along the southern site boundary. An unnamed stream flows in a southerly direction along the western site boundary discharging into the Lung River at the southwest of the site.



Map Legend

 Site Boundary



Drawing Title
Site Location - Replanting Lands

Project Title
Coole Wind Farm, Co. Westmeath

Drawn By EC	Checked By MW
Project No. 200445	Drawing No. Figure 2-1
Scale 1:75000	Date 08.02.2021



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2.3 Proposed Afforestation Techniques

2.3.1 Forest Service Best Practice

Afforestation and subsequent harvesting will conform to current best practice Forest Service regulations, policies and strategic guidance documents as well as Coillte and DAFM produced guidance documents, including the specific guidelines listed below, to ensure that newly planted trees remain viable and afforestation provide minimal potential impacts to the receiving environment.

- Standards for Felling and Reforestation (DAFM, 2019)
- Environmental Requirements for Afforestation (Forest Service, 2016a)
- Land Types for Afforestation (Forest Service, 2016b)
- Forest Protection Guidelines (Forest Service, 2002)
- Forest Operations and Water Protection Guidelines (Coillte, 2013)
- Forestry and Water Quality Guidelines (Forest Service, 2000b)
- Forestry and the Landscape Guidelines (Forest Service, 2000c)
- Forestry and Archaeology Guidelines (Forest Service, 2000d)
- Forest Biodiversity Guidelines (Forest Service, 2000e)
- Forestry Standards Manual (DAFM, 2015)
- Forests and Water, Achieving Objectives under Ireland's River Basin Management Plan 2018-2021 (DAFM, 2018)

Planting will be carried out in accordance with the *Forestry Schemes Manual* (Forest Service, 2011), which provides guidance in relation to ground cultivation, stocking and spacing, plant handling, planting dates, fertiliser application, fencing, fire, and weed control. Certain specific silvicultural and environmental conditions are also set out in the Forest Service Technical Approvals for each site, which will be adhered to.

2.3.2 Planting

Planting will be by hand. The main forms of planting, as described in the *Forestry Schemes Manual*, are set out as follows.

Slit Planting

A spade is used to make a vertical slit in the ground. The trees roots are carefully positioned in the slit to ensure that roots are equally spaced in the vertical slit created. The slit is closed and firmed up ensuring the tree is vertical and upright. It is important to ensure that roots are not bent over which can lead to poor development, e.g. J root. This form of planting can be suitable for ribbons, mounds and ripped ground.

Angle Notch

A spade is used to cut a T or L-shaped slit in the ground. The spade is used to lift the slit and the trees roots placed underneath to ensure good root distribution without causing damage. The slit is closed and firmed up to ensure that stem is left vertical and upright.

Pit Planting

A spade is used to dig a hole and the trees roots placed in the centre. Soil is placed around the tree and firmed in, ensuring that it is upright and straight. This form of planting can be used in sensitive

sites where no ground preparation has taken place. It may also be appropriate for steep slopes where other types of preparation may lead to sediment run off.

The Technical Approvals for the proposed replanting lands include the species approved for afforestation.

2.3.3 Drainage

Drainage and sediment control at each site will be designed in accordance with the measures outlined in the Forestry Standards Manual¹ and Environmental Requirements for Afforestation². Appropriate drainage designs will include collector drains, interceptor drains and cut-off drains. A description of each drain type, as per the Forestry Schemes Manual, is set out below. Figure 2-2 presents a schematic diagram of each drain type.

Collector Drains

Collector drains collect water from mound drains, plough furrows, mole drains, etc., and discharge via sediment traps and/or an interceptor drain. Collector drains are excavated to a depth not greater than 10-15 cm below the depth of mound drains. Where collector drains have to be extended into erodible material, 'mini' silt traps are placed appropriately by deepening the drains in places.

Interceptor Drains

Interceptor drains are constructed along the edges of aquatic buffer zones, i.e. areas where forest operations are curtailed and which are managed for environmental protection and enhancement. Interceptor drains collect the discharge from the drainage sub-catchment and allow it to overflow into the buffer zone. In most cases, slope will allow for drainage channels to taper out or be connected to an interceptor drain rather than enter a buffer zone. However, on flat sites, or those with low slopes, it will be necessary to connect drains into the aquatic zone. This may be done only where it will not result in sediment or any pollutants entering the aquatic zone.

Cut off Drains

Cut off drains are constructed immediately up slope of a site and are designed to direct water away from the site.

¹ Forestry Standards Manual (DAFM, 2015)

² Environmental Requirements for Afforestation (Forest Service, 2016a)

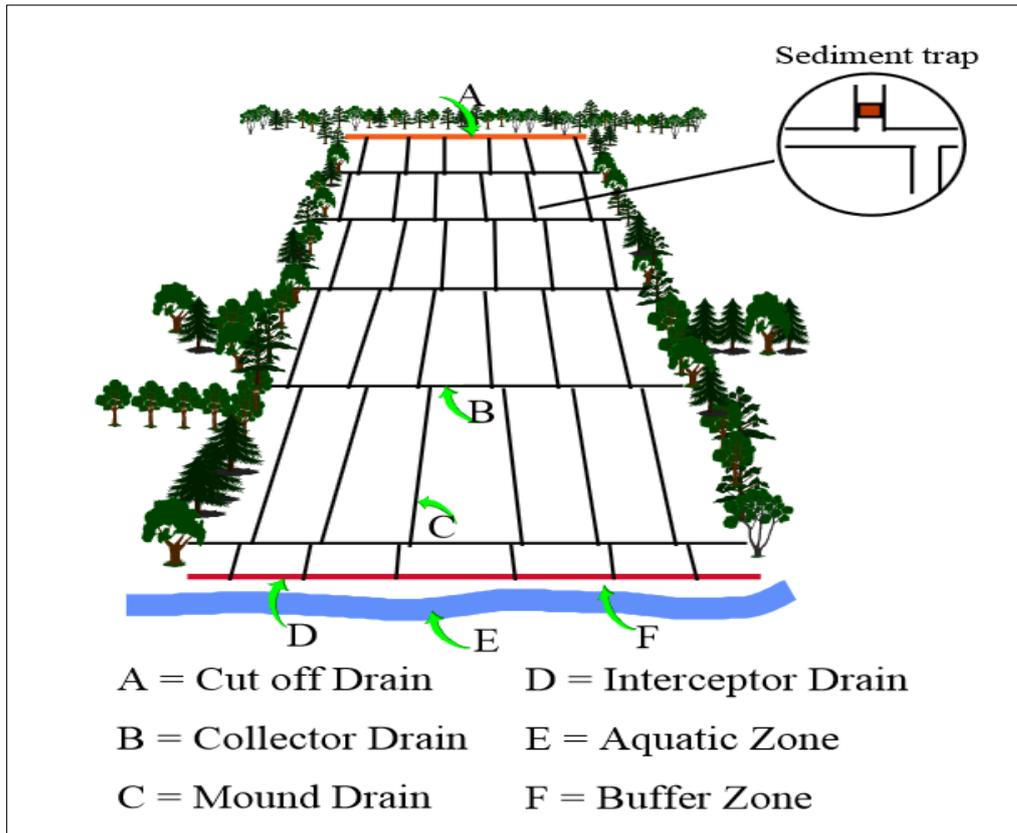


Figure 2-2 Standard Forestry Drainage (Forest Service, 2011)

Designs similar to the one above may be suitable for steeper erodible sites.

3. PLANNING POLICY AND PLANNING HISTORY

This section contains relevant national and local policies regarding forestry. This includes reference to several national forestry policy documents, the *Climate Action Plan 2019* (Department of Communications, Climate Action & Environment, 2019) as well as the County Development Plan for Roscommon.

This section of the report also addresses the planning history within, and in the vicinity of, the proposed replanting lands.

3.1 Planning Policy

3.1.1 National Policy

National policy includes Forest Service policy as well as policy on climate change. Forestry policy in Ireland is overseen by the Forest Policy Section of the DAFM. At a European and international level, the Forest Policy Section is responsible for the transposition of EU directives and regulations into Irish law, as well as representing the Forest Service at a European level. On a national level, the Forest Policy Section deals with issues relating to climate change, carbon sequestration, wood energy, forestry and the environment, legislative framework and liaison with stakeholders which includes other government agencies.

National policy is aimed towards increasing Ireland's forest cover in a sustainable manner. The document *Forests, products and people: Ireland's forest policy – a renewed vision* (DAFM, 2014) sets out an updated national forest policy strategy that takes account of the substantial changes that have occurred in Irish forestry since the publication of its forerunner, *Growing for the Future* (DAFM, 1996). As part of the Department's policy to ensure compatibility between forestry development and the protection of the environment, the Forest Service is implementing Sustainable Forest Management (SFM) with a view to ensuring that all timber produced in Ireland is derived from sustainably managed forests. This work is in accordance with Ireland's commitment to the six pan-European criteria for SFM adopted at the Third Ministerial Conference on the Protection of Forests in Europe, Lisbon, 1998. The implementation of SFM within Ireland is supported by the Irish National Forest Standard, the *Code of Best Forest Practice* and a suite of environmental guidelines (relating to water quality, landscape, archaeology, biodiversity and harvesting) as well as the work of the Forestry Inspectorate and the ongoing review of Irish forest legislation.

The *Environmental Requirements for Afforestation* (Forest Service, 2016a), released in December 2016, incorporate more recent developments in relation to environmental regulation, research and changes in forest practices, and consolidate into one single coherent document those measures and safeguards relating to afforestation which were previously contained within the following Forest Service Environmental 'Guidelines': *Forestry and Water Quality Guidelines*, *Forestry and Archaeology Guidelines*, *Forestry and the Landscape Guidelines*, and *Forest Biodiversity Guidelines*. The use of the word 'requirements' in the title was selected over 'guidelines', in order to underline the mandatory nature of the measures therein.

These environmental guidelines are referred to in Section 3.1.3 below.

3.1.1.1 Forests, products and people: Ireland's forest policy – a renewed vision

This document, published in 2014 by DAFM, contains strategic goals and recommendations of the Forest Policy Review Group. The strategic goal is defined as:

“Develop an internationally competitive and sustainable forest sector that provides a full range of economic, environmental and social benefits to society and which accords with the Forest Europe definition of sustainable development.”

The report notes the increasing economic, environmental and social role of forestry in Ireland, stating that forestry accounts for 10.8% of the land area of the country, which is low in comparison with other European countries. The strong forest growth rates found in Ireland when compared to other European countries is also noted. The role of forestry in rural development and diversification as well as rural employment is also recognised.

The document notes also the contribution of forests to mitigation of climate change through carbon sequestration and notes that Irish forests will sequester approximately 4.8 million tonnes of CO₂ in 2020. This document's afforestation policy therefore supports Ireland's efforts to reach the greenhouse gas emission reduction targets as well as reducing dependence on fossil fuels.

The role of the forest resource in contributing to the renewable energy policy goals, such as achieving a percentage of power generation by co-firing with biomass, as well as biomass in power generation, is also noted. The report notes that the contribution of forestry to achieving renewable energy targets is dependent on the scale and accessibility of the resource, and that a continuation of afforestation in order to maintain a sustainable level of supply of small roundwood would result in confidence for investment in Combined Heat and Power (CHP) and other wood energy technologies.

Some recommended relevant policies and actions include:

- **Expansion of the Forest Resource:** To increase the forest area, in accordance with SFM principles, in order to support a long term sustainable roundwood supply of 7 to 8 million cubic metres per annum. This policy aims to increase afforestation to 15,000 hectares annually.
- **Management of the Resource:** To ensure that the sustainable management of the forest resource in accordance with best practice thereby ensuring its capacity to provide the full range of timber and other benefits.
- **Environment and Public Goods:** To ensure that afforestation, management of existing forests and development of the forest sector are undertaken in a manner that enhances their contribution to the environment and the capacity to provide public goods and services.

3.1.1.2 Forestry Programme 2014-2020

This document was submitted in accordance with EU Guidelines on State Aid for Agriculture and Forestry in Rural Areas 2014-2020 and represents Ireland's proposals for 100% State aid funding for a new forestry programme 2014-2020. These measures are consistent with the document *Forests, products and people; Ireland's forest policy – a renewed vision* as referred to in Section 3.1.1.1 above. The European Commission has prolonged the validity of state aid rules applicable in the agricultural and forestry sectors, for a further two years until December 31, 2022.

This document contains a number of responses to the actions and policies identified in the above document, and these include an Afforestation scheme - this is the main response to the policy entitled '*Expansion of the forest resource*'.

An identification of needs was carried out by DAFM in relation to forestry, and these needs are as follows:

- Increase, on a permanent basis, Ireland's forest cover to capture carbon, produce wood and help mitigation;
- Increase and sustain the production of forest-based biomass to meet renewable energy targets;
- Support forest holders to actively manage their plantations; and
- Optimise the environmental and social benefits of new and existing forests.

A number of measures are proposed to meet these needs, and the most relevant of these refers to the first measure, which is aimed at increasing Ireland's forest cover (currently at approximately 10.8%) which is well below the EU average of 38%. The aim is to increase forest cover to 18% by the mid-century. The second need, that to increase forest-based biomass in order to meet the stated targets for renewable energy by 2020.

3.1.1.3 Climate Action Plan 2019

The *Climate Action Plan* (DCCA, 2019) which features 183 action plans sets out how Ireland will meet its EU targets to reduce its carbon emissions by 30% between 2021 and 2030 and lay the foundations for achieving net zero carbon emissions by 2050. One of the key targets in relation to forestry is the delivery of ‘...an average of 8,000 ha per annum of newly planted forest, and sustainable forest management of existing forests (21 MtCO₂eq. cumulative abatement)’. Ongoing and proposed measures to deliver the target include:

- The investment of nearly €3 billion in forestry, since the late 1980s, which through ongoing sustainable forest management will contribute to delivering abatement of 21 MtCO₂eq over the period 2021 to 2030.
- Review of the current afforestation programme to enhance participation rates, and inform land use policy to increase the benefits for climate, the environment, and rural communities.
- Commitment by Coillte to replant or restock a total of 34,770 hectares between 2016 and 2020.
- Bord na Móna's estate extends to a little under 80,000 ha. To date a little over 18,000 ha of the cut-away and cut-over peatland has been rehabilitated and the target for 2019 is to complete a further 3,000 ha. By way of additional context, as much as 50,000ha of the overall estate is currently under consideration for a wide variety of commercial future uses of which renewable energy projects constitute the greatest proportion by far.
- Hedgerows are estimated to cover 3.9% of the Irish landscape or 660,000 km length. The total area of hedgerow and non-forest woodland patches across the landscape could possibly represent a significant carbon sink and could potentially be used as a mitigation option.

3.1.1.4 Project Ireland 2040- National Planning Framework

Agricultural diversification and alternative landuses are necessary in order to maintain and create jobs in rural Ireland where low quality land presents challenges for sustainable development and economic growth. Afforestation is recognised as an alternative landuse which creates rural employment and drives the national economy. The direct and indirect contribution of the forestry sector to the economy has been calculated at €2.3 billion annually. Afforestation play an important role reaching national CO₂ target emissions “*through carbon sequestration in forests and the provision of renewable fuels and raw materials. Irish forestry is a major carbon sink and afforestation is the most significant mitigation option that is available to Ireland's land use sector*”. In order to facilitate this further, the annual target for afforestation by 2020 is 8,290 hectares, an increase in over 2,000 hectares over the past three years.

Table 3-1 Project Ireland 2040 NPF Objectives which relate to forestry

National Policy Objective 23	Facilitate the development of the rural economy through supporting a sustainable and economically efficient agricultural and food sector, together with forestry, fishing and aquaculture, energy and extractive industries, the bio-economy and diversification into alternative on-farm and off-farm activities, while at the same time noting the importance of maintaining and protecting the natural landscape and built heritage which are vital to rural tourism.
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3.1.2 Local Policy

3.1.2.1 Roscommon County Development Plan 2014-2020

The current adopted Roscommon County Development Plan (CDP) states that the council acts as a consultee rather than an assessor in relation to forestry development and adhere to the ‘Code of Best Forestry Practice – Ireland (2000)’. The council recognise the benefits of forestry as a method of: boosting the rural economy, encouraging population growth and agricultural diversity, and assisting in Ireland’s goal of reaching CO₂ target emissions. It is also recognised as a recreational use and therefore the council encourages forestry development. However, any such afforestation proposals must be appropriate in scale and nature with the surrounding environment to the location, comply with the following:

- “landscapes of scenic value are not unduly eroded.
- areas with environmental and archaeological protections are safeguarded.
- access from forestry development onto public roads for the purposes of thinning and felling do not compromise traffic safety”

Roscommon County Council (RCC) requests a mixture of broadleaf and conifer species to be planted where possible in order to support flora and fauna species and to encourage rich biodiversity in the forestry landscape. A planting free zone of 30m along public roads should be observed. Reference should be made to the document *Code of Best Forestry Practice – Ireland (2000)*, published by the Forest Service, Department of the Marine and Natural Resources.

Policies and objectives in the Roscommon CDP which relate to forestry can be found in Table 3-2 below.

Table 3-2 Policies and objectives in Roscommon CDP which relate to forestry

Policy 188	<p>RCC shall facilitate forestation in suitable locations in co-operation with the Forest Service and Coillte Teoranta and in accordance with sustainable Forest Management guidelines including;</p> <ul style="list-style-type: none"> ➤ Forestry and Landscape Guidelines in order to enhance the overall landscape, involving shape, scale, diversity, visual force and unity. ➤ Forestry and Water Quality Guidelines including recommendations in relation to sensitive water catchments, cultivation, drainage, fertilizing and storage, the use of chemicals, herbicides and fuels, road making, bridges and culverts and harvesting Forestry and Archaeology Guidelines designed to ensure that Ireland’s rich heritage of archaeological sites and artefacts are not damaged by forest operations. ➤ Forest Biodiversity Guidelines to recognize the importance of the maintenance and enhancement of forest biodiversity and implement the objectives in a forestry context of the National Biodiversity Plan such as structural diversity, retained habitats and open spaces, the retention of
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	<p>deadwood, the control of troublesome species and the use of conservation of native species.</p> <p>➤ Forest Harvesting and Environmental Guidelines to ensure that all forest harvesting operations, including felling, extraction, road and site restoration, are environmentally sustainable.</p>
Policy 189	Facilitate forestation in appropriate locations, in co-operation with Coillte Teoranta and the Forest Service and in line with National policy and the Roscommon LCA (S 3.6 of the LCA Report 2007), while ensuring the no pollution or injury is caused to natural waters, wildlife habitats or conservation areas.
Policy 190	Discourage forestry development in proposed/candidate/adopted SAC's, NHA'S and SPA's, in designated Sensitive Rural Landscapes and in water quality sensitive areas.
Policy 191	Promote appropriate forestry related industries and rural tourism.
Policy 192	Prevent excessive forestation that would negatively impact on rural communities i.e. forestry development should be appropriate to the surrounding area in terms of nature and scale and should not allow that residential development becomes isolated when plantations mature.
Policy 193	Promote mixed species forestry and selective rather than clear felling.
Policy 194	The Council will co-operate with Coillte Teoranta, the Forest Service and private landowners in promoting greater public access and recreational use of Forests in the County.
Policy 195	Have regard to the Bio-energy Action Plan for Ireland 2007, to the Department of Agriculture and Food Best Practice Manuals and to the LCA when considering significant planting of bio energy crops.
Policy 196	RCC shall support the development of the bio-energy industry over the Plan period.

The Roscommon County Development Plan 2021-2027 is currently out for public consultation.

3.1.3 Forest Service Guidelines

3.1.3.1 Environmental Requirements for Afforestation

The *Environmental Requirements for Afforestation* (Forest Service, 2016a), released in December 2016, incorporate more recent developments in relation to environmental regulation, research and changes in forest practices, and consolidate into one single coherent document those measures and safeguards relating to afforestation which were previously contained within the following Forest Service Environmental Guidelines: *Forestry and Water Quality Guidelines*, *Forestry and Archaeology Guidelines*, *Forestry and the Landscape Guidelines*, and *Forest Biodiversity Guidelines*. The use of the word 'requirements' in this document's title was selected over 'guidelines', in order to underline the mandatory nature of the measures therein.

The overall aim of the *Environmental Requirements for Afforestation* is to ensure that the establishment of forests is carried out in a way that is compatible with the protection and enhancement of the environment, in regard to water quality, biodiversity, archaeology, landscape and other environmental receptors. In relation to water, the focus is on reducing and eliminating sources of pollution and

preventing the creation of pathways to receiving waters. The Requirements provide an enhanced baseline level of protection regarding afforestation and water, with the water setback representing an important feature. They will also support the *Plan for Forestry and Freshwater Pearl Mussel in Ireland* (DAFM, 2016), by providing an enhanced baseline level of protection regarding afforestation and water.

The *Environmental Requirements for Afforestation* are set out in three stages that reflect the project development process, i.e. pre-application design, site works, and ongoing site management. While some overlap exists, these three stages reflect the typical sequence of activities undertaken by an Applicant and her / his Registered Forester, and the corresponding sequence of mandatory environmental measures that apply, throughout afforestation up until the end of the premium period (or 15 years, for non-grant aided forests).

Afforestation at the proposed replanting land will be carried out in accordance with the *Environmental Requirements for Afforestation* document, as stated in the conditions attached to each Technical Approval.

3.2 Planning History

A planning history search was carried out for the proposed replanting lands and the lands in their immediate vicinity. This entailed reference to the Planning Application search facility and maps on the website of the Planning Authority, i.e. Roscommon County Council. The planning history searches found that planning applications in the vicinity of the proposed replanting lands relate to housing. No projects or plans were identified that would be incompatible with the proposed replanting or give rise to significant cumulative impacts.

4. IMPACT ASSESSMENT METHODOLOGY

The impacts of afforestation at the potential replanting lands described in Section 2.2 of this report have been assessed under the following key environmental headings:

- > Biodiversity
- > Land, Soils and Geology
- > Hydrology and Hydrogeology
- > Landscape
- > Cultural Heritage
- > Air, Climate and Noise
- > Human Beings
- > Material Assets

Each site is addressed separately under the key environmental headings, and described in terms of Baseline Environment, Impact Assessment, Proposed Mitigation Measures and Residual Impacts and Significance of Effects. The findings of the assessment are presented in Sections 5 to 12 of this report.

Impacts are described in terms of quality, significance, duration and type, where possible. The classification of impacts in this report uses the standard best-practice terms provided in the Environmental Protection Agency (EPA) document, *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2017). Table 1-2 (pp. 1-16 to 1-19) of the Environmental Impact Assessment Report (EIAR) submitted as part of the Coole Wind Energy Development planning application presents a copy of the impact classification terminology.

Appropriate mitigation measures are presented where relevant to reduce, remedy or eliminate potential impacts. Residual impacts are also presented following any impact for which mitigation measures are prescribed.

5. BIODIVERSITY

This section of the report includes accurate descriptions of the baseline ecological environment of the forestry replacement lands, which is based on an appropriate level of survey work that was carried out in accordance with the most appropriate guidelines and methodologies. The assessment then completes a thorough assessment of the impacts of the proposed afforestation on biodiversity. Where likely ecologically significant effects are identified, measures are prescribed to avoid or minimise or compensate for such effects associated with afforestation, at the following locations:

- Magheraboy, Co. Roscommon

This section of the report includes accurate descriptions of the baseline ecological environment of the forestry replacement lands, which is based on an appropriate level of survey work that was carried out in accordance with the most appropriate guidelines and methodologies. The assessment then completes a thorough assessment of the impacts of the proposed afforestation on biodiversity. Where likely ecologically significant effects are identified, measures are prescribed to avoid or minimise or compensate for such effects associated with afforestation at the locations identified above.

5.1 Establishing the Zone of Influence

As described in the CIEEM, 2018 *Guidelines for Ecological Impact Assessment in The UK and Ireland*, 'the *zone of influence* for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities'. The zone of influence will vary with different ecological features, depending on their sensitivities to an environmental change. This may extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries.

The assessment of the site began with a desk study of available published data on sites designated for nature conservation, other ecologically sensitive sites, habitats and species of interest near the proposed development. A review of OSI mapping, online environmental web-mappers and ortho-photography was also undertaken. The baseline information obtained from the desk study was the first stage in defining a zone of influence of the proposed development.

The zone of likely influence for the proposed development varied depending on the ecological receptors identified on site. In the assessment, effects on habitats and species within the site were considered and also the potential for the proposed development to affect habitats and species outside the site.

5.2 Methodology

5.2.1 Field Surveys

An ecological site visit was undertaken at the subject site in November 2020. Habitats were identified in accordance with the Heritage Council's *'Guide to Habitats in Ireland'* (Fossitt, 2000). Plant nomenclature for vascular plants follows *'New Flora of the British Isles'* (Stace, 2010), while mosses and liverworts nomenclature follow *'Mosses and Liverworts of Britain and Ireland - a field guide'* (British Bryological Society, 2010).

The multi-disciplinary walkover surveys were designed to detect the presence, or likely presence, of a range of protected habitats and species. Incidental sighting/observations of birds and additional fauna were noted during the site visits. Surveys were undertaken in accordance best practice guidance (TII, 2008: *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*). During the multi-disciplinary ecological walkover surveys the potential for the study area

to support protected mammals listed in the Wildlife Acts, 1976–2019, such as pine marten, red squirrel, Irish hare, pygmy shrew, Irish stoat etc. was assessed.

During the multi-disciplinary walkover surveys, a search for non-native invasive species was undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

Features within the sites were visually assessed for potential as bat roosting habitat using a protocol set out in the Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists: good practice Guidelines (3rd edn.) (Collins, J (ed.), 2016). Table 4.1 of the BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into four Suitability Categories: High, Moderate, Low and Negligible.

Seasonal factors that affect distribution patterns and habits of species were considered when conducting the surveys. The potential of the sites to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic habits) was assessed. All habitats were readily identifiable, and it is considered that a comprehensive and accurate assessment of the habitats was achieved.

5.2.2 Desk Study

The following sections detail the results of the searches of published material that were consulted as part of the desk study. These included the Site Synopses of relevant designated sites as compiled by the National Parks and Wildlife Service (NPWS) of the Department of Culture Heritage, and the Gaeltacht (CHG) bird and plant distribution atlases and other research publications.

5.2.2.1 Designated Sites

5.2.2.1.1 European Sites

The Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. In total, the Habitats Directive protects over 1,000 animal and plant species and over 200 'habitat types' (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance.

With the introduction of the EU Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC) which were transposed into Irish law as S.I. No. 94/1997 *European Communities (Birds and Natural Habitats) Regulations 1997*, the European Union formally recognised the significance of protecting rare and endangered species of flora and fauna, and also, more importantly, their habitats. The 1997 Regulations and their amendments were subsequently revised and consolidated in S.I. No. 477/2011- *European Communities (Birds and Natural Habitats) Regulations 2011*. This legislation requires the establishment and conservation of a network of sites of particular conservation value that are to be termed 'European Sites'. This includes Special Areas of Conservation and Special Protection Areas, as described below.

Special Areas of Conservation

Articles 3 – 9 of the EU Habitats Directive (92/43/EEC) provide the EU legislative framework of protecting rare and endangered species of flora and fauna, and habitats. Annex I of the Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. Marsh Fritillary, Atlantic Salmon, and Killarney Fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as Lesser Horseshoe Bat and Otter, and Annex V lists animal

and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish Hare, Common Frog and Pine Marten.

Species can be listed in more than one Annex, as is the case with Otter and Lesser Horseshoe Bat which are listed on both Annex II and Annex IV.

Special Protection Areas

Council Directive 79/409/EEC of 2 April 1976 on the conservation of wild birds (Birds Directive) has been substantially amended several times. In the interests of clarity and rationality the said Directive was codified in 2009 and is now cited as Directive 2009/147/EC. The Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3).

A subset of bird species has been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

5.2.2.1.2 Nationally Designated Sites

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that were designated for the protection of flora, fauna, habitats and geological sites under the Wildlife (Amendment) Act 2000. These sites do not form part of the Natura 2000 network.

5.2.3 Methodology for Assessment of Impacts and Effects

5.2.3.1 Identification of Target Receptors and Key Ecological Receptors

The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ecological Receptors (KERs). Following a comprehensive desk study, site visits were undertaken, “Target receptors” likely to occur in the zone of influence of the development were identified. The target receptors included habitats and species that were protected under the following legislation:

- Annexes of the EU Habitats Directive
- Qualifying Interests (QI) of Special Areas of Conservation (SAC) within the likely zone of impact.
- Species protected under the Wildlife Acts 1976-2019
- Species protected under the Flora Protection Order 2015

5.2.3.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the ‘*Guidelines for Assessment of Ecological Impacts of National Roads Schemes*’ (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

- International
- National
- County
- Local Importance (Higher Value)
- Local Importance (Lower Value)

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

Any ecological receptors that are determined to be of National or International, County or Local importance (Higher Value) following the criteria set out in NRA (2009) are considered to be Key Ecological Receptors (KERs) for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be Key Ecological Receptors.

5.2.3.3 Characterisation of Impacts and Effects

The proposed development will result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM ‘*Guidelines for Ecological Impact Assessment in the UK and Ireland*’ (2018). These guidelines are the industry standard for the completion of Ecological Impact Assessment in the UK and Ireland. This chapter has also been prepared in accordance with the corresponding EPA guidance (EPA 2017). The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- **Positive or Negative.** Assessment of whether the proposed development results in a positive or negative effect on the ecological receptor.
- **Extent.** Description of the spatial area over which the effect has the potential to occur.
- **Magnitude** Refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- **Duration** is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- **Frequency and Timing.** This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- **Reversibility.** This is a consideration of whether an effect is reversible within a ‘reasonable’ timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

5.2.3.4 Determining the Significance of Effects

The ecological significance of the effects of the proposed development are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018).

For the purpose of Ecological Impact Assessment (EcIA), ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed.
- There will be an effect on the nature, extent, structure and function of important ecological features.
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

The EPA draft *Guidelines on information to be included in Environmental Impact Assessment Reports* (EPA, 2017) and the *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009) were also considered when determining significance and the assessment is in accordance with those guidelines.

The terminology used in the determination of significance follows the suggested language set out in the Draft EPA Guidelines (2017) as shown in Table 5-1.

Table 5-1 Criteria for determining significance of effect, based on (EPA, 2017) guidelines

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature.
Imperceptible effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics.

As per TII (NRA, 2009) and CIEEM (2018) best practice guidelines, the following key elements should also be examined when determining the significance of effects:

- The likely effects on ‘integrity’ should be used as a measure to determine whether an impact on a site is likely to be significant (NRA, 2009).
- A ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2018).

Integrity

In the context of EcIA, ‘integrity’ refers to the coherence of the ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued (NRA, 2009). Impacts resulting in adverse changes to the nature, extent, structure and function of component habitats and effects on the average population size and viability of component species, would affect the integrity of a site, if it changes the condition of the ecosystem to unfavourable.

Conservation status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to CIEEM (2018) guidelines the definition for conservation status in relation to habitats and species are as follows:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

- Its natural range, and areas it covers within that range, are stable or increasing
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future
- The conservation status of its typical species is favourable.

The conservation of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future
- There is and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

According to the NRA/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

5.2.3.5 Incorporation of Mitigation

Section 5.3.4 of this document assesses the potential effects of the proposed development to ensure that all effects on Key Ecological Receptors (KERs) are adequately addressed. Where significant effects on Key Ecological Receptors are predicted, mitigation is incorporated into the assessment to address such impacts. The implemented mitigation measures avoid or reduce or offset potential significant residual effects, post mitigation.

5.2.3.6 Limitations

The information provided in this assessment accurately and comprehensively describes the baseline ecological environment following dedicated ecological surveys; provides an accurate prediction of the likely ecological effects of the proposed development; prescribes best practice and mitigation as necessary; and describes the residual ecological impacts.

The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

The habitats and species on the site were readily identifiable and comprehensive assessments were made during the field visits. No significant limitations in the scope, scale or context of the assessment have been identified.

5.3 Replacement Area: Magheraboy, Ballaghaderreen, Co Roscommon

The proposed replanting land Magheraboy, Ballaghaderreen, Co. Roscommon has been assessed as part of the Afforestation Approval – Form 1 process described above and has obtained Technical Approval for Afforestation from the Forest Service.

5.3.1 Desk Study

The following sections detail the results of the searches of published material that were consulted as part of the desk study for the site.

5.3.1.1 Identification of the Designated Sites Likely Zone of Influence of the Project

Using the Geographic Information System (GIS) software QGIS Version 3.4 designated sites within a within a 15-kilometre radius of the proposed afforestation site were identified. Sites outside 15km were considered but no potential for impact was identified. The Nationally designated sites are listed below in Table 5-2 and all EU designated sites are listed in Table 5-3. Nationally and EU designated sites are displayed in Figure 5-1 and 5-2.

Table 5-2 Identification of Nationally designated sites within the Likely Zone of Impact

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
Natural Heritage Areas (NHA)		
Bella Bridge Bog NHA	10.8km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub catchment (Lung_SC_020) to the NHA (Breedoge_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the NHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Cornaveagh Bog NHA	11km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub catchment (Lung_SC_020) to the NHA (Breedoge_SC_010/Boyle_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the</p>

		<p>separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the NHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Tullaghan Bog (Roscommon) NHA	13.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub catchment (Lung_SC_020) to the NHA (Breedoge_SC_010/Boyle_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the NHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Proposed Natural Heritage Areas (pNHA)		
Tullaghanrock Bog	0.9km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the pNHA and the small scale and nature of the afforestation works there is no potential for indirect effects on the NHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Lough Gara	1.8km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located approximately 6km hydrological distance upstream of Lough Gara. Due to the small scale and nature of the afforestation works there is no potential for indirect effects on the NHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Lough Glinn	7.7km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub catchment (Lung_SC_020) to the pNHA (Lung_SC_020) and there is no hydrological connectivity to this pNHA and no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>

<p>Kilgarriff Bog</p>	<p>9.2km</p>	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the pNHA (Moy and Killala Bay/Moy_SC_030) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Tawnaghbed Bog</p>	<p>9.3km</p>	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the pNHA (Moy and Killala Bay/Moy_SC_030) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Derrynabrock Bog</p>	<p>9.4km</p>	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the pNHA (Moy and Killala Bay/Moy_SC_030) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Bellanagare Bog</p>	<p>9.8km</p>	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the pNHA (Suck_SC_010, Breedoge_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>

Gowlaun Bog	10.2km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the pNHA (Moy and Killala Bay/Moy_SC_030) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Derrinea Bog	10.4km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the pNHA (Lung_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Flughany Bog	10.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the pNHA (Sligo Bay & Drowse/Owenmore_SC_020, Owenmore_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Cloonshanville Bog	10.9km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the pNHA (Breedoge_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>

Cloonakillina Lough	11.1km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the pNHA (Sligo Bay & Drowse/Owenmore_SC_020, Owenmore_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Drumalough Bog	11.2km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon (26B)/Lung_SC_020) to the pNHA (Upper Shannon (26D)/Suck_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Ardagh Bog	12.5km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the pNHA (Breedoge_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Carrowbehy/Caher Bog	12.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment (partially) and sub-catchment (Upper Shannon(26B)/Lung_SC_020) to the pNHA (Upper Shannon(26B)/Lung_SC_010, Upper Shannon(26D) Suck_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p>

		<p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact</p>
Urlaur Lakes	12.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the pNHA (Lung_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Errit Lough	13.1km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the pNHA (Lung_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Cloonchambers Bog	13.8km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon (26B)/Lung_SC_020) to the pNHA (Upper Shannon (26D)/Suck_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Doocastle Turlough	13.8km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the pNHA (Sligo Bay & Drowse/Owenmore_SC_020) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p>

		No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Lough Gower	13.9km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the pNHA (Lung_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Lough O'Flynn	14.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon (26B)/Lung_SC_020) to the pNHA (Upper Shannon (26D)/Suck_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the pNHA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>

Table 5-3 Identification of EU Designated sites within the Likely Zone of Impact

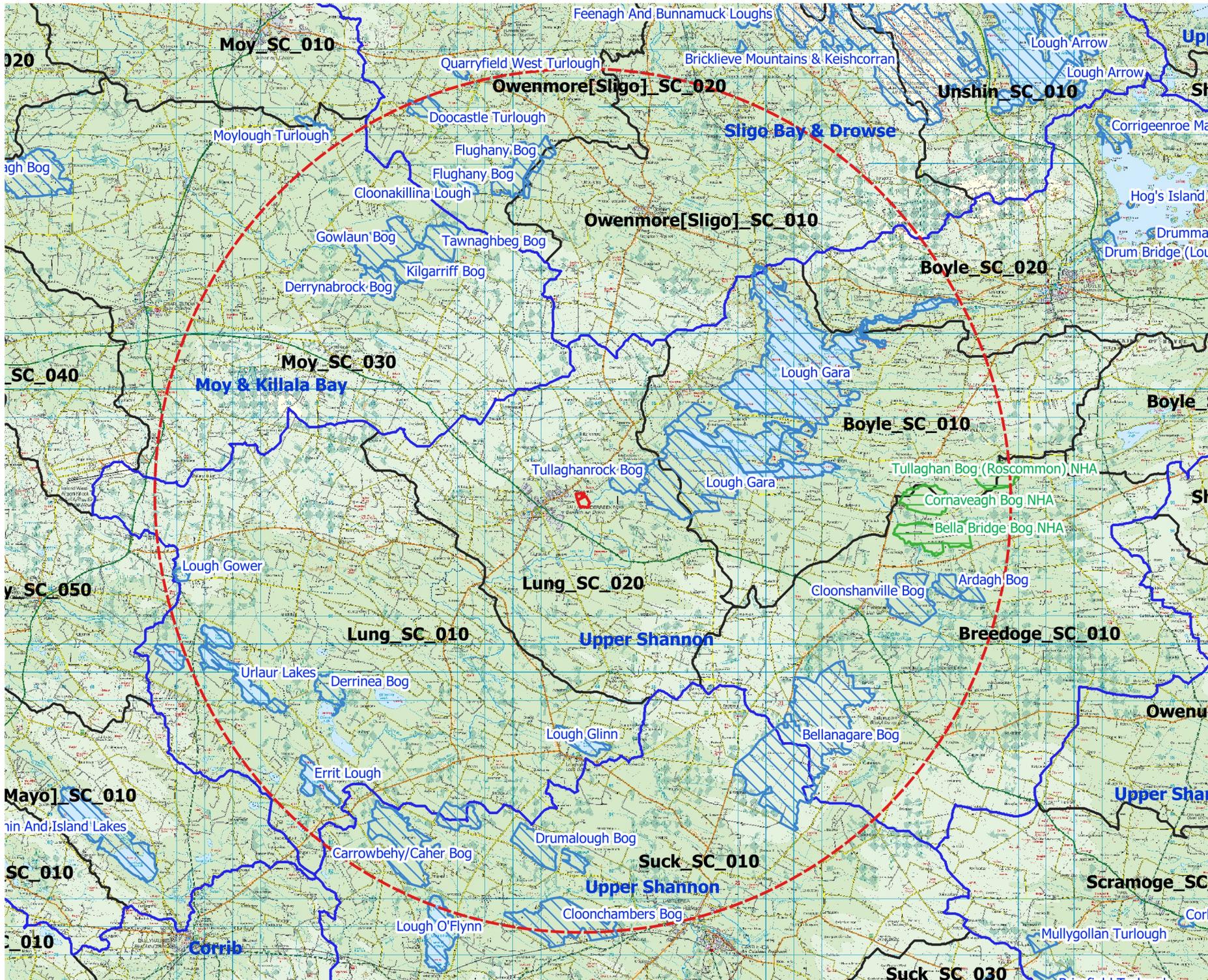
Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
Special Area of Conservation (SAC)		
Tullaghanrock Bog SAC	0.9km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>Given the terrestrial nature of the SAC and the small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Callow Bog SAC	1.8km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>Given the terrestrial nature of the SAC and the small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p>

		No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
River Moy SAC	7.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located in a separate hydrological catchment (Upper Shannon(26B)) to the SAC (Moy & Killala Bay(34)). Therefore, there is no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Bellanagare Bog SAC	9.5km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the SAC (Suck_SC_010, Breedoge_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Derrinea Bog SAC	10.4km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the SAC (Lung_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Flughany Bog SAC	10.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the SAC (Sligo Bay & Drowse/Owenmore_SC_020, Owenmore_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>

Cloonshanville Bog SAC	10.9km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the SAC (Breedoge_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Cloonakillina Lough SAC	11.1km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the .1 (Sligo Bay & Drowse/Owenmore_SC_020, Owenmore_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Drumalough SAC	11.2km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon (26B)/Lung_SC_020) to the SAC (Upper Shannon (26D)/Suck_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Carrowbehy/Caher Bog SAC	12.5km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the SAC (Lung_SC_010, Suck_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact</p>
Urlaur Lakes SAC	12.6km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p>

		<p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the SAC (Lung_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Errit Lough SAC	13.1km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the SAC (Lung_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Cloonchambers Bog SAC	13.8	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon (26B)/Lung_SC_020) to the SAC (Upper Shannon (26D)/Suck_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Doocastle Turlough SAC	13.8km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate catchment and sub-catchment (Upper Shannon/Lung_SC_020) to the SAC (Sligo Bay & Drowse/Owenmore_SC_020) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SAC.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Special Protection Areas (SPAs)		
Lough Gara SPA	3.8km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p>

		<p>The proposed afforestation site is located approximately 6km (hydrological distance) from the SPA. This SPA is designated for Whooper Swan and Greenland White-fronted Goose. The proposed afforestation site comprises rush dominated wet grassland and does not provide supporting habitat for any SCI species associated with the SPA. Therefore, there is no potential for impact as a result of water quality deterioration or disturbance as a result of the proposed afforestation works. There is no potential for indirect effects on the SPA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
Bellanagare Bog SPA	9.7km	<p>There will be no direct effects as the project footprint is located entirely outside the designated site.</p> <p>The proposed afforestation site is located within a separate sub-catchment (Lung_SC_020) to the SPA (Suck_SC_010, Breedoge_SC_010) and there is therefore no potential for impact as a result of water quality deterioration. In addition, given the separation in distance, the nature and small scale of the forestry replacement lands, as permitted in the technical approval document, there is no potential for indirect effects on the SPA.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>

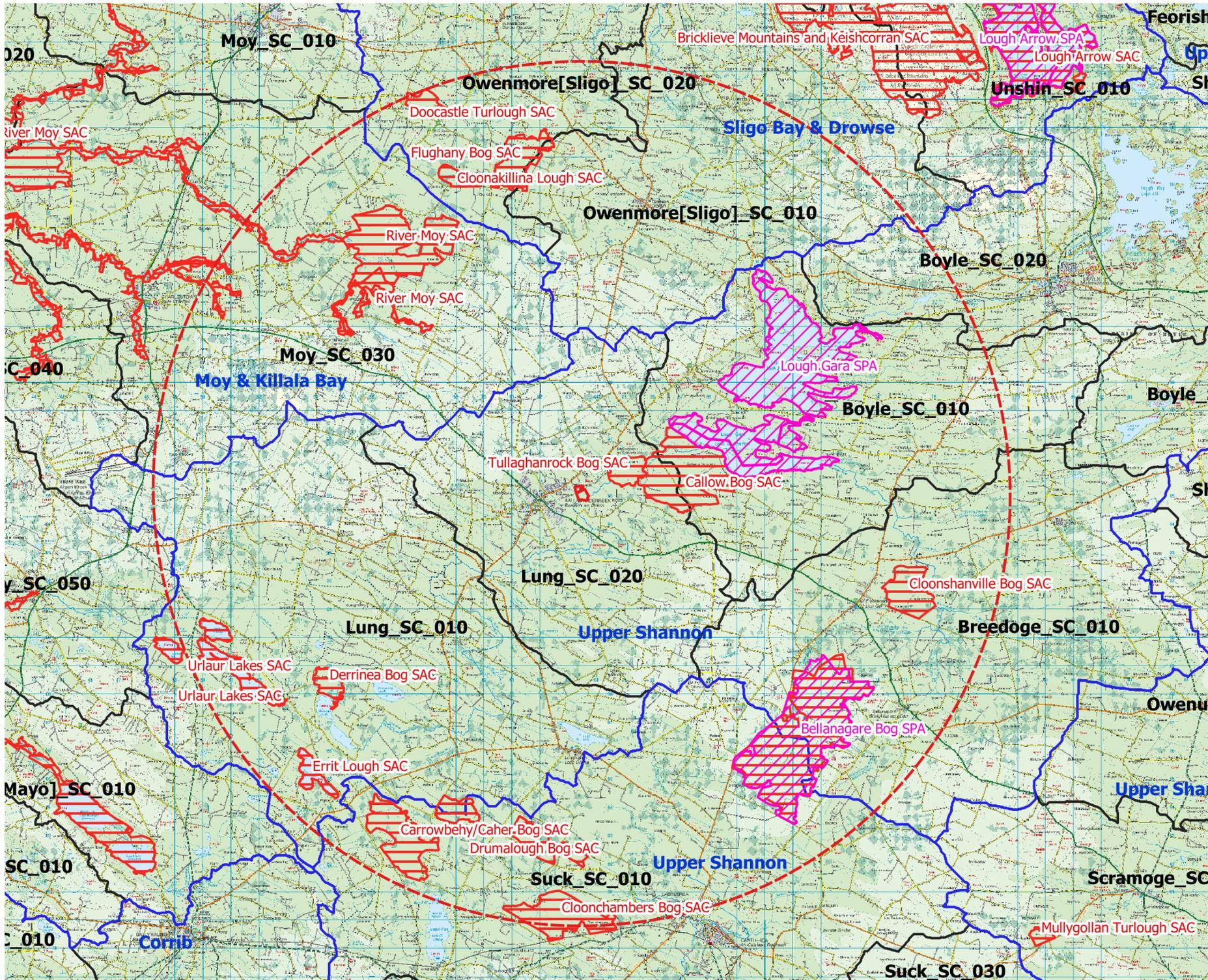


Map Legend

- Natural Heritage Area
- Proposed Natural Heritage Area
- Water Framework Directive Catchment
- Water Framework Directive Subcatchment
- Site boundary
- 15km Buffer

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Drawing Title 15km Buffer with nationally designated Sites	
Project Title Magherabeg Coole replanting site	
Drawn By IR	Checked By PR
Project No. 200445	Figure No. Figure 5-1
Scale 1:12112	Date 08.03.2021
MKO Planning and Environmental Consultants Tuam Road, Galway Ireland, H91 VV84 +353 (0) 91 735611 email: info@mkoland.ie Website: www.mkoland.ie	



Map Legend

- Special Area of Conservation
- Special Protection Area
- Water Framework Directive Catchment
- Water Framework Directive Subcatchment
- Site boundary
- 15km Buffer

Drawing Title
15km Buffer with EU designated Sites

Project Title
Magherabeg Coole replanting site

Drawn By IR	Checked By PR
Project No. 200445	Drawing No. Figure 5-2
Scale 1:12112	Date 08.03.2021

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5.3.1.2 New Flora Atlas

A search was made in the New Atlas of the British & Irish Flora (Preston et al, 2002) to investigate whether any rare or unusual plant species listed under Annex II of the EU Habitats Directive, the Ireland Red List of Vascular Plants (Wyse et.al 2016) or the Flora (Protection) Order, 2015 had been recorded in the relevant 10km square in which the study site is situated (M69). The search found one record of rare or protected plant species.

Table 5-4 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad M69

Common Name	Scientific Name	Status
Common moonwort	Botrychium lunaria	Near threatened

5.3.1.3 Biodiversity Ireland Database

A search of the National Biodiversity Data Centre (NBDC) database was conducted with a focus on records of protected fauna recorded from hectad M69. The results of the database search (excluding birds) are provided in Table 5-5 and the results for bird species recorded within the relevant hectads (R11, R12) are provided in Table 5-6. Table 5-7 includes records of non-native invasive species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015).

Table 5-5 NBDC records for species of conservation interest within Hectad M69 [excluding birds]

Species	Designation
European otter (<i>Lutra lutra</i>)	WA, EU Habitats Directive – Annex II, IV
Freshwater white-clawed crayfish (<i>Austropotamobius pallipes</i>)	WA, EU Habitats Directive – Annex II, V
Marsh fritillary (<i>Euphydryas aurinia</i>)	EU Habitats Directive – Annex II, Vulnerable
Daubenton's bat (<i>Myotis daubentonii</i>)	WA, EU Habitats Directive -Annex IV
Lesser noctule (<i>Nyctalus leisleri</i>)	
Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	
Common frog (<i>Rana temporaria</i>)	WA, EU Habitats Directive – Annex V
Pine marten (<i>Martes martes</i>)	

WA = Wildlife Acts (1976-2019), HD Annex II, III, IV and V = EU Habitats Directive.

Table 5-6 NBDC records for bird species of conservation interest within Hectad M69

Species	Designation
European golden plover (<i>Pluvialis apricaria</i>)	WA, EU Birds Directive, - Annex I, II, II, BoCCI - Red List

Greater white-fronted goose (<i>Anser albifrons</i>)	WA, EU Birds Directive, Annex I, II, III, BoCCI - Amber List
Corn crake (<i>Crex crex</i>)	WA, EU Birds Directive -Annex I, BoCCI -Red List
Common kingfisher (<i>Alcedo atthis</i>)	WA, EU Birds Directive -Annex I, BoCCI -Amber List
Common tern (<i>Sterna hirundo</i>)	
Hen harrier (<i>Circus cyaneus</i>)	
Merlin (<i>Falco columbarius</i>)	
Whooper swan (<i>Cygnus cygnus</i>)	
Peregrine falcon (<i>Falco peregrinus</i>)	
Grey partridge (<i>Perdix perdix</i>)	WA, EU Birds Directive - Annex II, III, BoCCI - Red List
Northern pintail (<i>Anas acuta</i>)	
Northern shoveler (<i>Anas clypeata</i>)	
Red grouse (<i>Lagopus lagopus</i>)	
Eurasian curlew (<i>Numenius arquata</i>)	WA, EU Birds Directive – Annex II, BoCCI - Red List
Northern lapwing (<i>Vanellus vanellus</i>)	
Barn owl (<i>Tyto alba</i>)	WA, BoCCI - Red List
Black-headed gull (<i>Larus ridibundus</i>)	
Common redshank (<i>Tringa totanus</i>)	
Herring gull (<i>Larus argentatus</i>)	
Yellowhammer (<i>Emberiza citrinella</i>)	

WA = Wildlife Acts (1976-2019), BoCCI = Birds of Conservation Concern; EU Birds Directive Annex I.

Table 5-7 NBDC records for invasive species in Hectad M69

Common Name	Scientific Name
American mink	<i>Mustela vison</i>
Canadian waterweed	<i>Elodea canadensis</i>
Japanese knotweed	<i>Fallopia japonica</i>
Rhododendron	<i>Rhododendron ponticum</i>
Zebra mussel	<i>Dreissena (Dreissena) polymorpha</i>

5.3.1.4 Local Hydrology

The following information on the local and regional hydrological regime of the site is based on that described in Section 7 of this replanting assessment and is provided here for context. Further detail on the hydrological conditions on site are fully described in Section 7. The Lung River flows along the southern and south-eastern boundary of the site and there is one smaller stream bordering the western and south-western edge of the site. These watercourses provide hydrological connectivity with Lough Gara approximately 5.5km (hydrological distance) downstream. There are several manmade drains within the site and surrounds that are in place predominately to drain the surrounding lands for agricultural purposes.

The site is located within the Upper Shannon Catchment IE_26B and within the Lung_SC_020 subcatchment. The Upper Shannon Catchment comprises 12 sub catchments with 58 river water bodies, 23 lakes 15 groundwater bodies. There is one artificial water body in the Upper Shannon Catchment, namely, the Royal Canal.

5.3.1.5 Freshwater Pearl Mussel Sensitive Areas

The site is not located within a freshwater pearl mussel (*Margaritifera margaritifera*) sensitive area. The site has no connectivity to any freshwater pearl mussel sensitive areas.

5.3.1.6 Article 17 Habitat Areas

No EU Habitats Directive Article 17 habitat polygons were recorded within or immediately adjacent to the proposed replanting sites. The most proximal Article 17 habitats have been identified as Wet heath, Dry heath and Active blanket bog and are located approximately 4.2km north east of the site. There is no direct hydrological connectivity between the proposed afforestation site and the Article 17 habitats.

5.3.1.7 Conclusions of the Desktop Study

The afforestation site is not located within any site designated for nature conservation. The proposed afforestation site is located upstream of Lough Gara SPA/pNHA, Tullaghmarock Bog SAC/pNHA and Callow Bog SAC. Tullaghmarock Bog SAC and Callow Bog SAC are designated for terrestrial habitats. Lough Gara SPA/pNHA is designated for Whooper Swan and Greenland White-fronted Goose. Given the small scale and nature of the works, the terrestrial nature of the European sites and the lack of supporting habitat for any SCI species associated with any European sites, no pathway for significant effect was identified and no sites were considered to be within the Likely Zone of Impact of the proposed works.

The mammal species recorded within the relevant hectad have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland (Marnell et al, 2009³). The site is not located within a freshwater pearl mussel 'sensitive area'. The desk study also provided useful information to inform the ecological surveys undertaken on site as well as the identification of pathways for potential impact on sensitive ecological receptors.

5.3.2 Description of Habitats within the Study Area

An MKO ecologist site visit was carried out on 19th November 2020. The site consists of **Wet grassland (GS4)** dominated by soft rush (*Juncus effusus*), grasses and sedges which were grazed by cattle, leaving only a few cm in height. Other species include yellow iris (*Iris pseudacoris*), creeping buttercup (*Ranunculus repens*), mint (*Mentha aquatica*) and great willowherb (*Equilobium hirsutum*) (Plate 5-1).

³Marnell, F., Kingston, N. & Looney, D. (2009) Ireland Red List No. 3: Terrestrial Mammals, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

At the time of visit, parts of the site were waterlogged and floating sweet-grass (*Glyceria fluitans*) was found growing in a few submerged linear areas traversing the site in a west-east direction (Plate 5-2). Single hawthorn trees (*Crataegus monogyna*) were found along the sides of the dismantled railway that traverses the site and bramble (*Rubus fruticosus* agg.) can be found associated with elevated ridges found throughout the site.

The site is bordered by Lung River (Plate 5-3), a **Depositing/lowland river (FW2)** to the south and one smaller river (unnamed) flowing into River Lung borders the west of the site and flows into the Lung River. Several **Drainage ditches (FW4)** traverse the site, one borders the site to the east and north-east (Plate 5-4).

Field boundaries in the form of **Treelines (WL2)** dominated by ash (*Fraxinus excelsior*) can be found on the north-west and north-east of the site (Plate 5-3). **Hedgerows (WLI)** dominated by hawthorn with an understory dominated by bramble and ivy (*Hedera helix*) can be found at the north-west and north-east of the site, and short stretches of hawthorn can be found associated with the watercourses and the dismantled railway (Plate 5-1) running from the north to the south through the site.



Plate 5-1 *Juncus effusus* dominated wet grassland habitat with waterlogged area at the front and view of hawthorn trees along the dismantled railway, grazing evident.



Plate 5-2 Submerged area with floating sweetgrass



Plate 5-3 River Lung as it runs along the south of the site



Plate 5-4 Small waterway to the east of the site, overgrown with watercress



Plate 5-5 Hedgerow and treeline at the north-east of the site.

5.3.2.1 Significance of Habitats

Ecological evaluation follows a methodology that is set out in Chapter 3 of the ‘Guidelines for Assessment of Ecological Impacts of National Roads Schemes’ (NRA, 2009). The habitats within and adjacent to the works site were evaluated in accordance with the criteria developed by the NRA (2009b), which classifies sites in terms of their ecological importance, i.e., ‘*international importance*’, ‘*national importance*’, ‘*county importance*’, ‘*local importance (higher value)*’ or ‘*local importance (lower value)*’.

No habitats which correspond to those that are listed in Annex I of the EU Habitats Directive were identified during the site visit. The wet grassland habitat with interspersed bramble shrub that is present within the site, given its modified nature and low species diversity, is of *Local Importance (Lower Value)* as it contains areas which are of some local importance for wildlife. Hedgerow and treelines habitat were assigned a significance of *Local Importance (Higher Value)* as they have a higher level of biodiversity within the context of the local environment and provide cover and commuting corridor links between habitats of higher ecological value. The watercourses adjacent to the site are of *Local Importance (Higher Value)* as they provide habitat and food for local aquatic and semi-aquatic species (e.g., otter).

5.3.3 Fauna in the Existing Environment

Birds

Records of birds seen and heard on the forestry replacement site were taken. The following species were observed:

- Blackbird *Turdus merula*
- Grey heron *Ardea cinerea*
- Hooded crow *Corvus cornix*
- Magpie *Pica pica*
- Starling *Sturnus vulgaris*
- Wren *Troglodytes troglodytes*

No birds listed on Annex I of the EU Birds Directive were recorded during the field survey. The site provided habitat for a range of common and widespread species but was not of significance for rare or protected bird species. Given the lack of significant habitat for rare or protected bird species, there is no requirement for further bird surveys at the site.

Terrestrial Mammals

No evidence of badger was recorded during the site visit and no other protected mammal species, or evidence of such species, were recorded within the site boundary. A single fox scat was recorded within the centre of the site. No species listed under Annex II of the Habitats Directive were recorded during the site visit.

Otter

The Lung River runs along the southern boundary of the site and provides suitable habitat for otter. The heavily vegetated drainage ditches that occur within the site do not provide suitable habitat for otter, nor do they provide significant connectivity to other watercourses used by otter. No evidence of otter was recorded within the site though this species is anticipated to use the river for commuting and foraging.

Bats

There are no structures within the site which may provide suitable roosting habitat for bats. The site is dominated by open wet grassland with a number of linear hedgerow and treeline features that may be used by the local bat population for commuting and foraging. Overall, the site is considered to have low suitability for bat species.

5.3.3.1 Significance of Fauna

No evidence of Annex listed species, or other species of conservation concern were recorded within the site boundaries.

Bird species recorded within the site boundaries are common generally and assigned a value of Local Importance (Lower Value). The forestry replacement site provides some limited foraging, commuting and nesting habitats for these and other common bird species in general. Similar habitat is widespread in the locality.

No protected fauna associated with any nearby European Sites were recorded within the proposed afforestation site on the day of the site visit.

No QI or SCI faunal populations of ecological significance were recorded within or adjacent to the proposed replanting site boundary. Overall, given its agricultural nature, it is considered that the site of the proposed afforestation is of relatively low value to faunal species.

5.3.4 Impact Assessment

5.3.4.1 Do Nothing Impact

Were the site to remain unplanted the management on site would likely remain as it is presently i.e., grazed wet grassland with some treelines and hedgerows demarcating field boundaries. However, given that the site has received Technical Approval from the Forest Service as described above it will be afforested per the provisions of the approval at a later date.

5.3.4.2 Loss of Floral Habitat

Long-Term Neutral Impact

The proposed afforestation will result in the loss of wet grassland habitat assigned Local importance (lower value). These habitats are common in the wider landscape and the loss of these habitats is not considered to be significant.

The treelines and hedgerows along the borders of the site will be retained.

The impacted habitat is not considered to be of ecological sensitivity and their loss will constitute a neutral impact when compared with the coniferous forestry to be planted. The loss of these habitats is not considered significant at any geographic scale.

Mitigation

Despite the fact that the loss of habitats on the site of the proposed replanting site is not a significant ecological effect, all works will be carried out in accordance with the relevant Forest Service requirements, including 'Forestry Biodiversity Guidelines' (2000). All hedgerows and existing treelines along the borders of the site will be retained and appropriate set-back applied as per the Forest Service document 'Environmental Requirements for Afforestation (2016)'. The Technical Approval document

specifies the area that should contain a suitable broadleaf and conifer species. This management would allow for the retention of the Local Value (Higher Importance) habitats.

Residual Impact

The replacement of grassland habitat with forestry is considered to be a Long Term Neutral Impact. No significant effects are anticipated.

5.3.4.3 **Loss of Faunal Habitat**

Long Term Neutral Impact

The proposed planting site is dominated by wet grassland and is not of high value or importance to local faunal species, with limited cover or shelter restricted to hedgerow and treeline habitats. It is likely that the proposed planting of forestry will result in some loss of foraging or breeding habitat for some faunal species. Wet grassland habitats are widespread in the local area and this loss is not considered to be significant.

The proposed afforestation site does not provide significant foraging or roosting habitat for protected bird species given the highly managed/modified nature of habitats on site, dominated by wet grassland. Given the lack of significant bird assemblages recorded within or adjacent to the site, significant impacts as a result of disturbance or displacement are not anticipated on bird species at any geographic scale.

Treelines and hedgerow provide bat commuting and foraging habitat, there will be no loss of hedgerow or trees as part of the proposal and therefore no impacts on bat commuting and foraging habitat. Some individual Hawthorn trees within the field will be removed as part of the afforestation.

Possible habitat for otter was identified to the south of the site. No instream works will take place and a minimum buffer of 10m will be retained from adjacent watercourses.

The afforestation, in particular that of broadleaf species will result in the creation of cover and nesting habitat for a range of bird species, resulting in an overall Long-Term Neutral Impact.

Mitigation / Best Practice

- All works will be carried out in accordance with the relevant Forest Service requirements, including 'Forestry Biodiversity Guidelines' (2000)'.
- All hedgerows and existing treelines around the boundary of the site will be retained and appropriate set-back applied as per the Forest Service document '*Environmental Requirements for Afforestation (2016)*'.
- Vegetation clearance will be carried out in line with the Wildlife Acts.

Residual Impact.

No significant effects on faunal habitat as a result of the proposed afforestation is anticipated.

5.3.4.4 **Water Pollution & Aquatic Fauna**

Short-Term Negative Impact

There is hydrological connectivity between the proposed afforestation site and Lough Gara, which is designated as an SPA/pNHA and potential for localised water pollution of the Lung River, smaller streams and drainage ditches within the site in the form of release of suspended solids, siltation and erosion.

Mitigation/Best Practice

Best practice methods related to water incorporated into the forestry management and mitigation measures have been derived from:

- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): Forest Operations & Water Protection Guidelines;
- Forest Service (Draft): Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures; and,
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.
- Forest Service (2016) Environmental Requirements for Afforestation. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.
- Forest Service (2016) Land Types for Afforestation. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.

Measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which will be applied at the replanting site. These include:

- Machine combinations will be chosen which are most suitable for ground conditions at the time of excavation and felling, and which will minimise surrounding soils disturbance;
- Where possible, existing drains will not be disturbed during drainage works;
- Drains and sediment traps will be installed during ground preparation and felling. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and should avoid being placed at right angles to the contour;
- Drains and silt traps will be maintained throughout all planting works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimised and controlled.

Buffer Zones

There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the *Environmental Requirements for Afforestation* (DAFM 2016) are shown in Table 5-7.

Table 5-8 Minimum Buffer Zone Widths (Forest Service, 2000)

Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils
Moderate	(0 – 15%)	10 m	20 m
Steep	(15 – 30%)	15 m	25 m
Very steep	(>30%)	20 m	25 m

Residual Impact

No adverse residual impacts on water quality are anticipated following the implementation of the measures and best practice described above.

5.3.4.5 Impact on Designated Sites

The site was subject to the Forest Service AA procedure as part of the technical approval process as per Table 5-2 above. There are no European sites within in the Likely Zone of Impact. The impact on nationally designated sites was assessed as per Table 5-3 above and there were no Natural Heritage Areas (NHA) or proposed Natural Heritage Areas (pNHAs) identified within the Likely Zone of Impact.

5.3.4.6 Cumulative Impacts

The impact assessment undertaken in this EIAR outlines that significant effects from the proposed replanting lands on hydrology and hydrogeology are unlikely. A planning history search of applications in the vicinity of the proposed replanting lands has also been carried out, as described in Section 3.2 of this report. There are no developments located in the vicinity of the site that would give rise to cumulative impacts in conjunction with the proposed replanting lands.

The impacts associated with this afforestation have been classified overall as a neutral impact. As such, when considered in combination with the other land uses in the area and considering that the forestry guidelines are designed to minimise and prevent impacts to habitats that are outside the site, cumulative impacts on sensitive ecological receptors are not anticipated.

5.3.5 Conclusion

Following consideration of the residual effects (post mitigation) it is concluded that the proposed replanting site will not result in any significant effects on any of the identified KERs. No significant effects on receptors of International, National or County Importance were identified.

No potential for significant effects on the Key Ecological Receptors have been identified. No EU Habitats Directive Annex I listed habitats were identified within the site. No protected faunal species were records within the site, although the site is likely to be used by regularly occurring common and widespread species that are common in a local and National context.

Taking the above information into consideration and having regard to the precautionary principle, the proposed afforestation project will not result in any significant effect at any geographic scale and will not have any significant impacts on the ecology of the wider area.

Provided that the proposed afforestation is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant impacts on ecology are not anticipated at any geographic scale.

6. LAND, SOILS AND GEOLOGY

6.1 Introduction

This section of the report provides baseline information on the environmental setting of the approved afforestation lands in terms of soils and geology and discusses the potential impacts and associated effect that the activity may have on them. Where required, appropriate mitigation measures to limit any identified significant impacts to land, soils and geology are recommended.

6.1.1 Desk Study

This desk study involved collecting all relevant geological data for each site and its surrounding area. This included consultation of the following resources:

- Environmental Protection Agency database (www.epa.ie)
- Geological Survey of Ireland (GSI) - National Draft Bedrock Aquifer Map
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie)
- Bedrock Geology 1:100,000 Scale Map Series. (GSI, 2003)
- Geological Survey of Ireland – 1:25,000 Field Mapping Sheets
- General Soil Map of Ireland, 2nd edition (www.epa.ie)

6.1.2 Impact Assessment Methodology

Using information from the desk study, an estimation of the importance of the soil and geological environment within each of the study areas is assessed using the criteria set out in the *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (NRA, 2005) and presented below in Table 6-1.

Table 6-1 Estimation of Importance of Soil and Geology Criteria (NRA, 2005)

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.	Contaminated soil on site with previous light industrial usage. Small recent landfill site for mixed wastes.

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

The statutory guidelines (EPA, 2017, 2003 and 2002) for the assessment of impacts require that likely impacts are described with respect to their extent, magnitude, complexity, probability, duration, frequency, reversibility and trans-frontier nature (if applicable). The descriptors used in the EIAR are those set out by the EPA (EPA, 2017) Glossary of Impacts as shown in Chapter 1 of the EIAR which accompanies the application. In addition, the two impact characteristics, proximity and probability, are described for each impact, and these are defined in Table 6-2.

In order to provide an understanding of this descriptive system in terms of the geological/hydrological environment, elements of this system of description of impacts are related to examples of potential impacts on the hydrology and morphology of the existing environment, as listed in Table 6-3.

Table 6-2 Additional Impact Characteristics

Impact Characteristic	Degree / Nature	Description
Proximity	Direct	An impact which occurs within the area of the proposed project, as a direct result of the proposed project.
	Indirect	An impact which is caused by the interaction of effects, or by off-site developments.
Probability	Low	A low likelihood of occurrence of the impact.
	Medium	A medium likelihood of occurrence of the impact.
	High	A high likelihood of occurrence of the impact.

Table 6-3 Impact Descriptors Related to the Receiving Environment

Impact Characteristics		Potential 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.

Impact Characteristics		Potential Hydrological Impacts
Quality	Significance	
		-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.

6.2 Proposed Replanting Lands

6.2.1 Geology and Subsoils

Information on the main geological formations and subsoils underlying the replanting area is shown in Table 6-4.

Table 6-4 Information on geology and subsoil information – Magheraboy, Co. Roscommon.

Geological Formation	Subsoil Type
> Boyle Sandstone Formation	> Cutover peat

The site is underlain by cutover peat over the Boyle Sandstone Formation which is comprised of sandstones and red-green conglomerates.

The surrounding area is largely underlain with similar bedrock to the site with the Kilbryan Limestone Formation also present. Additional subsoils identified in the surrounding area include alluvium and till derived from Devonian and Carboniferous sandstones and shales.

6.2.1.1 Geological Resource Importance

The GSI online Aggregate Potential Mapping Database shows that the proposed site is located within an area mapped as having a ‘Very Low’ Potential in terms of crushed rock aggregate potential. The GIS database shows the Proposed Site does not have granular aggregate potential (i.e. potential for gravel reserves).

The bedrock at the site could be classified as “Low” importance. The bedrock could be used on a “sub-economic” local scale for construction purposes. The bedrock at the site has not been used in the past for this purpose and the proposed replanting does not propose to do so.

The peat deposits at the site could be classified as “low” importance. While peat has not been cut at this site, it is not designated in this area, is of a small volume, is used for agricultural purposes and is poorly drained. Refer to Table 6-1 for criteria.

6.2.1.2 Geological Heritage and Designated Sites

There are no recorded Geological Heritage sites, mineral deposit sites or mining sites (current or historic) within the proposed replanting area.

6.2.1.3 Potential Impacts

6.2.1.3.1 ‘Do-Nothing’ Scenario

The lands have been Technically Approved and will be afforested should the Coole Wind Energy Development proceed or not. If the land was not replanted, the current landuse would continue at the site i.e. grazed wet grassland.

6.2.1.4 Planting Phase

6.2.1.4.1 Likely and Significant Impacts and Associated Mitigation Measures

The likely impacts of the proposed planting and mitigation measures that will be put in place to eliminate or reduce them are described below.

Construction of Drains and Planting of Trees

There will be some minor disturbance of soils, associated with the construction of drains through the site. Planting of trees will be carried out by hand using the slit planting method, so soil disturbance from this will be insignificant. There are no likely impacts of this afforestation on the underlying geology.

Site Roads & Tracks Construction

Forestry felling would typically occur within 0.5km of access points (roads & tracks) to the main forest body. Due to the small size of this site, additional access tracks or roads will not be required.

6.2.1.4.2 Mitigation Measures

Planting of trees will be carried out by hand. Any drains will be generally shallow and will be constructed in accordance with the measures outlined in the *Forestry Standards Manual* and *Environmental Requirements for Afforestation* described in detail in Section 2.3. Soils will remain in situ at the site and will not be removed offsite.

6.2.1.5 Operational Phase

There will be no significant indirect or direct impacts on soils and geology once the site has been afforested.

6.2.1.5.1 Residual Impact

There will be no impacts on soils and geology associated with the proposed afforestation.

6.2.1.6 **Significance of the Effects**

Based on the above, there will be no significant effects on soils and geology at this site.

6.2.1.7 **Cumulative Impacts**

The geological impact assessment undertaken above outlines that significant effects are unlikely. Impacts on land soil and geology will not extend beyond the immediate vicinity of the replanting site.

A planning history search of applications in the vicinity of the proposed replanting lands has also been carried out, as described in Section 3.2 of this report. There are no developments located in the vicinity of the site that would give rise to cumulative impacts in conjunction with the proposed replanting lands.

7. HYDROLOGY AND HYDROGEOLOGY

7.1 Introduction

7.1.1 Background and Objectives

MKO was engaged to undertake an assessment of the potential impacts and associated effect of forestry planting at the replanting site on water aspects (hydrology and hydrogeology) of the receiving environment. The objective of the assessment is to:

- Produce a baseline study of the existing water environment (surface and groundwater) in the area of the site locations;
- Identify likely positive and negative impacts of the proposed development on surface and groundwater during all phases of the development; and,
- Identify mitigation measures to avoid, remediate or reduce significant negative impacts.

This section of the report provides baseline information on the environmental setting of the approved afforestation sites in terms of hydrology and hydrogeology and discusses the potential impacts that the activity may have on them. Where required, appropriate mitigation measures to limit any identified significant impacts to site hydrology and hydrogeology are recommended.

7.1.2 Methodology

7.1.2.1 Desk Study

A desk study of the site and the surrounding areas involved collecting all relevant geological, hydrological, hydrogeological and meteorological data for the area. This included consultation with the following resources:

- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland – Spatial Resources Map (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive “WaterMaps” Map Viewer (www.wfdireland.ie);
- OPW Flood Maps (www.floodinfo.ie); and
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie).

7.1.2.2 Impact Assessment Methodology

Please refer to Chapter 1 of the EIAR which accompanies the application for details on the impact assessment methodology (EPA, 2002, 2003 & 2017). In addition to the above methodology the sensitivity of the water environment receptors were assessed on completion of the desk study. Levels of sensitivity which are defined in Table 7-1 are then used to assess the potential effect that the proposed replanting may have on them.

Table 7-1 Receptor Sensitivity Criteria (adapted from www.sepa.org.uk)

Sensitivity of Receptor	
Not Sensitive	Receptor is of low environmental importance (e.g. surface water quality classified by EPA as A3 waters or seriously polluted), fish sporadically present or restricted). Heavily engineered or artificially modified and may dry up during summer months. Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character. No abstractions for public or private water supplies. GSI groundwater vulnerability “Low” – “Medium” classification and “Poor” aquifer importance.
Sensitive	Receptor is of medium environmental importance or of regional value. Surface water quality classified by EPA as A2. Salmonid species may be present and may be locally important for fisheries. Abstractions for private water supplies. Environmental equilibrium copes well with all natural fluctuations but cannot absorb some changes greater than this without altering part of its present character. GSI groundwater vulnerability “High” classification and “Locally” important aquifer.
Very Sensitive	Receptor is of high environmental importance or of national or international value i.e. NHA or SAC. Surface water quality classified by EPA as A1 and salmonid spawning grounds present. Abstractions for public drinking water supply. GSI groundwater vulnerability “Extreme” classification and “Regionally” important aquifer.

7.2

Proposed Drainage

The proposed replanting lands will be drained in accordance with the measures outlined in the *Forestry Standards Manual* and *Environmental Requirements for Afforestation* described in detail in Section 2.3.3. Forestry plantations are generally drained by a network of mound drains which typically run perpendicular to the topographic contours of the site and feed into collector drains, which discharge to interceptor drains down-gradient of the plantation.

Mound drains are generally spaced approximately every 15m. Interceptor drains are generally located up-gradient (cut-off drains) and down-gradient of forestry plantations. A schematic of a typical standard forestry drainage network and one which is representative of the proposed site drainage network is shown in Figure 2-2 of this report.

7.3

Baseline Environment and Local Hydrology

Ground level elevations at the replanting site are at approximately 70m OD.

There are no streams or rivers within the Proposed Site boundary, however the Lung River flows in easterly direction along the southern boundary of the site. An unnamed stream flows in a southerly direction along the western site boundary discharging into the Lung River at the southwest of the site.

There are numerous manmade drains within the site and surrounds that are in place predominately to drain the surrounding lands for agricultural purposes.

7.3.1 Water Balance

While the process of afforestation may result in a slight alteration in the water runoff of the site, the small size of the site (0.165 km²) when compared with the Upper Shannon Catchment 26B (674km²) means that any potential impacts this may have would be insignificant. The afforestation will lead to an imperceptible reduction in the runoff volumes in the longer term as the trees mature.

7.3.2 Regional Hydrology

The site is located within the Upper Shannon Catchment IE_26B and forms part of the Lung subcatchment_SC_020. The Upper Shannon Catchment comprises six subcatchments, with 28 river and 15 lake water bodies, and eight groundwater bodies.

7.3.3 Flood Risk Identification

OPW's indicative river and coastal flood map (www.floodmaps.ie), CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie), Department of Environment, Community and Local Government on-line planning mapping (www.myplan.ie) were consulted to identify those areas as being at risk of flooding.

No records or risks associated with flooding were identified in the published data sets. The OPW flood map notes that the Lung River and unnamed stream forms part of an arterial drainage scheme which is maintained by the OPW. The OPW maps also notes that the site was also drained as part of the scheme.

7.3.4 Surface Water Hydrochemistry

Slightly acidic pH values of surface waters would be typical of peatland environments due to the decomposition of peat. In addition, the limestone bedrock (and related till subsoils) which underlie the area would have slightly acidic groundwater characteristics which would have some effect on surface water chemistry specifically during dry periods when baseflow is likely to be more prevalent.

7.3.5 Hydrogeology

According to the GSI www.gsi.ie, the site is underlain by the Boyle Sandstone Formation which is comprised of sandstones and red-green conglomerates (refer to Section 6 – Soils & Geology). The GSI has classified the bedrock formation here as a Locally Important Aquifer (LI) - bedrock which is moderately productive only in local zones.

7.3.5.1 Groundwater Vulnerability

The GSI and EPA has assigned a groundwater vulnerability rating of 'Low' which would indicate the presence of at least 10m of low permeability till in these sections of the site.

7.3.6 Surface Water Body Status

The EU Water Framework Directive aims to protect, enhance and restore all waters with aim to achieve at least good status by 2027.

The Water Framework Directive Status Report 2013 - 2018, published by the EPA has classified the Lung River and the unnamed stream as having a 'Good' status and not at risk.

7.3.7 Groundwater Body Status

The EPA has classified the groundwater within the aquifer underlying the site as being of 'Good' status and not at risk.

7.3.8 Designated Sites and Habitats

Designated sites include National Heritage Areas (NHAs), Proposed National Heritage Areas (SACs) Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). The proposed forestry replanting site is not located within any designated conservation-site. Designated sites in proximity to the proposed replanting site are described Section 5 Biodiversity.

7.3.9 Water Resources

There are no borehole wells within or adjacent to the site. The nearest well (GSI name: 1429SEW016) is located 360m to the north of the proposed replanting area and was constructed in 1899.

7.3.10 Receptor Sensitivity

As afforestation is a near-surface construction activity, impacts on groundwater are largely negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the site is from nutrients associated with fertilisers.

Based on criteria set out in Table 7-1 groundwater at the site can be classed as Sensitive to pollution because the sandstone bedrock is classified as a locally important Aquifer. However, the site is covered in blanket peat and sandstone and shale till which acts as a protective cover to the underlying aquifer. Any contaminants which may be accidentally released on-site are more likely to travel to nearby streams within surface runoff.

Surface waters such as the Lung River and unnamed stream are sensitive to potential contamination. Surface water mitigation and controls are outlined below to ensure protection of all downstream receiving waters. Mitigation measures will ensure that surface runoff from the afforested areas of the site will be of a high quality and will therefore not impact on the quality of downstream surface water bodies.

7.3.11 Proposed Site Drainage

The site will be drained in accordance with the measures outlined in the *Forestry Standards Manual* and *Environmental Requirements for Afforestation*. Forestry plantations are generally drained by a network of mound drains which typically run perpendicular to the topographic contours of the site and feed into collector drains, which discharge to interceptor drains down-gradient of the plantation.

Mound drains are generally spaced approximately every 15m. As illustrated in Figure 2-2, Interceptor drains are generally located up-gradient (cut-off drains) and down-gradient of forestry plantations. A schematic of a typical standard forestry drainage network and one which is representative of the proposed site drainage network is shown above as Figure 2-2.

7.3.12 Proposed Drainage Management

Runoff control and drainage management are key elements in terms of mitigation against impacts on surface water bodies. Two distinct methods will be employed to manage drainage water within the proposed replanting site. The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features. The second method involves collecting any drainage waters from planted

areas within the site that might carry silt or sediment, and nutrients, using cut off drains to control direct discharge into streams.

7.4 Potential Impacts

The potential impacts of the proposed replanting and mitigation measures that will be put in place to eliminate or reduce them are set out below.

7.4.1 'Do-Nothing' Scenario

The lands have been Technically Approved and will be afforested should the Coole Wind Energy Development proceed or not. If the land was not replanted, the current land use would continue at the site i.e. grazed wet grassland.

7.4.2 Likely and Significant Impacts and Associated Mitigation Measures – Planting Phase

7.4.2.1 Excavation of Forestry Drains and Planting

Pathways: Drainage and surface water discharge routes.

Receptors: Surface waters and associated dependent ecosystems.

Potential Impacts: Indirect, negative, slight, short term, medium probability impact.

Shallow forestry drains will be constructed using an excavator throughout the site to a similar drainage pattern as Figure 2-2. There are no surface watercourses on the site and so the drains will ultimately discharge to the existing offsite field drain networks.

Potential impacts during drain construction occur mainly from:

- Exposure of soil and subsoils due to excavation, vehicle tracking, and skidding resulting in a source of suspended sediment which can become entrained in surface water runoff and enter drains; and,
- Nutrient release.

7.4.2.2 Harvesting Operations

Pathways: Drainage and surface water discharge routes.

Receptors: Surface waters and associated dependant ecosystems.

Potential Impacts: Indirect, negative, moderate, short term, medium probability impact.

Potential impacts during tree felling occur mainly from:

- Exposure of soil and subsoils due to vehicle tracking, and skidding or forwarding extraction methods resulting in a source of suspended sediment which can become entrained in surface water runoff;
- Release of sediment attached to timber in stacking areas; and,
- Nutrient release.

7.4.2.3 Site Access

Forestry felling would typically occur within 0.5km of access points (roads & tracks) to the main forest body. Due to the small size of this site, additional access tracks or roads will not be required.

7.4.3 Proposed Mitigation Measures

Best practice methods related to water incorporated into the forestry management and mitigation measures have been derived from:

- Forestry Standards Manual (DAFM, 2015);
- Environmental Requirements for Afforestation (Forest Service (2016);
- Forests and Water Guidelines, Fourth Edition. Publ. (Forestry Commission, Edinburgh 2004);
- Forest Operations & Water Protection Guidelines (Coillte 2013);
- Forest Service (Draft): Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures.

Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which are set out as follows:

- Machine combinations will be chosen which are most suitable for ground conditions at the time of excavation and felling, and which will minimise surrounding soils disturbance;
- Where possible, existing drains will not be disturbed during drainage works;
- Drains and sediment traps will be installed during ground preparation and felling. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and should avoid being placed at right angles to the contour; and,
- Drains and silt traps will be maintained throughout all planting works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimised and controlled.

Buffer Zones

There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the *Environmental Requirements for Afforestation* (DAFM 2016) are shown in Table 7-2.

Table 7-2 Minimum Buffer Zone Widths (Forest Service, 2000)

Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils
Moderate	(0 – 15%)	10 m	20 m
Steep	(15 – 30%)	15 m	25 m
Very steep	(>30%)	20 m	25 m

7.4.3.1.2 Residual Impact

Indirect, slight, short term, low probability impact.

7.4.3.2 Potential Release of Hydrocarbons during drainage works

Pathway: Groundwater flow paths and site drainage network.

Receptor: Groundwater and surface water.

Potential Impact: Indirect, negative, slight, temporary, medium probability impact to surface water quality.

Indirect, negative, slight, temporary, medium probability impact to local groundwater quality.

The replanting will be carried out by hand, but it may be necessary to employ one excavator to create shallow drainage channels prior to planting. There is the potential for minor leaks from the excavator.

7.4.3.2.1 Proposed Mitigation Measures

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- Maintenance will not be carried out on site.
- Fuels will not be stored on site.
- The plant used will be regularly inspected for leaks and fitness for purpose.

7.4.3.2.2 Residual Impact

Indirect, negative, imperceptible, short term, low probability impact.

7.4.3.3 Potential Hydrological Impacts on Designated Sites

The proposed afforestation site is located within the Upper Shannon 26B catchment. There will however be no direct discharges from the site and the hydrological regime locally will not be altered by the afforestation due to its small scale.

Pathway: Surface water flow paths.

Receptor: Down-gradient water quality & designated sites.

Potential Impact: Indirect, negative, imperceptible, short term, low probability impact.

7.4.3.3.1 Impact Assessment & Proposed Mitigation Measures

The proposed mitigation measures which will include buffer zones and drainage control measures (*i.e.* cut off drains, tapered drains before buffer zones) will ensure that the quality of runoff from proposed replanting areas will be very high. The proposed replanting site is located in the Upper Shannon catchment. There could potentially be an “*imperceptible, short term, low probability impact*” on local streams and rivers but this would be very localised and over a very short time period (*i.e.* hours).

7.4.3.3.2 Residual Impact

No residual impacts.

7.4.3.4 Operational Phase

There will be no significant indirect or direct impacts on hydrology and hydrogeology once the site has been afforested.

7.4.3.4.1 **Residual Impact**

No residual impacts.

7.4.3.5 **Cumulative Impacts**

The impact assessment undertaken above outlines that significant effects from the proposed replanting lands on hydrology and hydrogeology are unlikely. A planning history search of applications in the vicinity of the proposed replanting lands has also been carried out, as described in Section 3.2 of this report. There are no developments located in the vicinity of the site that would give rise to cumulative impacts in conjunction with the proposed replanting lands.

8. LANDSCAPE AND VISUAL

8.1 Introduction

This section of the report addresses the landscape and visual impacts of the proposed replanting area. It includes a description of Roscommon County Council landscape policy and describes the site's landscape values and sensitivity. The landscape is described in terms of its character, which includes a description of landform and landcover. An impact assessment of the proposed replanting is then undertaken. Documents consulted include:

- 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities' (Department of the Environment and Local Government 2000).
- 'Guidelines for Landscape and Visual Impact Assessment' (The Landscape Institute/Institute of Environmental Management & Assessment, 2013).
- 'Forestry and the Landscape Guidelines' (Forest Service, 2000).

8.1.1 Baseline Landscape Assessment Methodology

In order to carry out this assessment, a desk study was undertaken which identified relevant policies and guidelines, both at national and local level. This includes policies on forestry, landscape and landscape character, designated landscapes, and scenic routes. Maps and aerial images of the proposed replanting site were also studied.

8.2 Landscape Policy Context

This section of the report refers to policies of the Roscommon County Development Plan 2014 – 2020 (CDP), as well as to the Forest Service Landscape Guidelines.

8.2.1 Roscommon County Development Plan 2014-2020

8.2.1.1 Forestry Policy and Objectives

Section 9: 'Development Management Guidelines and Standards' of the Roscommon County Development Plan deals with policies and objectives relating to forestry. The planning authority acts as a consultee rather than an assessor in relation to forestry. Policies in the Roscommon CDP relating to forestry can be found in Table 3-2 of Section 3.

8.2.1.2 Landscape Policy and Objectives

This section of the report refers to the Roscommon CDP and the Landscape Character Assessment of the county, as well as to the Environmental Requirements for Afforestation document.

8.2.1.2.1 Landscape Character Assessment of County Roscommon

Section 11 of the Roscommon CDP comprises the Landscape Character Assessment of the county. The aim of the assessment is to provide technical background for the local planning authority to formulate a set of Landscape Objectives and Policy Recommendations for the county. The objectives and policies aim to strike a balance between boosting rural economic diversity, job creation and tackling climate change with landscape suitability and environmental sensitivity. Particular emphasis is laid on the following development types when assessing landscape sensitivity:

- Housing (including housing in existing settlements as well as single rural dwellings relating to the guidance set out in the Sustainable Rural Housing Guidelines for Planning Authorities);
- Quarries;
- Wind farms;
- Afforestation; and
- Rural buildings and alternative enterprise proposals (an increase of farm buildings is anticipated as a result of the recent EU Nitrates Directive).

The main sensitivities and areas of concern when assessing the above developments are:

- The conservation and enhancement of the landscape diversity, character and quality of the County; Protection of sensitive areas from development that would detract from or be injurious to the amenity of the area;
- Provision for development and change that would benefit the economy of the county including the rural economy while protecting and enhancing the landscape;
- Identification of suitable 'working' landscapes where there is potential to accommodate development.
- The landscape objectives and policy recommendations focus on the following five specific development types:
- Heritage Landscapes.

The CDP identifies thirty six landscape character areas (LCA). The site is located within both LCA 22: Cloona Lough and Lung River Bogland Basin. LCA 22 is defined by the catchment of the Lung River which drains in a north easterly direction from a cluster of lakes close to the border with County Mayo. LCA 22 is described as being of moderate value.

8.2.1.2.2 **Scenic Routes**

There are a total of 9 existing and proposed Scenic Routes and a total 25 existing and proposed Scenic Views within the county and can be found in Appendix 1 of the Landscape Character Assessment of the CDP. The need to preserve scenic routes and views are highlighted throughout the CDP and are taken into consideration, along with sites of special value and immediate and long-distance views, when processing all types of development within the county. The proposed replanting site is not located along or adjacent to a scenic route.

8.2.2 **Forestry and the Landscape Guidelines**

As of 2011, almost 21,000ha (8.7%) of forestry has been planted within the county, with 13,000 if this on private land and 8,000ha in public ownership. The grant-driven Forest Environment Protection Scheme (FEPS) maintains public interest in this type of agricultural diversification. The Landscape Assessment of the CDP follows the national guidelines produced by the Department of Agriculture and outlined in Chapter 3 Table 3.2 to ensure that sustainable Forest Management is implemented throughout the county.

8.3 **Baseline Landscape**

8.3.1 **Landscape character**

The topography, vegetation and anthropological features on the land surface in an area combine to set limits on the amount of the landscape that can be seen at any one time. These physical restrictions form individual areas or units, known as physical units, whose character can be defined by aspect, slope, scale and size. A physical unit is generally delineated by topographical boundaries and is defined by landform and landcover.

The proposed replanting site is located approximately 260 metres to the south of the R293 Regional road. Cunniffes Ballaghaderreen Bacon Factory is located approximately 65 metres to the north of the site. The land to the east and west is bordered by wet grassland. Field boundaries are evident. The site lies at 70m OD. There are existing forestry plantations located approximately 995 metres to the southeast, 967 metres to the southwest and approximately 1.5 kilometres to the north of the site.

The proposed replanting area is located within the Upper Shannon Catchment 26B. There are no streams or rivers within the site boundary, however the Lung River flows in easterly direction along the southern boundary of the site and an unnamed stream flows in a southerly direction along the western site boundary discharging into the Lung River at the southwest of the site.

The landcover of the site is composed primarily of grazed wet grassland.

8.3.1.1 Landscape Sensitivity

The sensitivity of a landscape to development and therefore to change varies according to its character and to the importance that is attached to any combination of landscape values. The sensitivity of a landscape is derived from consideration of designations such as Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Natural Heritage Areas (NHAs) and National Parks, from information such as tourist maps, guidebooks and brochures, and from the evaluation of indicators such as uniqueness, popularity, distinctiveness, and quality of the elements of the area.

A desktop assessment of landscape sensitivity in the vicinity of the replanting site was carried out. The methodology for this assessment was based on that set out in the Department of the Environment and Local Government (DoEHLG) guidance document *'Landscape and Landscape Assessment – Consultation Draft of Guidelines for Planning Authorities'* (2000). This document recommends an assessment of landscape sensitivity based on an evaluation of individual features, such as the quality, integrity, etc. The results of the assessment are presented in Table 8-1.

Table 8-1 Landscape Sensitivity

Feature	Description
Quality	The quality of the landscape in this area can be described as modified due to agriculture and urban development .
Integrity	The current replanting site has been modified by the interaction of man with the environment.
Distinctiveness	There are no distinctive features on the site.
Popularity	A sense of popularity is created where landscape features are widely recognised or appreciated. There are no popular features on the replanting site.
Rarity	There are no Natura 2000 sites within the vicinity of the site.
Cultural Meaning	A sense of cultural meaning arises where a site or features within a site are deemed to explain, represent or inspire cultural values. There are two recorded archaeological features on the study site – a Ringfort – rath (RO008-039) and an Earthwork (RO008-040). An exclusion zone has been placed around these recorded monuments.
Sense of Public Ownership & Social Importance	A sense of public ownership arises due to ease of accessibility, visibility or a widely shared meaning. The site is privately owned and has no special social importance.

The replanting site is therefore considered to be of Medium landscape sensitivity.

8.3.1.2 **Landscape Context and Site Visibility**

Views towards the site would be westwards from the N5 National Road and southwards from the R293 Regional Road. In general views towards the site would be partially screened either by existing vegetation, trees and buildings.

8.3.2 **Impact Assessment**

8.3.2.1 **'Do-Nothing' Scenario**

In the 'Do Nothing' scenario, the subject site would be afforested in any case, as per Technical Approval that has been issued for the site. If the land was not replanted, the current land use of grazed wet grassland would continue at the site.

8.3.2.2 **Site Preparation and Planting Phase**

8.3.2.2.1 **Impacts on Landscape Character – Temporary Imperceptible Neutral Impact**

The planting of forestry will entail site works in terms of woody weed clearance and construction of forestry drains and will use the angle notch planting method described in Section 2.3.2 above. These activities will have a temporary neutral impact on the landscape character, which is that of a rural working landscape with agricultural, commercial and residential land uses. A neutral impact is a change which does not affect the quality of the environment (EPA, 2017). The site clearance and replanting activities will assimilate well into the receiving environment, and are therefore classed as an imperceptible impact, i.e. an impact capable of measurement but without noticeable consequences.

8.3.2.2.2 **Impacts on Visual Amenity - Temporary Imperceptible Neutral Impact**

The proposed replanting is to be carried out in an area where there are already existing conifer plantations among agricultural fields, and therefore the proposed replanting is not introducing a new land use but conforming to an established one. The predicted residual visual impact of the proposed replanting is Long Term, Imperceptible Neutral Impact.

8.3.2.3 **Operational Phase**

8.3.2.3.1 **Impacts on Landscape Character – Long Term Imperceptible Neutral Impact**

The proposed replanting is to be carried out in an area where there are already existing conifer plantations among agricultural fields, and therefore the proposed replanting is not introducing a new land use but conforming to an established one and contributing to the patchwork of forestry plantations with open land. The predicted residual visual impact of the proposed replanting is Long Term, Imperceptible Neutral Impact.

8.3.2.3.2 **Impacts on Visual Amenity - Long Term Imperceptible Neutral Impact**

The proposed replanting is to be carried out in an area where there are already existing conifer plantations among agricultural fields, and therefore the proposed replanting is not introducing a new land use but conforming to an established one and contributing to the patchwork of forestry plantations with open land. Felling will be carried out in accordance with the Environmental Requirements for Afforestation. The predicted residual visual impact of the proposed replanting is Long Term, Imperceptible Neutral Impact.

8.3.2.4 Proposed Mitigation Measures

8.3.2.4.1 Site Preparation and Planting Phase

Mitigation measures for the construction of the drainage and planting methods have been included in the Technical Approval document. The planting method will be as per Section 2 above and mound drains will be constructed. The proposed replanting will be carried out in line with the recommendations of the Forestry and the Landscape Guidelines.

8.3.2.5 Residual Impacts

Following mitigation, the Residual Impact on Landscape Character will be Long Term Imperceptible Neutral Impact while the Residual Impact on Visual Amenity will be Long Imperceptible Term Neutral Impact.

8.3.2.6 Cumulative Impacts

Cumulative impacts are described as additional changes to the landscape or visual amenity caused by the proposed replanting site in conjunction with other developments or actions that occurred in the past, present or are likely to occur in the foreseeable future. The cumulative impact assessment is based on the Planning History search carried out and described in Section 3.2 and the existing land-uses. The cumulative impact arising from the proposed replanting site in conjunction with the existing land uses and future development is assessed as Long Term, Imperceptible Neutral Impact.

9. CULTURAL HERITAGE

9.1 Introduction

This section presents the results of an archaeological and cultural heritage impact assessment for the proposed afforestation of the replanting areas.

The purpose of this section is to assess the potential impacts of the afforestation on the surrounding archaeological, architectural and cultural heritage landscape. An assessment of potential impacts is presented and a number of mitigation measures are recommended where appropriate.

9.2 Methodology

A desk-based study of the proposed replanting areas was undertaken in order to assess the archaeological, architectural and cultural heritage potential of the area and to identify constraints or features of archaeological/cultural heritage significance within or adjacent to the sites. The proposed site has been Technically Approved for afforestation which will be completed in accordance with the 'Forestry and Archaeology Guidelines' (2000) (the Guidelines). The guidelines provide specific mitigation measures to be employed for afforestation which will minimise potential impacts on this resource.

9.2.1 Statutory Context

9.2.1.1 Current Legislation

Archaeological monuments are safeguarded through national and international policy, which is designed to secure the protection of the cultural heritage resource. This is undertaken in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention). This was ratified by Ireland in 1997.

Both the National Monuments Acts 1930 to 2004 and relevant provisions of the Cultural Institutions Act 1997 are the primary means of ensuring protection of archaeological monuments, the latter of which includes all man-made structures of whatever form or date. There are a number of provisions under the National Monuments Acts which ensure protection of the archaeological resource. These include the Register of Historic Monuments (1997 Act) which means that any interference to a monument is illegal under that Act. All registered monuments are included on the Record of Monuments and Places (RMP).

The Record of Monuments and Places (RMP) was established under Section 12 (1) of the National Monuments (Amendment) Act 1994 and consists of a list of known archaeological monuments and accompanying maps. The Record of Monuments and Places affords some protection to the monuments entered therein. Section 12 (3) of the 1994 Amendment Act states that any person proposing to carry out work at or in relation to a recorded monument must give notice in writing to the Minister (Environment, Heritage and Local Government) and shall not commence the work for a period of two months after having given the notice. All proposed works, therefore, within or around any archaeological monument are subject to statutory protection and legislation (National Monuments Acts 1930-2004).

Under the Heritage Act (1995) architectural heritage is defined to include *'all structures, buildings, traditional and designed, and groups of buildings including street-scapes and urban vistas, which are of historical, archaeological, artistic, engineering, scientific, social or technical interest, together with their setting, attendant grounds, fixtures, fittings and contents...'* A heritage building is also defined to

include 'any building, or part thereof, which is of significance because of its intrinsic architectural or artistic quality or its setting or because of its association with the commercial, cultural, economic, industrial, military, political, social or religious history of the place where it is situated or of the country or generally'.

9.2.1.2 Granada Convention

The Council of Europe, in Article 2 of the 1985 Convention for the Protection of the Architectural Heritage of Europe (Granada Convention), states that *'for the purpose of precise identification of the monuments, groups of structures and sites to be protected, each member State will undertake to maintain inventories of that architectural heritage'*. The Granada Convention emphasises the importance of inventories in underpinning conservation policies.

The National Inventory of Architectural Heritage (NIAH) was established in 1990 to fulfil Ireland's obligations under the Granada Convention, through the establishment and maintenance of a central record, documenting and evaluating the architectural heritage of Ireland. Article 1 of the Granada Convention establishes the parameters of this work by defining 'architectural heritage' under three broad categories of Monument, Groups of Buildings, and Sites:

- Monument: all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings;
- Group of buildings: homogeneous groups of urban or rural buildings conspicuous for their historical, archaeological, artistic, scientific, social or technical interest, which are sufficiently coherent to form topographically definable units;
- Sites: the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogenous to be topographically definable, and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest.

The Council of Europe's definition of architectural heritage allows for the inclusion of structures, groups of structures and sites which are considered to be of significance in their own right, or which are of significance in their local context and environment. The NIAH believes it is important to consider the architectural heritage as encompassing a wide variety of structures and sites as diverse as post boxes, grand country houses, mill complexes and vernacular farmhouses.

9.2.2 Desktop Assessment

A primary cartographic source and base-line data for the archaeological assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) through the electronic database of recorded monuments which may be accessed at www.archaeology.ie. All known recorded archaeological monuments are indicated on 6 inch Ordnance Survey (OS) maps and are listed in this record.

The following sources were consulted for this assessment report:

- Electronic database of recorded monuments (www.archaeology.ie).
- Aerial photographs (copyright of Ordnance Survey Ireland (OSI.ie)).

9.2.2.1 Recorded Monuments and Places

The Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) is a record of all known recorded archaeological monuments. The SMR/RMP is not a complete record of all monuments as newly discovered sites may not appear in the list or accompanying maps. In conjunction with the consultation of the SMR and RMP, the electronic database of recorded monuments which may be accessed at www.archaeology.ie was consulted.

Aerial Photograph Analysis

Aerial photographs of the site were examined and no previously unrecorded archaeological features could be seen. Sources included Bing, Google Maps and Ordnance Survey of Ireland.

9.2.3 Archaeology

Archaeological heritage is a non-renewable resource. The overall objective of this assessment of impacts of the proposed afforestation is to ensure that where a potential impact has been identified that it can be mitigated against to ensure that the archaeological heritage will be available for future generations. The potential impacts on the recorded archaeological heritage are assessed here.

Potential impact are assessed on the basis of the impact classification terminology outlined in Table 1.1 of the EIAR, with the significance of impacts being defined as either imperceptible, slight, moderate, significant or profound, or if no impact is predicted to occur, 'No Impact'.

9.2.4 Potential Impacts

Potential afforestation impacts include direct destruction of recorded and unrecorded sites and indirect impacts on archaeological potential of nearby sites.

9.3 Existing Environment

The electronic database of recorded monuments (www.archaeology.ie) was used to compile a list of known sites which occur at and in the vicinity of the site. There are two recorded archaeological features on the study site – a Ringfort – rath (RO008-039) and an Earthwork (RO008-040). The Forest Service Inspectorate has also noted that a possible unrecorded archaeological feature may be present in the northern section of the site.

There are no structures listed in the NIAH located within or in the vicinity of the site.

9.4 Potential Impacts

9.4.1 'Do-Nothing' Scenario

The lands have been Technically Approved and will be afforested should the Coole Wind Energy Development proceed or not. If the land was not replanted, the current land use would continue at the site.

9.4.2 Potential Direct Impacts on the Archaeological/Architectural Heritage

Direct Impact refers to a 'physical impact' on a monument. The afforestation will require some minor earthmoving activities such as drainage and the provision of access tracks. Harvesting will require tree felling.

There are two archaeological features within the site. The ringfort – rath (RO008-039) is visible as a circular feature (diam. c. 30m) on aerial photographs (ACAP: V221/133-4), and situated on a low-lying level landscape. The earthwork (RO008-040) is visible as a curvilinear feature enclosing a subrectangular area (dims c. 40m NE-SW; c. 20m NE-SW). It is not visible at ground level in pasture. Specific archaeological conditions attached to the technical approval include the following:

- 20m archaeological exclusion zone to be established from the outermost extent of the ringfort, as illustrated.
- An exclusion zone as measured around the earthwork, as illustrated.
- No deep drains within 30m of the outermost extent of the ringfort or 10m outside the exclusion zone around the earthwork.
- Exclusion zones to be properly fenced off prior to works commencing.

The zone of notification will be maintained during the planting phase. Planting of trees outside of this zone will be carried out by hand using the methods described in Section 2.3 above. Drains will be constructed in accordance with the Forestry Service Best Practice Guidelines described in detail in Section 2.3.

9.4.3 **Potential Indirect Impacts on the Archaeological/ Architectural Heritage**

Potential indirect impacts may arise where a monument or area of archaeological or architectural potential is situated in relatively close proximity to a proposed development but is not directly (physically) affected by the development. In such cases the impact on the setting of the monument or views to and from it are assessed.

There are a further seven archaeological features within 500m of the replanting site. Three features are located within the graveyard and are not visible externally, one is no longer visible at ground level, one feature is a redundant record, and two features are screened by vegetation and hedgerows. Therefore, impacts on the features are considered not significant.

9.4.4 **Operational Phase**

There will be no significant indirect or direct impacts on cultural heritage once the site has been afforested.

9.4.5 **Cumulative Impacts**

A planning history search of applications in the vicinity of the proposed replanting lands has also been carried out, as described in Section 3.2 of this report. There are no developments of a similar scale and nature located in the vicinity of the site that would give rise to cumulative impacts in conjunction with the proposed replanting on features of cultural heritage significance. The cumulative impact of the replanting site is assessed as Long Term Imperceptible Neutral Impact in conjunction with the existing and future developments in the vicinity.

9.4.6 **Significance of the Effects**

Based on the above, there will be no significant effects, on cultural heritage or archaeology, associated with afforestation at this site.

10. AIR, CLIMATE AND NOISE

10.1 Air

10.1.1 Background

The primary land-uses within the vicinity of the replanting site comprise agriculture, housing and a commercial property. Due to the non-industrial nature of afforestation and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for this study. It is expected that air quality in the existing environment is good, since there are no major sources of air pollution (e.g. heavy industry) in the vicinity of the sites.

The growth of forestry has no direct atmospheric emissions. Some minor indirect emissions associated with site preparation, planting and harvesting include vehicular and dust emissions.

10.1.2 Air Quality Standards

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) deals with sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).
- A third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive, published in 2007, deals with polycyclic aromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air.

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality), which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- New air quality objectives for PM_{2.5} (fine particles) including the limit value and exposure concentration reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (for particulate matter PM₁₀) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 10-1 below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) and parts per billion (ppb). The notation PM₁₀ is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. PM_{2.5} represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

Table 10-1 Limit values of Directive 2008/50/EC, 1999/30/EC and 2000/69/EC (Source: EPA)

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM_{10})	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Particulate matter 2.5 ($\text{PM}_{2.5}$)	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 ($\text{PM}_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 2.5 ($\text{PM}_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1st Jan 2020
Lead (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	-	1st Jan 2005
Benzene (C_6H_6)	Protection of human health	Calendar Year	5	1.5	-	1st Jan 2010

The Ozone Daughter Directive 2002/3/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 10-2 presents the limit and target values for ozone.

Table 10-2 Target values for Ozone Defined in Directive 2008/50/EC

Objective	Parameter	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8 hour mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT ₄₀ calculated from 1 hour values from May to July	18,000 $\text{mg}/\text{m}^3\cdot\text{h}$ averaged over 5 years	6,000 $\text{mg}/\text{m}^3\cdot\text{h}$
Information Threshold	1 hour average	180 mg/m^3	-
Alert Threshold	1 hour average	240 mg/m^3	-

AOT₄₀ is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 g/m^3 and is expressed as g/m^3 hours.

10.1.3 Air Quality Zones

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- > Zone A: Dublin City and environs
- > Zone B: Cork City and environs
- > Zone C: 16 urban areas with population greater than 15,000
- > Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The sites for afforestation lie within Zone D, which represents rural areas located away from large population centres.

10.1.4 Likely and Significant Impacts and Associated Mitigation Measures

10.1.4.1 'Do-Nothing' Impact

The land has been Technically Approved and will be afforested should the proposed Coole Wind Energy Development proceed or not.

10.1.4.2 Long Term Slight Positive Impact

The growth of trees will result in the fixation of atmospheric carbon, and the production of oxygen.

10.1.4.3 Short-term Imperceptible Negative Impact

10.1.4.3.1 Exhaust Emissions

Some minor emissions associated with the use of an excavator for site drainage works are expected. This potential impact will not be significant and will be restricted to the duration of the drainage works.

Mitigation

All construction machinery will be maintained in good operational order while on-site, minimising any emissions that are likely to arise.

Residual Impact

Short-term Imperceptible Negative impact.

Significance of the Effects

Based on the above, there will be no significant effects, on air quality, associated with afforestation at the five sites.

10.1.4.3.2 Dust Emissions

Potential dust emission sources include the working of an excavator. This potential impact will not be significant and will be restricted to the duration of the drainage works.

Mitigation

Areas of excavation will be kept to a minimum, and all works will be carried out in accordance with the Forestry Service Best Practice Guidelines described in detail in Section 2.

Residual Impact

Short-term Imperceptible Negative Impact.

Significance of the Effects

Based on the above, there will be no significant effects, on air quality, associated with afforestation at the five sites.

10.2 Climate

10.2.1 Climate Change and Greenhouse gases

Although climate change is thought to be a natural process, the rate at which the climate is changing has been accelerated rapidly by human activities. Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of greenhouse gases in the atmosphere. These greenhouse gases come primarily from the combustion of fossil fuels in energy use. Changing climate patterns are thought to increase the frequency of extreme weather conditions such as storms, floods and droughts. In addition, warmer weather trends can place pressure on animals and plants that cannot adapt to a rapidly changing environment. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

10.2.2 International Policy

10.2.2.1 United Nations Framework Convention on Climate Change

In 1992, countries joined an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC), as a framework for international efforts to combat the challenge posed by climate change. The UNFCCC seeks to limit average global temperature increases and the resulting climate change. In addition, the UNFCCC seeks to cope with impacts that are already inevitable. It recognises that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The framework set no binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. Instead, the framework outlines how specific international treaties (called "protocols" or "Agreements") may be negotiated to set binding limits on greenhouse gases.

Ireland is a Party to the Kyoto Protocol, which is a protocol to the UNFCCC. The Kyoto Protocol is an international agreement that sets limitations and reduction targets for greenhouse gases for developed countries. It came into effect in 2005, as a result of which, emission reduction targets agreed by developed countries, including Ireland, are now binding. Further details on Ireland's obligations under the Kyoto Protocol are presented below.

10.2.2.2 Kyoto Protocol Targets

Under the Kyoto Protocol, the EU agreed to achieve a significant reduction in total greenhouse gas emissions of 8% below 1990 levels in the period 2008 to 2012. Ireland's contribution to the EU

commitment for the period 2008 – 2012 was to limit its greenhouse gas emissions to no more than 13% above 1990 levels.

10.2.2.3 Doha Amendment to the Kyoto Protocol

In Doha, Qatar, on 8th December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes:

- New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020;
- A revised list of greenhouse gases (GHG) to be reported on by Parties in the second commitment period; and
- Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

During the first commitment period, 37 industrialised countries and the European Community committed to reduce GHG emissions to an average of 5% against 1990 levels. During the second commitment period, Parties committed to reduce GHG emissions by at least 18% below 1990 levels in the eight-year period from 2013 to 2020; however, the composition of Parties in the second commitment period is different from the first.

Under the protocol, countries must meet their targets primarily through national measures, although market based mechanisms (such as international emissions trading) can also be utilised.

10.2.2.4 COP21 Paris Agreement

COP21 was the 21st session of the Conference of the Parties (COP) to the UNFCCC. Every year since 1995, the COP has gathered the 196 Parties (195 countries and the European Union) that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments. COP21 was organised by the United Nations in Paris and held from 30th November to 12th December 2015.

COP21 closed on 12th December 2015 with the adoption of the first international climate agreement (concluded by 195 countries and applicable to all). The 12-page text, made up of a preamble and 29 articles, provides for a limitation of the global average temperature rise to well below 2°C above pre-industrial levels and to limit the increase to 1.5°C. It is flexible and takes into account the needs and capacities of each country. It is balanced as regards adaptation and mitigation, and durable, with a periodical ratcheting-up of ambitions. Ireland formally ratified the agreement on the 27th October 2016, and it entered into force on the 4th November 2016.

10.2.3 Baseline Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Claremorris which is located approximately 34 kilometres from the site, is the nearest weather and climate monitoring station to the proposed replanting site that has meteorological data recorded for the 30-year period from 1971 - 2000. Meteorological data recorded at Claremorris over the 30-year period from 1979 - 2008 is shown in Table 10-3 overleaf. The wettest months are October and December, and April is usually the driest. July is the warmest month with an average temperature of 18.9° Celsius.

Table 10-3 Data from Met Éireann Weather Station at Claremorris, 1971 to 2000

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	7.5	8.1	9.8	12.1	14.9	17.0	18.9	18.7	16.4	13.1	9.9	8.1	12.9
Mean daily min	1.7	1.8	2.9	3.9	6.1	8.8	11.0	10.6	8.6	6.4	3.5	2.5	5.7
Mean temperature	4.6	4.9	6.3	8.0	10.5	12.9	15.0	14.7	12.5	9.8	6.7	5.3	9.3
Absolute max.	13.3	13.6	16.2	22.3	25.4	29.8	30.5	28.0	25.1	19.9	15.9	14.3	30.5
Absolute Min.	-11.7	-9.1	-8.0	-5.5	-3.1	0.7	0.6	2.6	-1.2	-4.3	-5.3	-12.9	-12.9
Mean No. of Days with Air Frost	8.7	7.3	5.2	3.3	0.8	0.0	0.0	0.0	0.1	1.2	5.3	7.6	39.5
Mean No. of Days with Ground Frost	15	14	12	10	5	0	0	0	2	5	12	14	89
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	90.7	90.3	88.7	82.5	79.3	80.4	83.6	86.2	88.1	91.6	91.2	91.0	87.0
Mean at 1500UTC	85.6	79.8	75.7	67.9	68.0	71.1	73.2	73.4	74.7	80.2	84.4	88.1	76.8
SUNSHINE (Hours)													
Mean daily duration	1.3	1.9	2.6	4.3	5.0	4.4	3.7	3.8	3.2	2.4	1.7	0.9	2.9
Greatest daily duration	7.9	9.3	10.8	13.4	15.1	15.8	14.8	13.7	11.4	9.3	8.6	6.7	15.8
Mean no. of days with no sun	9.5	7.3	5.7	2.8	2.0	2.2	2.2	2.1	3.4	5.0	8.1	10.8	61.1
RAINFALL (mm)													
Mean monthly total	127.9	102.1	101.6	63.7	68.1	64.5	70.1	95.7	94.3	128.2	127.7	129.6	1173.6
Greatest daily total	31.5	107.0	26.8	34.0	51.3	38.0	42.2	49.7	41.0	46.7	54.9	41.2	107.0
Mean num. of days with $\geq 0.2\text{mm}$	21	18	21	16	16	15	17	18	18	21	21	22	224
Mean num. of days with $\geq 1.0\text{mm}$	18	15	17	12	12	11	12	13	14	17	18	17	176
Mean num. of days with $\geq 5.0\text{mm}$	9	7	7	4	4	4	4	6	5	8	8	9	75
WIND (knots)													
Mean monthly speed	10.2	10.3	10.2	8.7	8.1	7.7	7.2	6.8	7.7	8.7	8.9	9.7	8.7
Max. gust	96	85	74	74	62	51	66	78	58	70	67	81	96
Max. mean 10-minute speed	59	48	45	41	41	34	39	32	37	46	40	52	59
Mean num. of days with gales	1.4	0.9	0.7	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.4	0.8	4.8



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
WEATHER (Mean No. of Days With:)													
Snow or sleet	5.7	4.4	3.8	1.6	0.2	0.0	0.0	0.0	0.0	0.1	1.2	3.1	20.0
Snow lying at 0900UTC	2.3	0.7	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	4.6
Hail	4.4	3.2	5.4	3.2	1.6	0.4	0.1	0.0	0.7	0.8	2.6	2.7	25.2
Thunder	0.3	0.1	0.2	0.2	0.4	0.7	0.7	0.2	0.2	0.2	0.3	0.5	4.0
Fog	3.4	2.3	1.6	1.8	1.2	1.4	2.0	3.2	3.3	3.2	2.6	3.4	29.5

10.2.3.1 Potential Impacts – Planting Phase

10.2.3.1.1 Short Term Imperceptible Negative Impact

The use of machinery during the drainage works will result in the emission of greenhouse gases. Operations such as the transport of materials are typical examples of machinery use. This impact is considered to be imperceptible only, given the insignificant quantity of greenhouse gases that will be emitted. Planting will be carried out by hand.

Proposed Mitigation Measures

Planting of trees will be carried out by hand using the methods described in Section 2.3.2 above. Any drains will be constructed in accordance with the measures outlined in the *Forestry Standards Manual* and *Environmental Requirements for Afforestation* described in detail in Section 2.

10.2.3.2 Potential Impacts – Operational Phase

10.2.3.2.1 Long Term Slight Positive Impact

The growth of forestry allows for the fixation of atmospheric carbon as it grows.

10.2.3.3 Residual Impacts

On balance there will be positive impacts on air and climate associated with the proposed afforestation at this site.

10.2.3.4 Significance of the Effects

Based on the above, there will be no significant effects, on climate, associated with afforestation the at this site.

10.3 Noise

10.3.1 Receiving Environment

The nearest sensitive location to the afforestation site is the residential estate located approximately 250 metres to the northwest of the site. In general, the existing noise climate is typical of a rural agricultural location. The R293 Regional road and Cunniffes Ballagherreen Bacon Factory are located approximately 260 and 65 metres to the north of the site, respectively.

10.3.2 Likely and Significant Impacts and Associated Mitigation Measures

10.3.2.1 ‘Do-Nothing’ Scenario

The land has been Technically Approved and will be afforested should the proposed Coole Wind Energy Development proceed or not. If the land was not replanted, the current land use of grazed wet grassland would continue at the site.

10.3.2.2 Planting Phase

10.3.2.2.1 Construction Activities

There will potentially be an increase in noise levels in the vicinity of the proposed replanting site during the planting phase, as a result of the use of an excavator for drainage works. These impacts will be short-term in duration and are not considered potentially significant. The noise levels will be similar to the existing agricultural machinery in use in the vicinity of the lands which is a working rural environment. Noise at any given noise sensitive location will be variable throughout the works, depending on the distance from the excavator to the receiving properties. This is likely to have a Short-term Negative Imperceptible Impact.

Mitigation

Best practice measures for noise control will be adhered to onsite during the planting phase of the afforestation site in order to mitigate the potentially imperceptible short-term negative impact associated with this phase of the replanting. The measures include:

- Noise will be controlled by prescribing that all work will be restricted to the specified working hours. Any work carried out outside of these hours shall be restricted to activities that will not generate noise of a level that may cause a nuisance.
- The excavator used on the site shall be well maintained and will comply with E.U. and Irish legislation in relation to noise emissions. The timing of on- and off-site movements of plant near occupied properties will be controlled.

10.3.2.3 Operational Phase

10.3.2.3.1 Negative Slight Short-term Impact

There will be an intermittent increase in noise levels in the vicinity of the proposed replanting site during the operational phase, as a result of the use of machinery for timber harvesting works. These impacts will be short-term in duration. Noise at any given noise sensitive location will be variable throughout the harvesting works, depending on the distance from the machinery to the receiving properties.

Mitigation

Best practice measures for noise control will be adhered to onsite during the timber harvesting at the proposed afforestation site in order to mitigate the slight short-term negative impact associated with this phase of the replanting. The measures include:

- Harvesting noise will be controlled by prescribing that all construction work will be restricted to the specified working hours. Any work carried out outside of these hours shall be restricted to activities that will not generate noise of a level that may cause a nuisance.
- The machinery used on the site shall be well maintained and will comply with E.U. and Irish legislation in relation to noise emissions. The timing of on- and off-site movements of plant near occupied properties will be controlled.

Residual Impacts

Potential residual impacts will be imperceptible and temporary in nature and not dissimilar to the existing noise sources of a working rural environment.



Significance of the Effects

Based on the above, there will be no significant effects, in relation to noise, associated with afforestation the at this site.

11. POPULATION AND HUMAN HEALTH

This section of the report describes the potential impacts of the proposed afforestation on Population & Human Health, and has been completed in accordance with the guidance set out by the Environmental Protection Agency in 'Draft Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2017).

One of the principle concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect impacts arising from the construction and operation of a development. Ultimately, all the impacts of a development impinge on human health, directly and indirectly, positively and negatively. The key issues examined in this section of the replanting assessment include population, employment, health and safety, land-use, community facilities and services, and tourism.

11.1 Baseline Environment

The proposed replanting site is located approximately 1.4km to the east of Ballaghaderreen town centre. The replanting site is located within the District Electoral Division (DED) of Edmondstown. The number of households recorded within the DED during the 2016 Census was 166 households. The nearest sensitive location to the afforestation site is the residential estate located approximately 250 metres to the northwest of the site. The R293 Regional road and Cunniffes Ballaghaderreen Bacon Factory are located approximately 260 and 65 metres to the north of the site, respectively.

11.1.1.1 Employment

Socio-economic grouping divides the population into categories depending on the level of skill or educational attainment required. The 'Higher Professional' category includes scientists, engineers, solicitors, town planners and psychologists. The 'Lower Professional' category includes teachers, lab technicians, nurses, journalists, actors and driving instructors. Skilled occupations are divided into 'Manual Skilled', such as bricklayers and building contractors; 'Semi-skilled', e.g. roofers and gardeners; and 'Unskilled', which includes construction labourers, refuse collectors and window cleaners.

The highest level of employment within the Edmondstown DED is within the 'All others gainfully occupied and unknown', 'Non-manual' 'Semi Skilled' and 'Farmers' categories at 76 persons, 65 persons, and 63 persons, respectively. The total population in this DED in Census 2016 was 418.

11.1.1.2 Land-use

The current land-use on the proposed replanting area is grazed wet grassland. This site is located within a rural, working landscape in which agriculture, commercial development and residential development forms the primary land-uses. There are existing forestry plantations located approximately 995 metres to the southeast, 967 metres to the southwest and approximately 1.5 kilometres to the north of the site.

11.1.1.3 Community Facilities and Amenities

The nearest schools and community facilities to the proposed planting site are located in the town of Ballaghaderreen, approximately 1.4 km west of the site.

11.1.1.4 Tourism

Ireland is divided into seven tourism regions. The West Region, in which the site of the replanting site is located, comprises Counties Galway, Mayo and Roscommon.

The nearest tourist attractions to the replanting area are Ballaghaderreen Cathedral located approximately 1.4km to the northwest of the site and Ballaghaderreen Golf Course located approximately 3.1km to the southwest of the site.

There are no scenic views or routes located near the replanting site.

11.1.2 Impact Assessment and Proposed Mitigation Measures

11.1.2.1 'Do-Nothing' Scenario

The lands have been Technically Approved and will be afforested should the Coole Wind Energy Development proceed or not. If the land was not replanted, the current use of land for grazing would continue at the site.

11.1.2.1.1 Population

Afforestation of the replanting site will have no impact on population trends or population density in the vicinity of the site.

11.1.2.1.2 Employment

The preparation and planting of the proposed replanting lands will provide short-term employment for three people; one person to operate an excavator for installation of drainage features, and two people to plant the site by hand.

In the longer-term, maintenance and felling of the site will provide part-term employment for two people.

11.1.2.1.3 Health and Safety

Health and safety in forestry is the concern of all those involved, including forest owners, managers, supervisors, operators, recreational users and trespassers (*'Code of Best Forest Practice'*, Forest Service, 2000). Forest practice must ensure that operations do not endanger workers and others. In the absence of the correct health and safety measures, forestry-related activities have the potential to have a significant negative effect on the health and safety of workers and members of the public, on and in the vicinity of the site.

The Forest Service's *'Code of Best Forest Practice'* states that the Safety, Health and Welfare at Work Act 1989 and the Safety, Health and Welfare at Work (General Application) Regulations 1993 place responsibilities on all involved in work activities and set out a basis for managing health and safety in all workplaces. Forest owners have legal responsibilities to ensure that the workplace and all articles and substances situated there are safe and free from health risk. This involves informing contractors of potential hazards, work agreements and monitoring. Employers, self-employed and employees all have clear responsibility to ensure safe working practices for themselves and others.

All Forest Service guidelines and Health and Safety legislation will be adhered to during all forestry-related activities at the proposed replanting lands. The residual potential for a significant negative impact on worker and public health and safety is therefore reduced to minimal.

11.1.2.1.4 Land-use

Afforestation of the replanting site will result in a long-term change in use of the site, from agriculture to forestry. This change in land-use is in keeping with the character of the surrounding landscape, as

forestry is already an established land-use in the general area. The impact of the change in land-use is therefore neutral, i.e. a change which does not affect the quality of the environment.

11.1.2.1.5 **Residential Amenity**

Planting at the site will have no impact on the residential amenity of the area.

11.1.2.1.6 **Community Facilities and Amenities**

There are no community facilities or amenities located on or in the immediate vicinity of the proposed replanting land. No recreational walks are located close to the proposed replanting site. There will be no impact to these or any other community amenities within the wider area. All appropriate health and safety measures, including signage, will be adopted at the site to ensure the safety of workers and the general public.

11.1.2.1.7 **Tourism**

Afforestation of the proposed replanting lands will have no impact on tourism. There are no tourist facilities or attractions located at the replanting lands or within the vicinity of the site. Forestry and peat land is a well-established land-use in this area; and a common feature in the landscape.

11.1.2.2 **Significance of the Effects**

Based on the above, there will be no significant effects, on human beings, population or health, associated with afforestation the at this site.

11.1.2.3 **Cumulative Effects**

It is considered that based on the assessment above, the proposed replanting site with other projects in the area will not cumulatively affect population and human health in the wider area.

12. MATERIAL ASSETS

Material Assets are resources that are valued and intrinsic to specific places. Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are dealt with in Sections 6, 7 and 8 of this report. Cultural assets are discussed in Section 9. Transportation infrastructure and land-use practices, which are economic assets of human origin, are discussed in this section of the report.

12.1 Transportation

The site is accessed via the off the R293 Regional Road to the north of the site. Traffic movements associated with the preparation and planting of the site will be minimal. Preparation of the site will require the use of an excavator for drainage, and travel to the site by the driver. Planting of the site will be by hand and will be carried out by one to two people over a two-week period approximately.

Forestry felling would typically occur within 0.5km of access points (roads & tracks) to the main forest body. Due to the small size of this site, additional access tracks or roads will not be required.

12.2 Land-Use

Land-use on the site will change from agriculture to coniferous forestry. Forestry, like agriculture, is an extractive industry, i.e. it produces a raw material which is then processed to add value.

12.3 Potential Impacts

12.3.1 'Do-Nothing' Scenario

The lands have been Technically Approved and will be afforested should the Coole Wind Energy Development proceed or not. If the land was not replanted, the current land use would continue at the site.

12.3.2 Transportation

Planting of the proposed site will have an imperceptible impact on local traffic, given the low volume of traffic associated with planting and felling.

12.3.3 Land-Use

Land-use on the site will change from agriculture to coniferous forestry. Forestry, like agriculture, is an extractive industry, i.e. it produces a raw material which is then processed to add value. The use of the proposed replanting lands for coniferous forestry will have a positive effect on the economic assets of the site.

12.3.4 Significance of the Effects

Based on the above, there will be no significant effects, on land use and traffic, associated with afforestation the at this site.

12.3.5 Cumulative Effects

A planning history search of applications in the vicinity of the proposed replanting lands has also been carried out, as described in Section 3.2 of this report. There are no developments located in the vicinity of the site that would give rise to cumulative traffic impacts in conjunction with the proposed replanting lands.



APPENDIX 1

**TECHNICAL APPROVAL
DOCUMENT**

RECEIVED
14 DEC 2018



SWS FORESTRY LTD
GATE LODGE
WEST CORK TECHNOLOGY PARK
CLONAKILTY
CO CORK

luD
KF

12/12/2018

Application for Technical Approval for an Afforestation Licence

Forest Owner	FO132649T
Contract Number	CN80274
Townland	Magheraboy
County	Roscommon
Approved Area (ha)	16.53
Fencing Length (lm)	1,755.00

James Curniffe

This is technical approval for an afforestation licence only and is not grant approval. You should note that the project will not be eligible for grant aid unless prior financial approval has been given in writing in advance of commencement of planting. Also, to qualify for Afforestation grant and premiums applicants must own, lease or be in joint management of the lands proposed for planting. You should consult with your registered forester about applying for financial approval under the Scheme.

I refer to your application for an afforestation licence as described above and shown on the enclosed map. Your application has been assessed and a licence is hereby issued on the basis that the works will be undertaken in accordance with the prescription set out in Appendix A, attached herewith. You are now required to remove your site notice immediately.

This scheme is financed by the State and payment of the grant, if financial approval is given, is subject to the following conditions:

1. Availability of funds in each financial year.
2. Submission of a fully completed and signed Form 2 (Application for Payment) and the following documents to support this application.

Proof of Ownership (including removal of any constraints on ownership)

Valid Mandate

Current Tax Clearance Certificate(s)

C2 Certificate

Provenance Certificates

Fencing Map

Biodiversity Map

Certified Species Map

3. Satisfactory completion of the work not later than 12/12/2021.
4. Compliance with Operational Proposals and Specifications enclosed.
5. Compliance with Departmental guidelines and requirements for Landscape, Water Quality, Harvesting, Biodiversity and Archaeology.



6. Compliance with Ecological Survey and Management Plan as submitted (if applicable).
7. The work is carried out by the registered company or forester specified on the original application. If it is intended to have a different company or forester undertake the work, it will be necessary to submit a new application (Form 1) to the Forest Service.
8. All applications are subject to the provisions of the penalty schedules as set out in the Afforestation Grant and Premium Scheme document.
9. All applications are subject to Cross Compliance checks with other grant schemes.
10. Grant payment may be subject to the netting policy of the Department of Agriculture, Food and the Marine.
11. This licence is issued subject to the terms and conditions of the Forestry Standards and Procedures Manual.
12. Your acceptance that the responsibility for the ultimate success of the plantation rests with you, the applicant. Plantations which fail to establish successfully will result in grant and premium recoupment.
13. Additional Environmental & Silvicultural Conditions
 - Adhere fully to Archaeological conditions and setbacks,
 - 15% ADB to be planted for this site as per revised scheme rules,
 - Adhere to Environmental Requirements for Afforestation,
 - All guidelines to apply

Specific Archaeological Conditions:

20m archaeological exclusion zone to be established from the outermost extent of the ringfort, as illustrated.

Fencing, plus access.

In addition no deep drains within 30m of the monument.

See attached archaeological report and accompanying illustrative map for further details.

You are required to notify the Department of Agriculture, Food and the Marine in writing if any of the details of your application have changed. Changes to your application may invalidate this licence.

In order to allow for the possibility of appeals, you must not commence any works until 28 days from the date of this letter have elapsed. If an appeal is lodged, this licence will be suspended and no work may commence until the appeal process has concluded.

If you wish to appeal any condition attached to this licence, where applicable, you should do so in writing within 28 days of the date of this letter to the Forestry Appeals Committee. You must set out the grounds of your appeal and include a statement of the facts and contentions upon which you intend to rely along with any documentary evidence you wish to submit in support of your appeal. The appeal must be sent to the Forestry Appeals Committee, Kilminchy Court, Portlaoise, Co. Laois, Lo-Call 076 1064418 or 057 8631900.

Yours sincerely

COLIN GALLAGHER
Approval Section
Forestry Division



Operational Proposals for Technical Approval for an Afforestation Licence

Forest Owner Number	FO132649T
Contract Number	CN80274
Townland	Magheraboy
County	Roscommon
Area Approved	16.53 (ha)
Fencing Length (LM)	1,755.00

All applications must be developed in accordance with detailed standards and procedures as described in the current Forestry Schemes Manual. Certain specific operational proposals particular to this application are described below. No change is permitted to these proposals and species approved unless approved in advance by the Department. The Department may insist that proposed changes constitutes a new application.

Operational Proposal Details

Agro Forestry (GPC 11)	
1. Tree Shelters	Not Entered
2. Plant Size and Stocking	Not Entered
Drainage	
1. Drainage	Not Required
2. Drainage Comment	Not Entered
Fertiliser	
1. Zero	Not Entered
2. 350 Kg Granulated Rock Phosphate	Not Entered
3. 250 Kg Granulated Rock Phosphate	Yes
4. Split Application	Not Entered
5. Other Details	Not Entered
Firebreaks/Res.	
1. Firebreaks/Res	Not Required
Forestry for Fibre (GPCs: 12a and 12b)	
1. Is Land Free Drainage arable or pasture soils	Not Entered
2. Are there surface water gleys without a peat layer	Not Entered
3. Do you intend to use improved genetic material	Not Entered
4. Details	Not Entered
Ground Prep.	
1. Woody Weed Removal	Yes
2. Ripping	Not Entered
3. Fit Plant	Not Entered
4. Mole Drainage	Not Entered
5. Mounding	Yes
6. Ploughing	Not Entered
9. Other Details	Not Entered
Planting Method	
1. Angle Notch	Not Entered
2. Pit	Not Entered
3. Machine	Not Entered



4.	Slit	Yes		
5.	Other Details	Not Entered		
Road Access				
1.	Road Access	Provided		
Standard Stocking				
1.	Standard Stocking	Yes		
2.	Details	Not Entered		
Weed Control				
1.	Herbicide Control yr0	Yes		
2.	Herbicide Control yr1	Yes		
3.	Herbicide Control yr2	Yes		
3.	Herbicide Control yr4	Not Entered		
4.	Manual	Yes		
4.	Herbicide Control yr3	Yes		
Fencing Details (metres)	Stock	0	Stock-Sheep	1755
	Stock-Rabbit	0	Upgrade to Deer	0
	Deer-Rabbit	0	Deer	0
	Upgrade Existing Fence(s)	0	Tree Shelter (Hectares)	0
	Upgrade Details: None Entered			

Species Approved

The species approved in this proposal relate to the digitised certified species map attached.

Species Approved for Afforestation

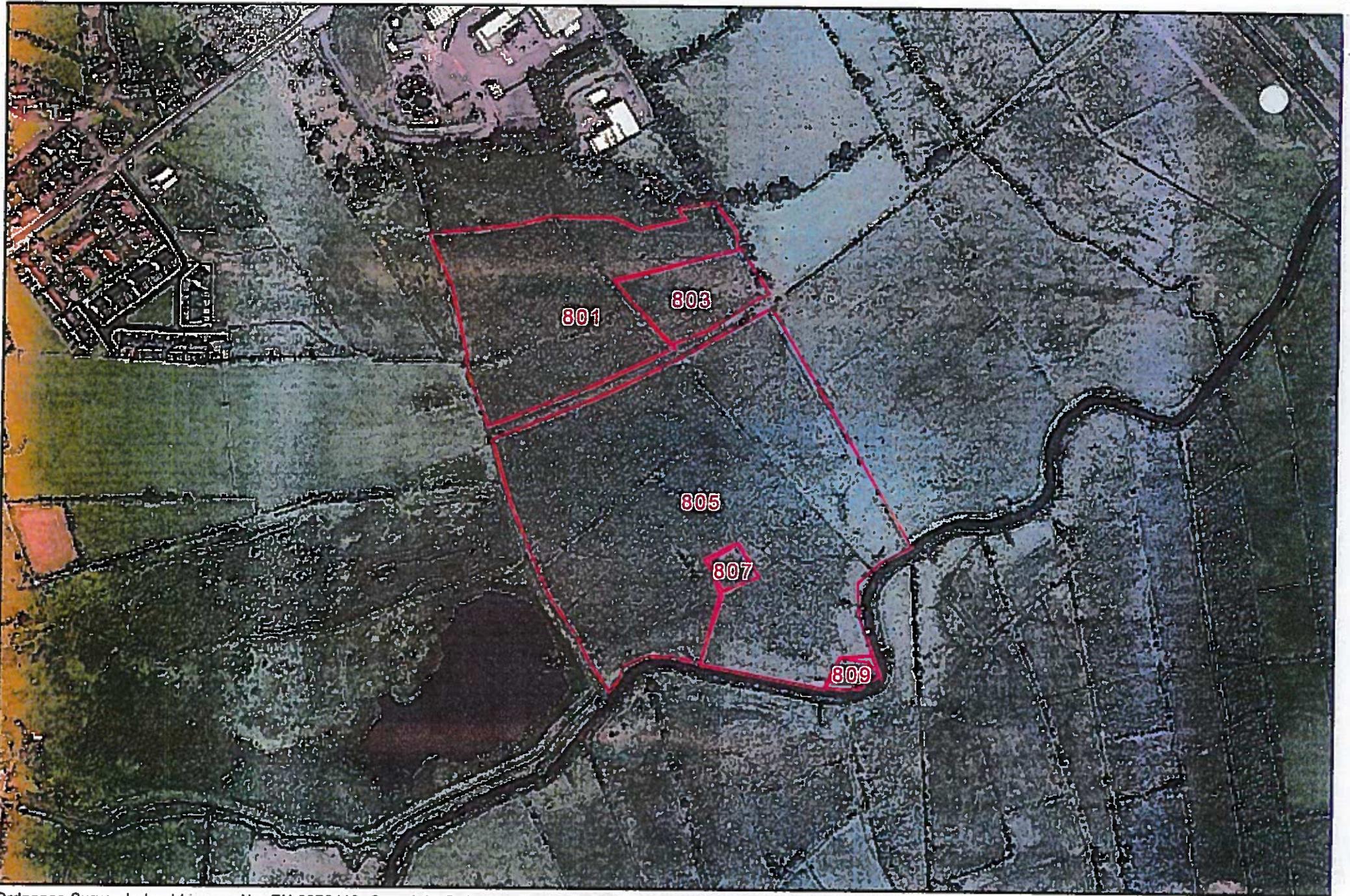
Plot	Area	GPC	Land Type	Species	Species Area	Yield Class	Mixture Type	Exclusion	Exclusion Type
1	4.19	GPC 3	CHF	SS	3.77	20	Pure		
				ADB	.42	8			
2	.91	GPC 3	Bio				None		
3	11.13	GPC 3	CHF	SS	10.02	20	Pure		
				ADB	1.11	8			
4	.16	GPC 3	Bio				None		
5	.14	GPC 3	Bio				None		

Additional Silvicultural and Environmental Conditions

In addition to the Department's environmental and silvicultural guidelines the following specific conditions apply to this proposal:

Silvicultural and Environmental Conditions

Adhere fully to Archaeological conditions and setbacks,
15% ADB to be planted for this site as per revised scheme rules,
Adhere to Environmental Requirements for Afforestation,
All guidelines to apply



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Unauthorized reproduction is not permitted. This map is for Forest Service related use only.

Contract: **CN80274**

Scale 1: 5000

Certified Species Information

Contract Number	CN80274
Townland	Magheraboy
County	Roscommon
6" OS No:	RN8

Plot No	GPC	Parcel No	GPC Area(H)	Land Use Type	Species Area	Species	Mixture Type	Excl Area(h)	Excl Type
1	3	45731801	4.19	CHF	4.19	ADB,SS	Pure	0	
2	3	45731803	.91	Bio	0		None	0	
3	3	45731805	11.13	CHF	11.13	ADB,SS	Pure	0	
4	3	45731807	.16	Bio	0		None	0	
5	3	45731809	.14	Bio	0		None	0	
TOTALS			16.53		15.32			0	

Remarks:

Area Surveyed By:

Species Certified By:

Date:

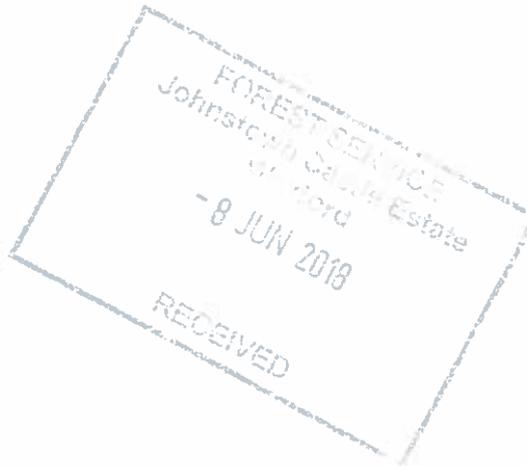
Date:

An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine



①

Approvals Section,
Forest Service,
Department of Agriculture, Food and the Marine,
Johnstown Castle Estate,
Co. Wexford,
Y35 PN52.



8th June 2018

Re: CN 80274 – Magheraboy, Co. Roscommon

Dear Sir / Madam,

I am writing to you with regard to the revised application for a licence for afforestation in respect of certain lands at Magheraboy, Co. Roscommon

The area proposed for afforestation contains two Recorded Monuments – an enclosure or ringfort (RO 008-039) and an earthwork (RO 008-039). In addition, a possible archaeological feature, hitherto unrecorded, is visible on recent aerial photographs at the northern part of the site.

Further to the conditions agreed with NMS, DCHG, in respect of a previous application for the same lands in August 2015 under CN72249, and the applicant's/Registered Forester's subsequent confirmation that Plot 2 will be retained exclusively a BIQ Plot, i.e. open space with no planting or ground disturbance whatsoever, it is recommended that the archaeological conditions detailed on the accompanying page should be attached to any letter of approval.

For the purposes of the EIA Screening Form and the Forestry Regulations 2017 this constitutes:

	Yes	No	N/A
- Adherence to the normal standards of the Forestry and Archaeology Guidelines	X		
- Specific conditions regarding buffer zones etc	X		
- Archaeological Monitoring during ground preparation or drainage works		X	
- Archaeological Assessment		X	
- Refusal in part		X	
- Refusal		X	

For the purposes of the IFORIS summary notes this constitutes:

Archaeological Conditions: Extra

Yours sincerely,

Emmet Byrnes
Senior Archaeologist
Forestry Inspector Grade 1



An Roinn Talmhaíochta, Bia agus Mara,
An Teach Talmhaíochta, Sráid Chill Dara, Baile Átha Cliath 2, D02 WK12
Department of Agriculture, Food and the Marine
Agriculture House, Kildara Street, Dublin 2, D02 WK1
T +353 1 607 2229 | emmet.byrnes@agriculture.gov.ie
www.agriculture.gov.ie

CN 80274

Magheraboy, Co. Roscommon

Revised Archaeological conditions

The area proposed for afforestation contains two Recorded Monuments – an enclosure or ringfort (RO 008-039) and an earthwork (RO 008-039). In addition, a possible archaeological feature, hitherto unrecorded, is visible on recent aerial photographs at the northern part of the site.

It is of concern that every effort should be made to prevent damage to this Recorded Monument pair and the potential new site and to ensure that there would be an appropriate response should any other previously unrecorded archaeology be discovered during the course of the works.

Consequently, the following conditions should be adhered to during the proposed afforestation works:

- 1. As always, at all times during the proposed afforestation operations the terms of the 'Environmental Requirements for Afforestation' should be adhered to.
- 2. Specifically, the areas highlighted in yellow with red hatching on the accompanying map, should be entirely excluded from the proposed afforestation works.

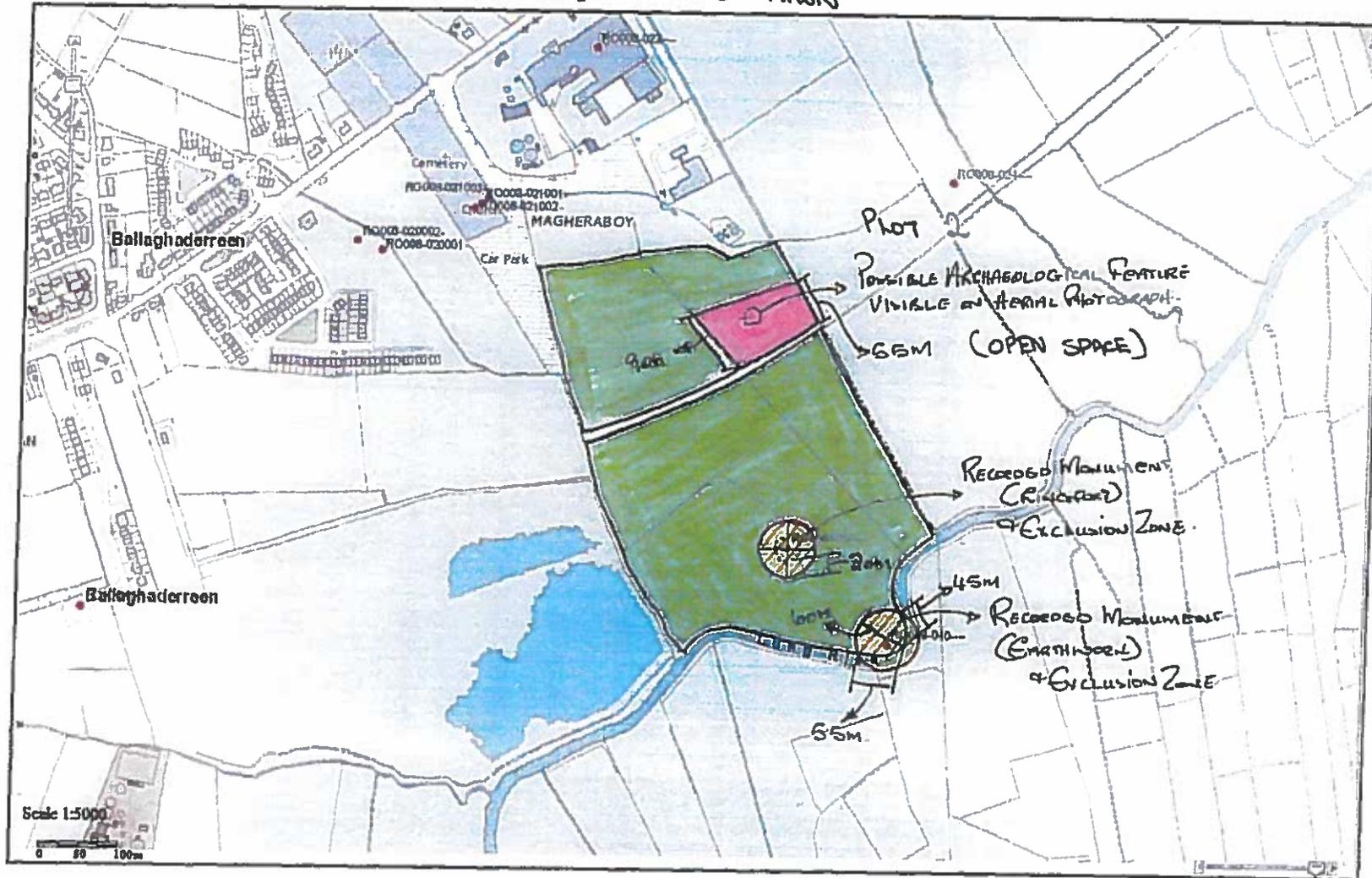
That means an exclusion zone 20m in width from the outermost extent of the enclosure or ringfort (RO 008-039), as illustrated.

That means an exclusion zone as measured around the earthwork (RO 008-039), as illustrated.

- 3. In addition, no deep drains should be excavated within 30m of the outermost extent of the ringfort or 10m outside the exclusion zone around the earthwork.
- 4. These exclusion zones should be properly fenced off prior to works commencing and all operational staff should be apprised of the location of the exclusion zone and the monument within each.
- 5. Existing pedestrian access from the monuments to the nearest forest track or road should be respected and if not present, established. Such access tracks should at a minimum be 4m wide.
- 6. Furthermore, Plot 2 containing the possible new archaeological site, as per the applicant's own revised plan, is required to be retained exclusively a BIO Plot, i.e. open space with no planting or ground disturbance whatsoever.
- 7. These archaeologically excluded areas may be eligible in whole or in part as an ABE/open space; see the Forest Standards Manual for details and rules.
- 8. Any previously unrecorded archaeological site or artefact discovered during the course of the works on site must be left undisturbed and the relevant authorities notified immediately. A minimum exclusion zone of 20m, preferably 100m or more, must be created until the any such site has been properly investigated. The relevant authorities include the duty archaeologist in the Forest Service, DAFM, and in the case of the discovery of human remains An Garda Síochána and the Local Coroner.
- 9. Otherwise, no known archaeological objections.

Emmet Byrnes
 Emmet Byrnes
 Forest Service Inspectorate
 Ph.: 01-6072229
 Mobile.: 087-2283697

CN 80274 - MAGHERABOY, Co. ROSCOMMON



, Magheraboy, Co. Roscommon.

OK FOR FORESTRY — 

EXCLUSION ZONES — 

BIOPLOT - OPEN SPACE / NO PLANTING / ONW7 GROUND DISTURBANCE — 