APPENDIX 4-3

ASSESSMENT OF PROPOSED REPLANTING

Planning and Environmental Consultants

Assessment of Forestry Replacement Lands

Slieveacurry Renewable Energy Development, Co. Clare

DOCUMENT DETAILS

Client:	**Slieveacurry Ltd**
Project Title:	**Slieveacurry Renewable Energy Development, Co. Clare**
Project Number:	**170224c**
Document Title:	**Assessment of Forestry Replacement Lands**
Document File Name:	**Replanting Assessment F - 2021.10.26 - 170224c**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Final	10.26.2021	EOS	MW

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1. INTRODUCTION

1.1 Introduction

This report has been prepared by McCarthy Keville O'Sullivan Ltd. (MKO) on behalf of Slieveacurry Ltd., who intends to apply to Clare County Council for planning permission to construct a renewable energy development and all associated infrastructure in the townland of Glendine North and adjacent townlands, in Co. Clare.

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. In the case of the area to undergo turbulence\ temporary felling, there is a requirement for replanting on a hectare for hectare basis within the site, plus an additional 10% offsite in the event that the turbulence felling exceeds 20 hectares.

A total of 29.78 hectares of new forestry will therefore be replaced as a condition of any felling licence that might issue in respect of the proposed renewable 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 4.3.9 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.

Three potential forestry replacement areas have been identified and are located at Cloonbony, Co. Longford, Lisduff, Co. Mayo and Sheehaun, Co. Roscommon. The total replanting area granted Forest Service Technical Approval for afforestation at these three sites is 31.29 hectares, which is more than sufficient to accommodate the wind farm replanting requirement. If these replacement lands become unavailable, other similarly approved replant lands will be identified for replanting should the proposed renewable energy development be constructed.

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 lands are assessed in combination with the proposed Slieveacurry Renewable 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 1st of April and the 15th 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

Three potential areas have been identified for assessment purposes, and any replanting associated with the Slieveacurry Renewable Energy Development will take place at these lands or similarly Technically Approved lands. The list of Technically Approved lands assessed in this report is presented in Table 2-2.

Table 2-2 Technically Approved Replanting Lands

Location No.	Site Name	Location	Proposed Replanting Areas (ha) [1]
1	Cloonbony	Co. Longford	10.06
2	Lisduff	Co. Mayo	13.5
3	Sheehaun	Co. Roscommon	7.73
Total Area			**31.29**

Notes: All areas are approximate.

The lands at Cloonbony, Lisduff and Sheehaun listed in Table 2-2 have been assessed as part of the Afforestation Approval – Form 1 process and obtained Technical Approval for Afforestation from the Forest Service. The combined approved area for replanting afforestation at the sites is 31.29 ha, which is available to the applicant and would meet the total Slieveacurry replanting requirement of 29.78 ha. Site location maps and further details on each site are provided in Sections 2.2.1 to 2.2.2 below.

2.2.1 Replanting Area 1: Cloonbony, Co. Longford

This replanting area is in the townland of Cloonbony, Co. Longford. The replanting site is located approximately 2 km northeast of the town of Lanesborough. The site location is presented in Figure 2-1.

The site is accessed off a local unnamed road which bounds the site to the west. The Technical Approval area for afforestation measures 10.06 hectares in total. The current land use is agriculture. Existing forestry can be found immediately to the north of the site.

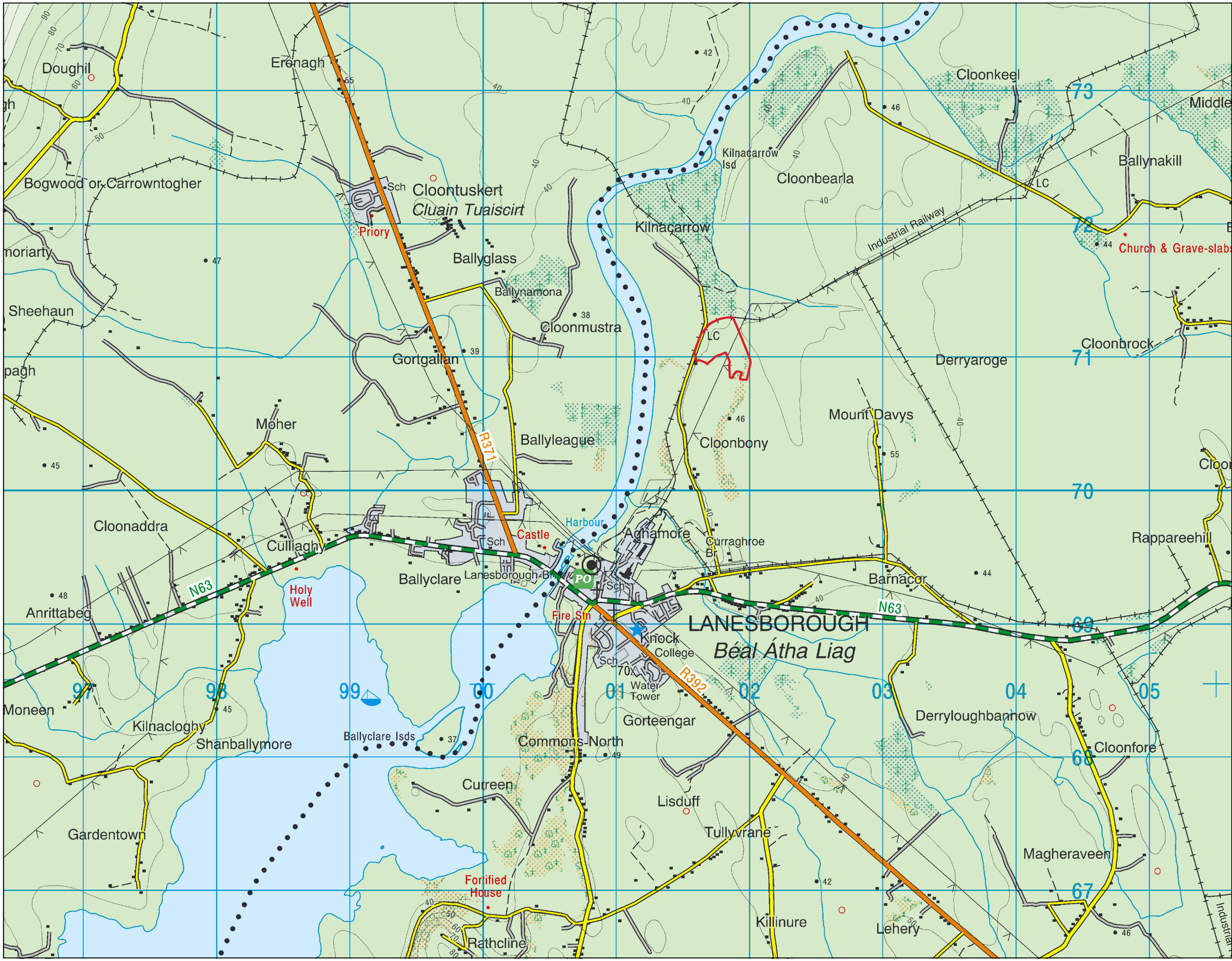
2.2.2 Replanting Area 2: Lisduff, Co. Mayo

This replanting site is located in the townland of Lisduff, Derreens, Co. Mayo, approximately 2.4 km southwest of the town of Ballyhaunis, Co. Mayo. The site location is presented in Figure 2-2. The Technical Approval area for afforestation for this site is 13.5 hectares and comprises of three parcels of land located either side of the local road. The site is accessed via an unnamed road which travels between the parcels of land. The current land use is agriculture. Existing forestry can be found to the northeast of the site.

2.2.3 Replanting Area 3: Sheehaun, Co. Roscommon

This replanting area is in the townland of Sheehaun, Co. Roscommon. The Sheehaun site is located approximately 3.5 kilometres to the northwest of Lanesborough, Co. Longford and 10 kilometres to the northeast of Roscommon town, Co. Roscommon.

The site location map and aerial photograph view are presented in Figure 2-3. The Technical Approval area for afforestation at Sheehaun measures 7.73 hectares in total. The proposed replanting site is accessed from a local road to the west of the site. The current land use is agricultural for pastoral farming. Existing forestry sites lie adjacent to the east.



Map Legend

Cloonbony Site Boundary

Drawing Title: Site Location Replanting Area 1 - Cloonbony

Project Title: Slieveacurry Renewable Energy Development, Co Clare

Drawn By	Checked By
Holly Witter	David McNicholas
Project No.	Drawing No.
170224	2-1
Scale	Date
1:25000	2020.10.19

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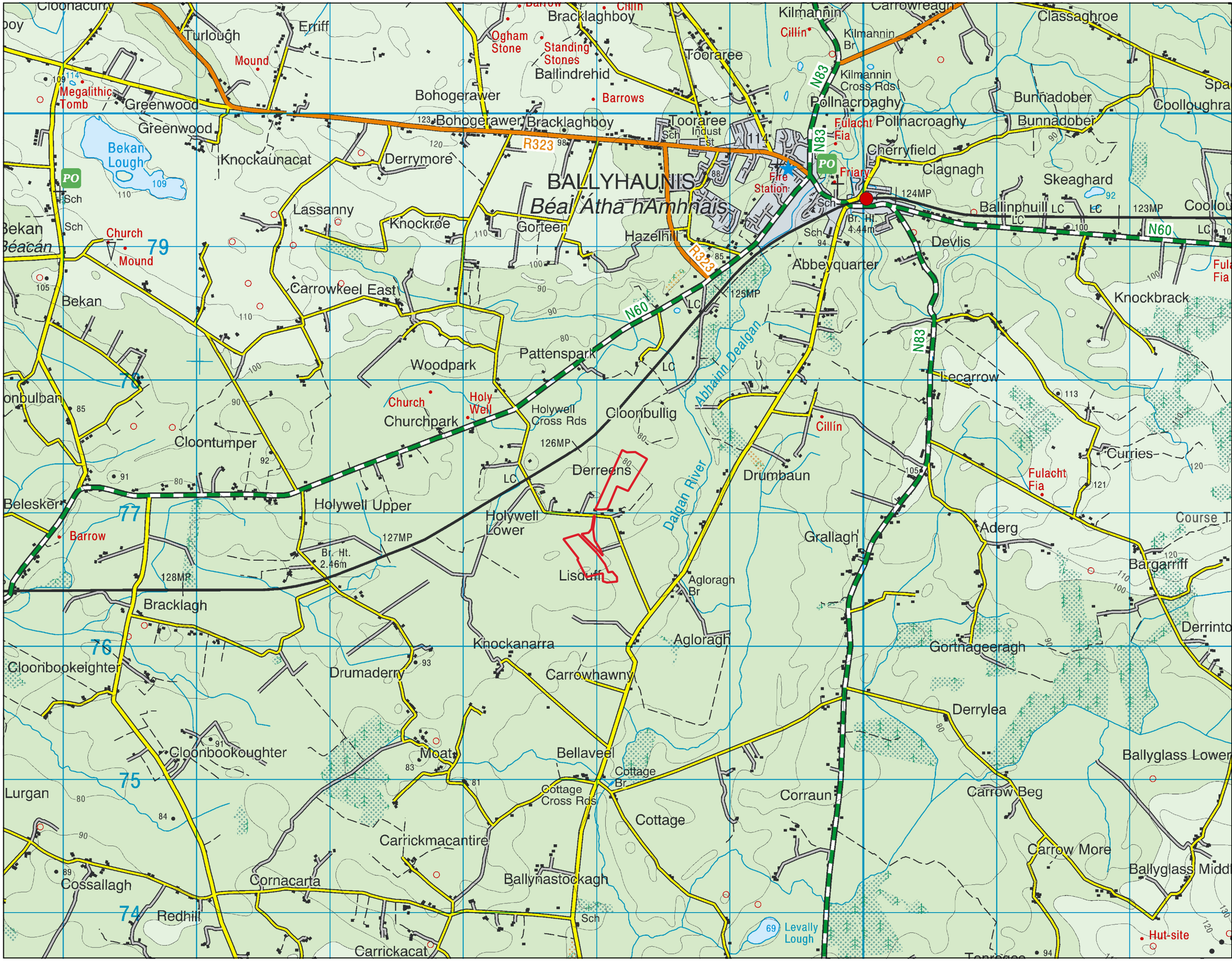

Map Legend

Lisduff Site Boundary

Drawing Title	Site Location Replanting Area 2 - Lisduff
Project Title	Slieveacurry Renewable Energy Development, Co Clare
Drawn By: HW	Checked By: DMN
Project No.: 170224	Drawing No.: 2-2
Scale: 1:25000	Date: 2020.10.19

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Map Legend

Sheehaun Site Boundary

Sheehaun

Reagh

Aghalahard

Killultagh

Aghaclogher

Doughil

Killavackan

Culleenanory

Erenagh

Kilnasillagh

Trilacroghan

Bogwood or Carrowntogher

Aghawerriny

Killattimoriarty

Ballinwully

Knockavurrea

Keelcurragh or Carrowreagh

Kilnalosset

Cappagh

Ballagh

Cloonshee

Moher

Cloonaddra

Cooncashel Beg

Cooncashel More

Anrittabeg

Cullaghy

Holy Well

Moneen

Kilnacloghy

Shanballymore

Coolshaghtena

Curreen

Ballyclare Isds

Ballyclare

Lanesborough Br

Castle

Harbour

Aghamore

Curraghroe Br

Barnacor

LANESBOROUGH

Béal Átha Liag

Knock College

Water Tower

Gorteengar

Commons North

Lisduff

Cloontuskert

Cluain Tuaiscirt

Priory

Ballyglass

Ballynamona

Cloonmustra

Gortgallan

Ballyleague

Cloonbony

Mount Davys

Erra

Kilnacarrow

Kilnacarrow Isd

Cloonbearla

Derryhanee

Industrial Railway

R371

R392

N63

LC

PO

Sch

Fire Stn

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Drawing Title: Site Location Replanting Lands 3 - Sheehaun

Project Title: Slieveacurry Renewable Energy Development, Co. Clare

Drawn By	Checked By
EC	MW

Project No.	Drawing No.
170224c	Figure 2-3

Scale	Date
1:25000	2021-10-26

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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 Manual[1] and Environmental Requirements for Afforestation[2]. 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 2-4 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)*

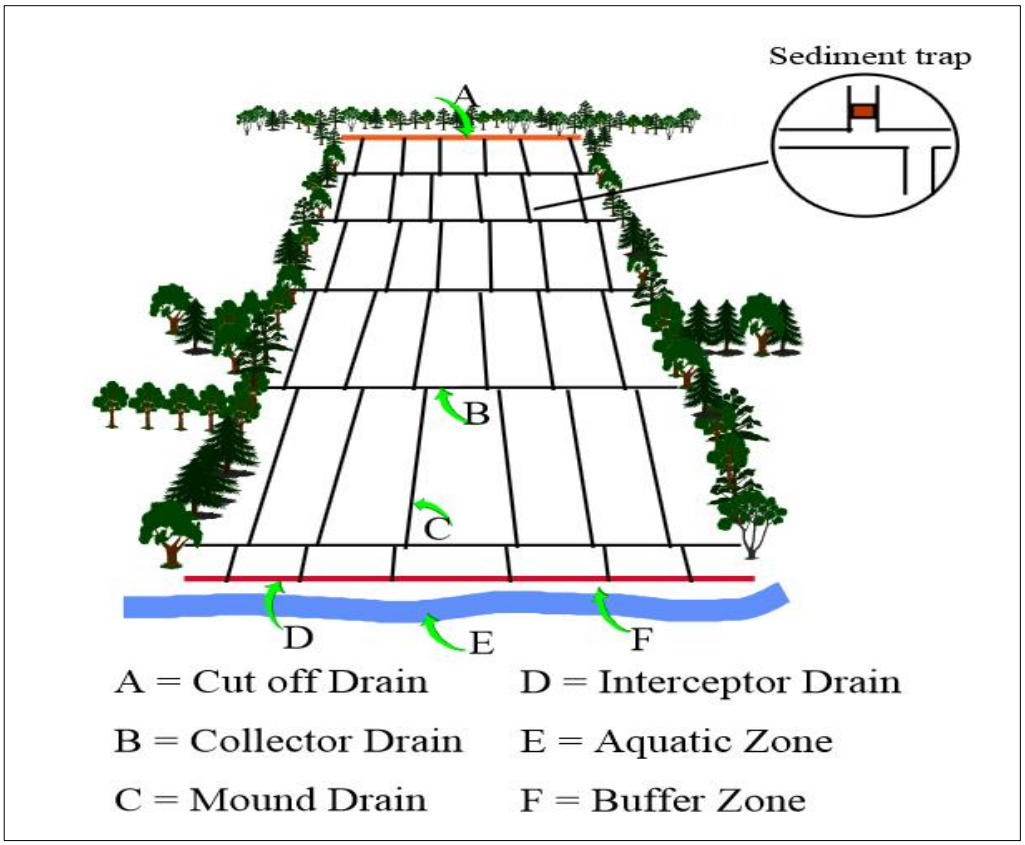


Figure 2-4 Standard Forestry Drainage (Forest Service, 2011

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 County Development Plans for Longford, Mayo and 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 CO_2 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* (DCCAE, 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 CO_2 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.

3.1.2 Local Policy

3.1.2.1 Longford County Development Plan 2015-2021

The *Longford County Development Plan 2015-2021* contains policy information and objectives in relation to forestry.

Policies and objectives related to forestry can be found in Table 3-2.

Table 3-2 Forestry Policies and Objectives of the Longford CDP

ID	Forestry Policies and Objectives
AGR 3: - Agriculture	To investigate the potential for farm diversification within the County, including an examination of forestry potential, the feasibility of small scale craft industries, tourism based activities, educational facilities and alternative uses of cut-over boglands. Larger industries, offices, warehousing and other forms of non-retail service industry will generally be directed toward the larger settlements.
ENV 10: - Conservation & Protection of the Environment	The Council, where appropriate, shall seek to control and manage any potential point and/or diffuse sources of pollution with a view towards improving and maintaining good water quality. Such activities include, but are not restricted to, wastewater and industrial discharges, landfills, quarries, mines, contaminated land, agricultural activities, wastewater from unsewered properties, forestry activities and the use and discharge of dangerous substances.
NHB 12: - Heritage	Generally it is the policy of the Council to protect all substantial areas of deciduous forest within the County, other than areas of commercial forestry. Any person considering altering such a stand of trees for any purpose other than normal maintenance should contact the Planning Section of the Local Authority for advice. Proposals for development in these areas should seek to interact with the landscape character of the forested areas and its limits, recognising the importance of working with the forest to achieve sustainable development proposals, and enhancing and building on aspects of the forested areas that increase biodiversity and the natural habitat.

ID	Forestry Policies and Objectives
NHB 13: - Heritage	The Council will promote a careful, deliberate and methodical approach for sustaining forested areas throughout the County, particularly given that a lot of these areas are living man-made landscapes that have evolved over time and need to continue evolving to sustain their future. The Council, in co-operation with The Forest Service (Coillte) and the Department of Communication, Energy and Natural Resources, shall encourage and promote the preparation and adoption of an Indicative Forestry Strategy for the County, as an important means of contributing to its objective of sustaining, protecting and enhancing the County's biodiversity, natural resources and landscape and developing tourism product.

3.1.2.2 Mayo County Development Plan 2014-2020

The *Mayo County Development Plan 2014-2020* contains policy information and objectives in relation to forestry. The draft Mayo County Development Plan 2021-2027 is currently out for public consultation.

Policies and objectives related to forestry can be found in Table 3-3.

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

FY-01	It is an objective of the Council to promote sustainable forestry development of appropriate scale in accordance with the Indicative Forest Strategy for Mayo or any amendment to it where it can be demonstrated that the development will not have significant adverse effects on the environment, including the integrity of the Natura 2000 network, residential amenity or visual amenity.
FY-02	It is an objective of the Council to work in partnership with Coillte to identify opportunities for tourism and recreation facility development within commercially managed forests, where appropriate.

3.1.2.3 Roscommon County Development Plan

The Roscommon County Development Plan 2014 contains information and objectives relating to forestry, in terms of promoting and controlling afforestation. The Roscommon Landscape Character Assessment is also a source of information and is referred to in further detail in Section 8 of this document.

Chapter 3 of the Roscommon Count Development Plan and contains objectives regarding Natural Resources. The Plan states that over 21,000ha of forestry has been planted in County Roscommon, representing 8.7% of the total area of the County.

Roscommon County Council recognizes the many benefits of forestry within the County in terms of economic, recreational and carbon sequestration potential, and acknowledges the potential for further afforestation in County Roscommon.

The Planning and Development (Amendment) (No. 2) Regulations 2011 transferred management of development for initial afforestation from the relevant Planning Authorities to the Forest Service (part of the Department of Agriculture, Food and the Marine). Roscommon County Council as the relevant local authority is now a consultation body and in this role the Planning Authority submit observations on applications for initial afforestation where appropriate.

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 lands 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 each relevant Planning Authority, i.e. Longford County Council, Mayo County Council and Roscommon County Council. The planning history searches found that planning applications in the vicinity of the proposed replanting lands relate to one-off houses. 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. 1-15 to 1-18) of the Environmental Impact Assessment Report (EIAR) submitted as part of the Slieveacurry Renewable 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:

- Lisduff, Co. Mayo
- Cloonbony, Co. Longford
- Sheehaun, 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

Ecological site visits were undertaken to the subject sites between in March 2020, September 2020 and October 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 was 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

Sections 5.3 and 5.4 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 1: Cloonbony, Co Longford

The proposed replanting land Cloonbony, Co. Longford 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)		
Lisnanarriagh Bog NHA	6.7	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub catchment (Shannon[Upper]_SC_070) to the NHA (Clooneigh_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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Mount Jessop Bog NHA	9.8	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the NHA (Shannon[Upper]_SC_060) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Derrycanan Bog NHA	9.9	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the NHA (Scramogue_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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Forthill Bog NHA	11.7	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the NHA (Bilberry_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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Rinn River NHA	13.3	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the NHA (Shannon[Upper]_SC_050) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Aghnamona Bog NHA	14.6	
Cloonageeher Bog NHA	15.2	
Proposed Natural Heritage Areas (pNHA)		
Lough Bannow	1.6	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located hydrologically upstream of the NHA 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Lough Ree	1.9	There will be no direct effects as the project footprint is located entirely outside the designated site. Although the proposed afforestation site is located within the same catchment (the Shannon) as the pNHA, no hydrological connectivity has been identified due to the absence of watercourses within the site and the nature of the proposed project. In addition, given the separation distance, the nature and smalls scale of the forestry replacement lands, as permitted in the technical approvement document, there is no potential for indirect effects on the SAC. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Royal Canal	5.1	There will be no direct effects as the project footprint is located entirely outside the designated site. Due to the linear and artificial nature of this pNHA, it spans across many catchments and sub-catchments. The pNHA is located hydrologically up gradient of the proposed afforestation site 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Corbo Bog	6.5	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the pNHA (Clooneigh_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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Lough Forbes Complex	6.6	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the pNHA (Shannon[Upper]_SC_050) and the site is located hydrologically downstream. 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 pNHA. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Cordara Turlough	6.9	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the pNHA (Shannon[Upper]_SC_090) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Fortwilliam Turlough	7.2	
Brown Bog	6.6	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the pNHA (Shannon[Upper]_SC_060) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Lough Bawn	10.6	There will be no direct effects as the project footprint is located entirely outside the designated site. Although the proposed afforestation site is located partially within the same sub-catchment (Shannon[Upper]_SC_070) as the pNHA, the pNHA is located hydrologically up gradient of the proposed afforestation site. 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.
Lough Slawn	11.5	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_090) to the pNHA (Shannon[Upper]_SC_060) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Clooneen Bog	12.4	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the pNHA (Shannon[Upper]_SC_050) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Kilglass And Grange Loughs	12.4	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the pNHA (Shannon[Upper]_SC_040) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Derrymore Bog	12.6	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the pNHA (Shannon[Upper]_SC_060) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Derry Lough	12.6	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the pNHA (Bilberry_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

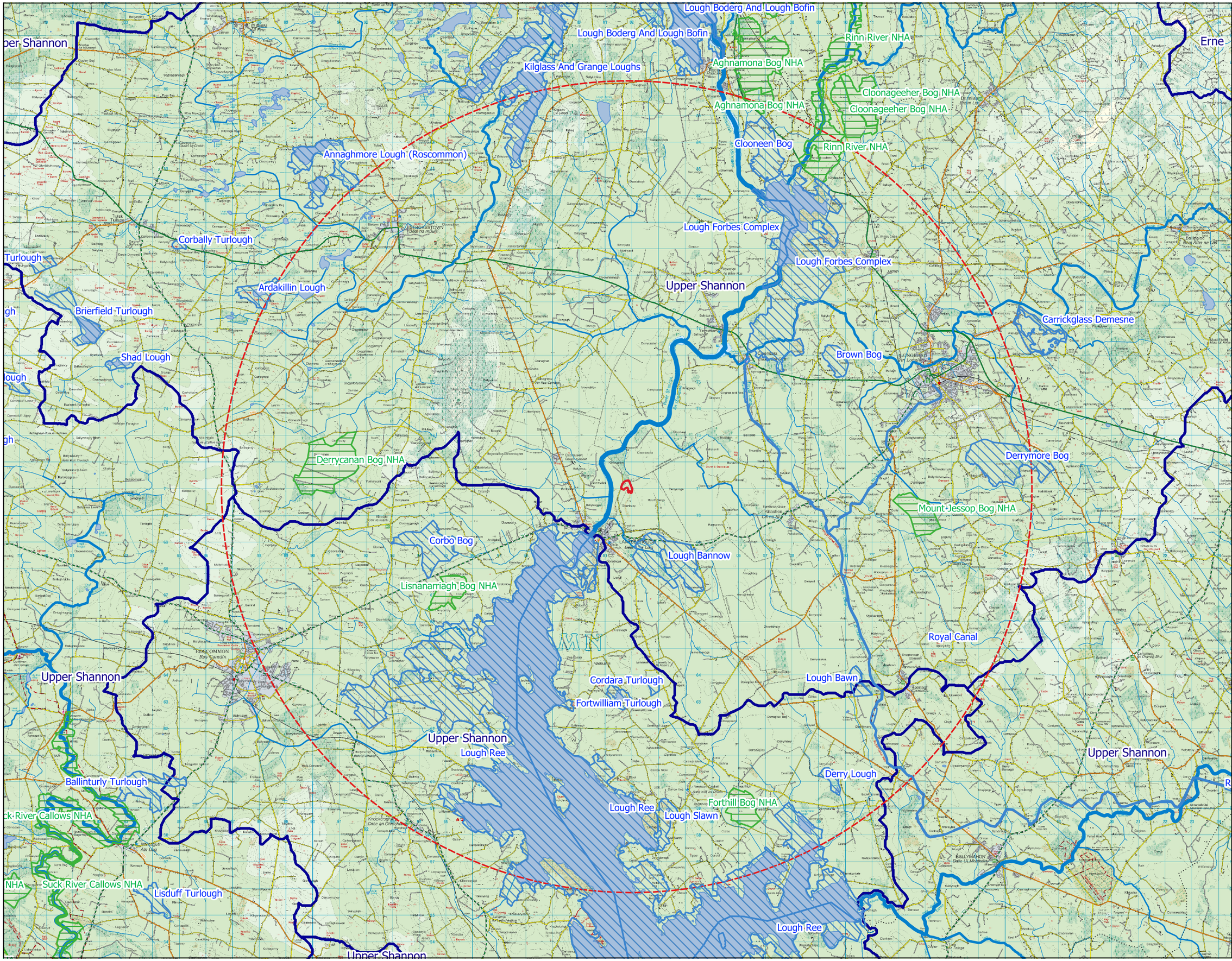
		approval document, there is no potential for indirect effects on the pNHA. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Ardakillin Lough	14.9	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the pNHA (Scramogue_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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Annaghmore Lough (Roscommon)	14.9	

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)		
Lough Ree SAC	1.9	There will be no direct effects as the project footprint is located entirely outside the designated site. Although the proposed afforestation site is located within the same catchment (the Shannon) as the SAC, no hydrological connectivity has been identified due to the absence of watercourses within the site and the nature of the proposed project. In addition, given the separation distance, the nature and smalls scale of the forestry replacement lands, as permitted in the technical approvement document, there is no potential for indirect effects on the SAC. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Corbo Bog SAC	6.5	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub catchment (Shannon[Upper]_SC_070) to the pNHA (Clooneigh_SC_010) and there is hydrological connectivity identified. 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Lough Forbes Complex SAC	6.6	There will be no direct effects as the project footprint is located entirely outside the designated site.

		The proposed afforestation site is located downstream of the SAC 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Fortwilliam Turlough SAC	7.2	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the SAC (Shannon[Upper]_SC_090) and there is no potential hydrological connectivity identified. 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Brown Bog SAC	7.6	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the SAC (Shannon[Upper]_SC_060) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Mount Jessop Bog SAC	10.7	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located hydrologically downstream of the SAC 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Clooneen Bog SAC	12.4	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the SAC (Shannon[Upper]_SC_050) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Annaghmore Bog SAC	14.9	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate sub-catchment (Shannon[Upper]_SC_070) to the SAC (Scramogue_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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact
Special Protection Areas (SPAs)		
Lough Ree SPA	1.3	There will be no direct effects as the project footprint is located entirely outside the designated site. Although the proposed afforestation site is located within the same catchment (the Shannon) as the SPA, no hydrological connectivity has been identified due to the absence of watercourses within the site and the nature of the proposed project. In addition, given the separation distance, the nature and smalls scale of the forestry replacement lands, as permitted in the technical approvement document, there is no potential for indirect effects on the SPA. No suitable supporting habitat for the SCI species occurs within the site. As the SPA is located over 1.3km to the south of the site, potential for disturbance/displacement related effects on SCI species have been excluded. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Ballykenny-Fisherstown Bog SPA	6.6	There will be no direct effects as the project footprint is located entirely outside the designated site. Although the proposed afforestation site is located within the same catchment (the Shannon) as the SPA, no hydrological connectivity has been identified due to the absence of watercourses within the site and the nature of the proposed project. In addition, given the separation distance, the nature and smalls scale of the forestry replacement lands, as permitted in the technical approvement document, there is no potential for indirect effects on the SPA. No suitable supporting habitat for the SCI species occurs within the site. As the SPA is located over 6.6km to the south of the site, potential for disturbance/displacement related effects on SCI species have been excluded. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.



Map Legend

- Cloonbony Site Boundary
- 15km Buffer
- Natural Heritage Area (NHA)
- Provisional Natural Heritage Area (pNHA)
- Water Framework Directive Catchments
- Watercourses

Drawing Title: Nationally Designated Sites

Project Title: Slieveacurry Renewable Energy Development, Co Clare

Drawn By	Checked By
Holly Witter	David McNicholas
Project No. 170224	Drawing No. 5-1
Scale 1:125000	Date 2020.10.19

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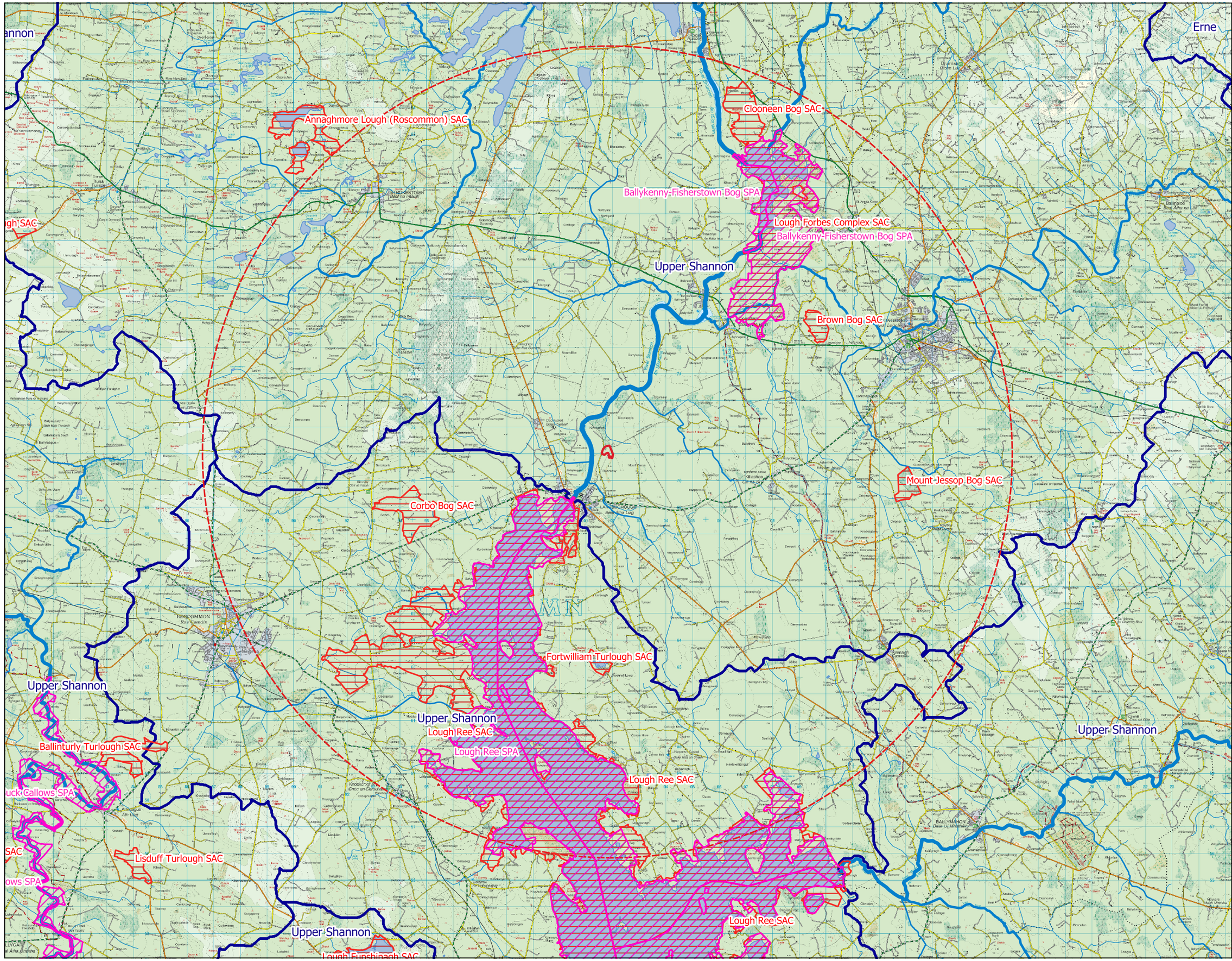

Drawing Title

EU Designated Sites

Project Title

Slieveacurry Renewable Energy Development, Co Clare

Drawn By	Checked By
Holly Witter	David McNicholas
Project No.	Drawing No.
170224	5-2
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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 (N07). The search found no records of rare or protected plant species.

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 H03. The results of the database search (excluding birds) are provided in Table 5-4 and the results for bird species recorded within the relevant hectads (R11, R12) are provided in Table 5-5. Table 5-6 includes records of non-native invasive species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015).

Table 5-4 NBDC records for species of conservation interest within 10km Grid Square N07 [excluding birds]

Species	Designation
European Otter *(Lutra lutra)*	Wildlife Acts, EU Habitats Directive – Annex II, Annex IV
Freshwater White-clawed Crayfish (*Austropotamobius pallipes)*	Wildlife Acts, EU Habitats Directive – Annex II, Annex V
Desmoulin's Whorl Snail (*Vertigo (Vertigo) moulinsiana)*	Wildlife Acts, EU Habitats Directive – Annex II, Threatened
Geyer's Whorl Snail (*Vertigo (Vertigo) geyeri)*	Wildlife Acts, EU Habitats Directive – Annex II, Vulnerable
Marsh Fritillary (*Euphydryas aurinia)*	EU Habitats Directive – Annex II, Vulnerable
Daubenton's Bat (*Myotis daubentonii)*	Wildlife Acts, EU Habitats Directive -Annex IV
Lesser Noctule (*Nyctalus leisleri)*	
Pipistrelle (*Pipistrellus pipistrellus sensu lato)*	
Soprano Pipistrelle (*Pipistrellus pygmaeus)*	
Common Frog (*Rana temporaria)*	Wildlife Acts, EU Habitats Directive – Annex V
Pine Marten (*Martes martes)*	
Eurasian Badger (*Meles meles)*	Wildlife Acts
Eurasian Pygmy Shrew (*Sorex minutus)*	
Eurasian Red Squirrel (*Sciurus vulgaris)*	Wildlife Acts

West European Hedgehog *(Erinaceus europaeus)*	
Pisidium pulchellum	Endangered
Chalk Hook-moss (*Drepanocladus sendtneri)*	Near Threatened
Common Whorl Snail *(Vertigo (Vertigo) pygmaea)*	
Gipsy Cuckoo Bee (*Bombus (Psithyrus) bohemicus*)	
Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius)*	
Megachile (Delomegachile) willughbiella	
Striated Whorl Snail (*Vertigo (Vertigo) substriata)*	
English Chrysalis Snail (*Leiostyla (Leiostyla) anglica*)	
Lake Orb Mussel (*Musculium lacustre)*	
Marsh Whorl Snail (*Vertigo (Vertigo) antivertigo*)	
Moss Bladder Snail (*Aplexa hypnorum)*	
Smooth Grass Snail (*Vallonia pulchella)*	
Tree Snail (*Balea (Balea) perversa)*	
Whirlpool Ramshorn (*Anisus (Disculifer) vortex)*	

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

Table 5-5 NBDC records for bird species of conservation interest within 10km Grid Square N07

Species	Designation
European Golden Plover (*Pluvialis apricaria)*	Wildlife Acts, EU Birds Directive, - Annex I, Annex II, Annex II, Red List
Greater White-fronted Goose (*Anser albifrons)*	Wildlife Acts, EU Birds Directive, Annex I, Annex II, Annex III, Amber List
Common Kingfisher (*Alcedo atthis)*	Wildlife Acts, EU Birds Directive, Annex I, Amber List
Common Tern (*Sterna hirundo)*	
Hen Harrier (*Circus cyaneus)*	Wildlife Acts, EU Birds Directive – Annex I, Amber List
Whooper Swan (*Cygnus cygnus)*	
Corn Crake (*Crex crex)*	Wildlife Acts, EU Birds Directive -Annex I, Red List

Common Pheasant (*Phasianus colchicus)*	Wildlife Acts, EU Birds Directive - Annex II, Annex III
Common Wood Pigeon (*Columba palumbus*)	
Mallard (*Anas platyrhynchos)*	
Red Grouse (*Lagopus lagopus)*	Wildlife Acts, EU Birds Directive Annex II, Annex III, Red List
Common Coot (*Fulica atra)*	Wildlife Acts, EU Birds Directive – Annex II, Annex III, Amber List
Eurasian Teal (*Anas crecca)*	
Eurasian Wigeon *(Anas penelope)*	
Tufted Duck *(Aythya fuligula)*	
Common Snipe *(Gallinago gallinago)*	
Eurasian Woodcock (*Scolopax rusticola)*	
Eurasian Curlew (*Numenius arquata)*	Wildlife Acts, EU Birds Directive – Annex II, Red List
Northern Lapwing (*Vanellus vanellus)*	
Barn Swallow (*Hirundo rustica)*	Wildlife Acts, Amber List
Common Grasshopper Warbler (*Locustella naevia*)	
Common Kestrel (*Falco tinnunculus)*	
Common Linnet (*Carduelis cannabina)*	
Common Sandpiper (*Actitis hypoleucos)*	
Common Starling (*Sturnus vulgaris)*	
Common Swift (*Apus apus)*	
Great Black-backed Gull (*Larus marinus)*	
Great Cormorant (*Phalacrocorax carbo)*	
Great Crested Grebe (*Podiceps cristatus)*	
House Martin (*Delichon urbicum)*	
House Sparrow (*Passer domesticus)*	
Lesser Black-backed Gull (*Larus fuscus)*	

Little Grebe (*Tachybaptus ruficollis)*	Wildlife Acts, Amber List
Mew Gull (*Larus canus)*	
Mute Swan *(Cygnus olor)*	
Sand Martin (*Riparia riparia)*	
Sky Lark *(Alauda arvensis)*	
Spotted Flycatcher (*Muscicapa striata)*	
Stock Pigeon (*Columba oenas*)	
Barn Owl (*Tyto alba)*	Wildlife Acts, Red List
Black-headed *Gull (Larus ridibundus*)	
Common Redshank (*Tringa totanus)*	
Yellowhammer (*Emberiza citrinella)*	

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

Table 5-6 NBDC records for invasive species in hectad N07

Common Name	Scientific Name
Common Garden Snail	*Cornu aspersum*
European Rabbit	*Oryctolagus cuniculus*
Canadian Waterweed	*Elodea canadensis*
Japanese Knotweed	*Fallopia japonica*
Rhododendron ponticum	*Rhododendron ponticum*
Jenkins' Spire Snail	*Potamopyrgus antipodarum*
Sycamore	*Acer pseudoplatanus*
Zebra Mussel	*(Dreissena (Dreissena) polymorpha)*
American Mink	*Mustela vison*
Eastern Grey Squirrel	*Sciurus carolinensis*

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 Chapter 7 of this EIAR and is provided here for context. Further detail on the hydrological conditions on site are fully escribed in Chapter 7. There are no streams or rivers within the site boundary, however the River Shannon is located approximately 230m to the west of the site

and is separated from the site by agricultural fields, a railway track and an unnamed road. Kilnacarrow Stream a tributary of the River Shannon is located approximately 233m to the north 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.

The site is located within the Upper Shannon Catchment IE_26C and forms part of the Shannon[Upper] subcatchment_SC_080. 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 i.e. 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 habitat has been identified as hydrophilous tall herb and is located approximately 770 m from the site. There is no direct hydrological connectivity between the proposed afforestation site and the Article 17 habitat.

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 has no direct or indirectivity with downstream nationally designated sites and no potential for impact was identified. 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, 2009[3]). 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

The majority of the site is dominated by improved agricultural grassland (GA1). The improved agricultural grassland is dominated by Yorkshire fog (*Holcus lanatus*), rye grass (*Lolium perenne*), and cock's foot (*Dactylis glomerata*), with creeping buttercup (*Ranunculus repens*), dock (*Rumex spp.*), plantain (*Plantago lanceolata*), thistle (*Cirsium spp.*), clover (*Trifolium spp.*), dandelion (*Taraxacum officinale*) and nettle (*Urtica dioica*) also present (see Plate 5-1).

Field boundaries are demarcated by ***Hedgerows (WL1)*** and some ***Treelines (WL2),*** see Plates 5-1 and 5-2. The hedgerows on site are dominated by hawthorn (*Crataegus monogyna*) and some blackthorn (*Prunus spinosa*). The understory is dominated by bramble (*Rubus fructicosus* agg.) and nettle (*Urtica dioca*). The treelines on site are dominated by ash (*Fraxinus excelsior*) to the south, beech (*Fagus sylvatica*), ash and hawthorn to the southwest and a short section of downy birch (*Betula pubescence*) to the northwest.

[3] *Marnell, 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.*

Plate 5-1 Example of Improved agricultural grassland (GA1) that occurs within much of the site, with mature treeline (left) and hedgerow (right) forming the field boundaries.

The larger area of land to the east of site consists of a ***Wet grassland (GS4)*** dominated by soft rush (*Juncus effusus*). Other species include meadow buttercup (*Ranunculus acris*), meadowsweet (*Filipendula ulmaria*), Yorkshire fog (*Holcus lanatus*), jointed/sharp flowered rush (*Juncus articulatus/acutiflorus*), white clover (*Trifoloium repens*), bird's foot trefoil (*Lotus corniculatus*) and common sorrel (*Rumex acetosa*) (Plate 5-2).

Plate 5-2 Example of wet grassland occurring within the northeast of the site boundary, with short section of birch treeline along the boundary (background).

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 grassland habitats that are present within the site, given their modified nature and low species diversity, are of *Local Importance (Lower Value)* as they contain 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.

5.3.3 Fauna in the Existing Environment

Birds

Records of birds seen and heard on the forestry replacement site were taken. Common passerines were recorded incidentally within the site. 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 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 south of the site. No species listed under Annex II of the Habitats Directive were recorded during the site visit.

Otter

No watercourses occur within or immediately adjacent to the site. Only heavily vegetated drainage ditches occur within the site which 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.

Bats

There are no structures within the site which may provide suitable roosting habitat for bats. The site is dominated by open improved agricultural grassland and 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 development 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. improved agricultural grassland and 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 and improved agricultural grassland habitats 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 within the site will be retained.

The impacted habitats are 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 development 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 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 and scrub 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 mostly by wet and improved agricultural 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

habitat for some faunal species. Wet and improved agricultural grassland habitats are widespread in the local area and this loss is not considered to be significant.

The proposed afforestation of the 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 improved agricultural grassland and 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.

No suitable otter supporting habitat for otter was identified within the site. No instream works will take place.

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 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

No hydrological connectivity has been identified due to the absence of watercourses within the site and the nature of the proposed project. However, taking a highly precautionary approach, there is potential for localised water pollution of the 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 5-7 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 impacts on water quality are anticipated as a result of any element of the proposed afforestation.

5.3.4.5 Impact on Designated Sites

The site was subject to Article 6(3) Appropriate Assessment Screening as part of the technical approval process as per Table 5-4. There are no European sites within in the Zone of Likely Impact. The impact on nationally designated sites was assessed as per Table 5-2 and there were no Natural Heritage Areas (NHA) or proposed Natural Heritage Areas (pNHAs) identified within the Zone of Likely 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 development 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 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.

5.4 Replacement Area 2: Lisduff, Co Mayo

The proposed forestry replacement land at Lisduff, Co Mayo 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 site location is presented in Figure 2-2.

5.4.1 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 Lisduff site.

5.4.1.1 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 15-kilometre radius of the proposed afforestation site were identified. Sites outside 15km were considered but no potential for impact was identified. The European designated sites are listed in Table 5.8. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively, and are collectively known as 'European Sites'.

Natural Heritage Areas (NHAs) are designated under the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this Chapter. Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in this

Chapter. Nationally designated sites are listed in Table 5.9. All designated sites are displayed in Figure 5.3 and Figure 5-4 of this report.

Table 5-8 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		
River Moy SAC	4.1	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate catchment, (the Corrib), to the SAC (Moy & Killala Bay) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Lough Corrib SAC	4.2	There will be no direct effects as the project footprint is located entirely outside the designated site. Although the proposed afforestation site is located within the same catchment (Corrib) as the SAC, no hydrological connectivity has been identified due to the absence of watercourses within the site. In addition, given the separation distance, the nature and smalls scale of the forestry replacement lands, as permitted in the technical approvement document, there is no potential for indirect effects on the SAC. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Errit Lough SAC	8.9	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate catchment (the Corrib) to the SACs 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Carrowbehy/Caher Bog SAC	9.4	
Coolcam Turlough SAC	10.0	
Urlaur Lakes SAC	10.9	
Williamstown Turlough SAC	11.1	
Drumalough Bog SAC	11.7	
Derrinea Bog SAC	11.8	
Croaghil Turlough SAC	12.0	
Cloonchambers Bog SAC	12.6	

Special Protection Area (SPA)		
N/A		No SPAs are present within 15km of the proposed afforestation site, and therefore determined to be outside the Likely Zone of Impact given the nature, scale and separation in distance.

Table 5-9 Identification of Nationally Designated sites within the Likely Zone of Impact

Designated Sites	Distance (km) from site	Features of Interest	Likely Zone of Impact Determination
Natural Heritage Area (NHA)			
Lough Namucka Bog NHA	12.1	Peatlands	There will be no direct effects as the project footprint is located entirely outside the designated site. As the NHA is designated for terrestrial habitats, i.e. peatlands, and give the separation in distance between the planting site and the NHA, no potential for impact exists. No hydrological connectivity has been identified between the site and any Nationally designated site. In addition, given 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Slieve Bog NHA	14.7	Peatlands	
Proposed Natural Heritage Area (pNHA)			
Mannin And Island Lakes	4.1	N/A	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate catchment (Corrib) to the pNHA (Moy & Killala Bay) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Attishane Turlough	5.5	N/A	There will be no direct effects as the project footprint is located entirely outside the designated site. Although the proposed afforestation site is located within the same sub-catchment (Clare[Galway]_SC_01) as the pNHA, the pNHA is located hydrologically up gradient of the

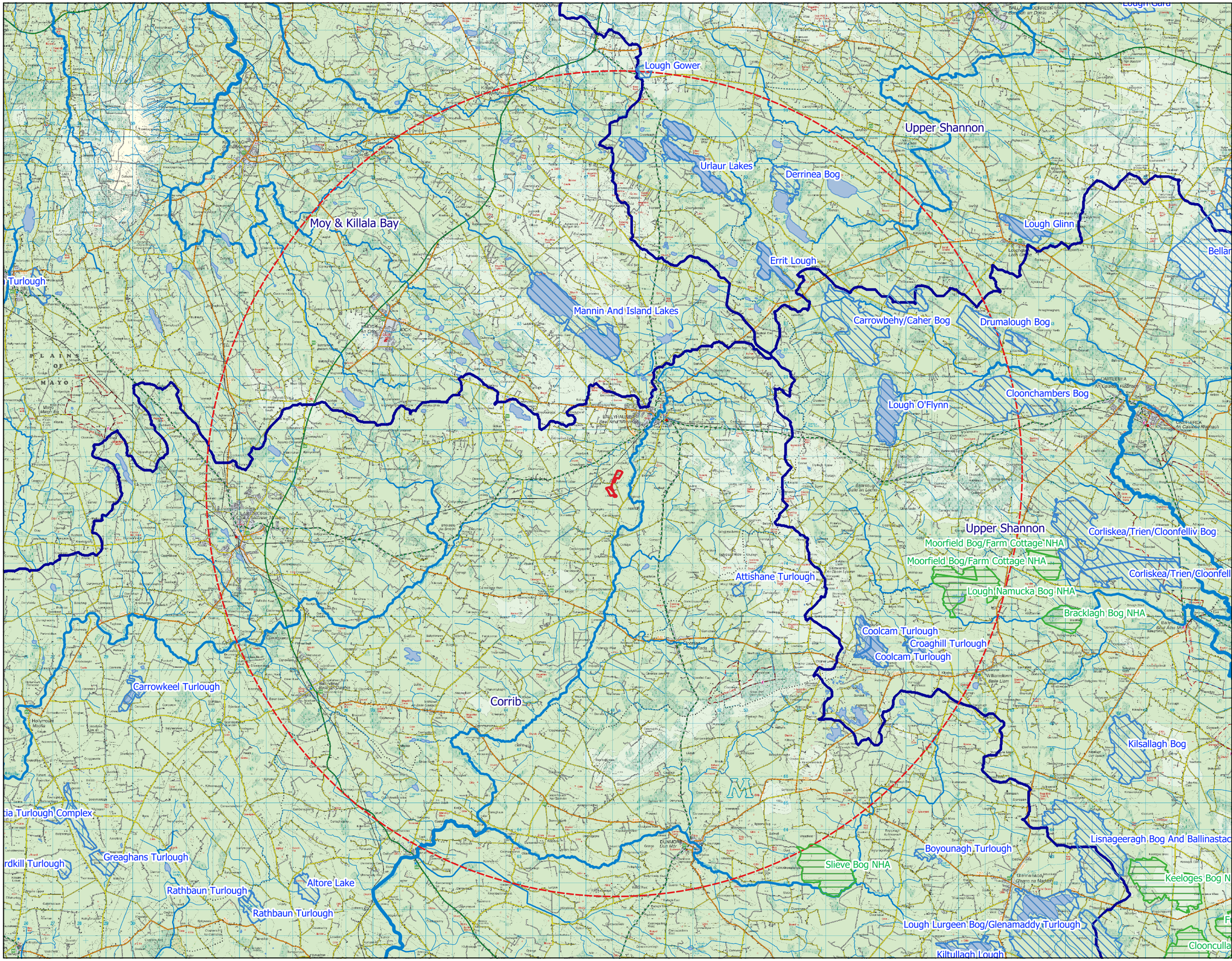
Designated Sites	Distance (km) from site	Features of Interest	Likely Zone of Impact Determination
			afforestation site and there is, therefore, no potential for impact. In addition, given the separation distance, the nature and smalls scale of the forestry replacement lands, as permitted in the technical approvement document, there is no potential for indirect effects on the pNHA. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Errit Lough	8.9	N/A	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site is located within a separate catchment (Corrib) to the pNHA (Upper Shannon) 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. No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Carrowbehy/Caher Bog	9.5	N/A	
Lough O'Flynn	9.5	N/A	
Coolcam Turlough	10.0	N/A	
Urlaur Lakes	10.9	N/A	
Drumalough Bog	11.7	N/A	
Derrinea Bog	11.8	N/A	
Croaghill Turlough	12.0	N/A	
Cloonchambers Bog	12.6	N/A	
Lough Gower	14.7	N/A	

5.4.1.2 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 I of the EU Habitats Directive had been recorded in the relevant 10km squares in which the study site is situated (M47), during the 1987-1999 atlas survey. The red listed species identified in Table 5-10 have been previously recorded within hectad M47. No species were recorded within the 10km hectad designated under the Flora Protection Order.

Table 5-10 Species listed in the Irish Red Data Book within Hectad M47

Common Name	Latin name	Status
Autumn Gentian	*Gentianella amarella*	Near Threatened (NT)
Least Bur-reed	*Sparganium natans*	Near Threatened (NT)



Drawing Title
Nationally Designated Sites

Project Title
Slieveacurry Renewable Energy Development, Co Clare

Drawn By	Checked By
Holly Witter	David McNicholas
Project No.	Drawing No.
170224	5-3
Scale	Date
1:125000	2020.10.19

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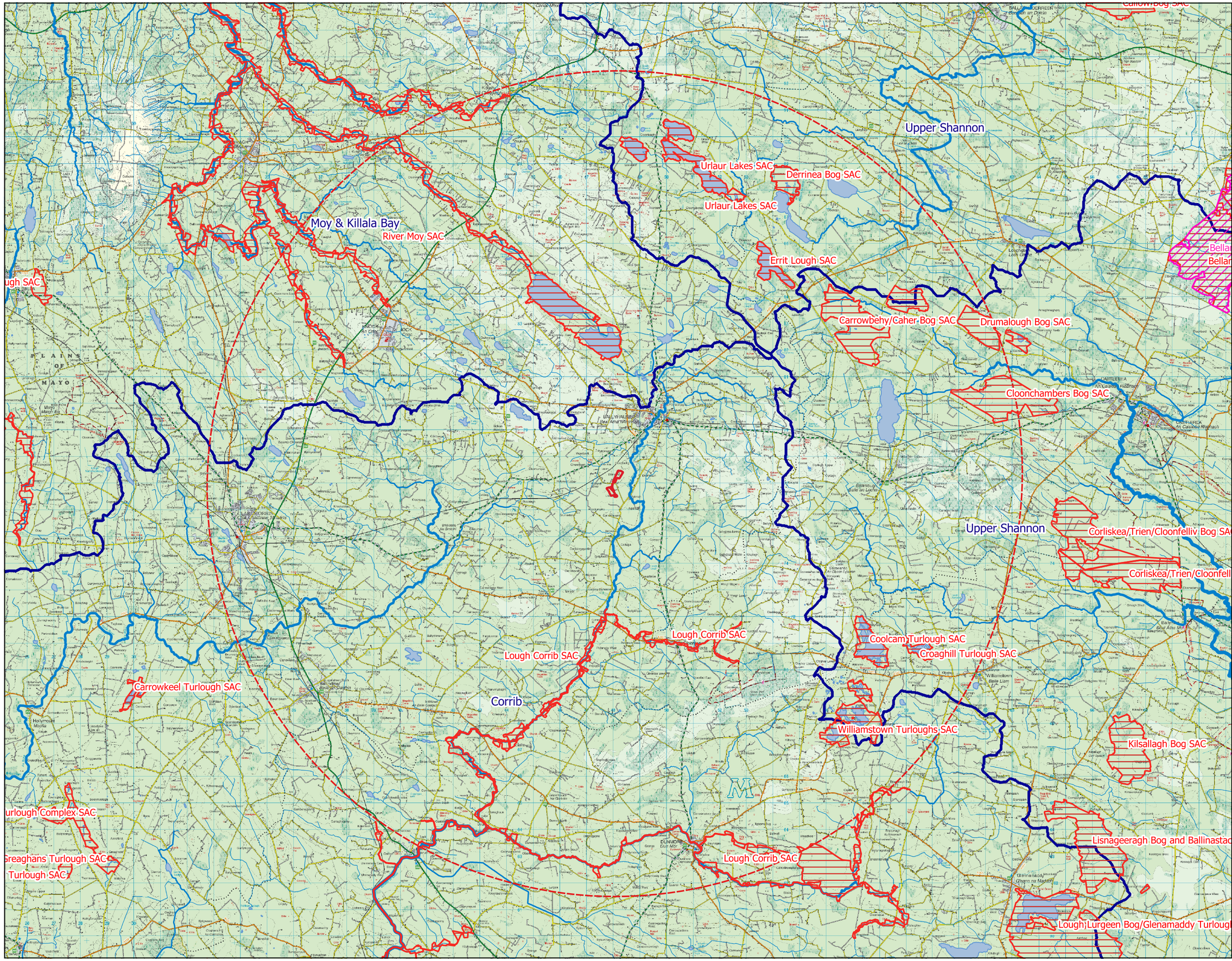
Map Legend
Lisduff Site Boundary
15km Buffer
Special Area of Conservation (SAC)
Special Protection Area (SPA)
Water Framework Directive Catchments
Watercourses
Upper Shannon
Urlaur Lakes SAC
Derrinea Bog SAC
Urlaur Lakes SAC
Moy & Killala Bay
River Moy SAC
Errit Lough SAC
Carrowbehy/Caher Bog SAC
Drumalough Bog SAC
Cloonchambers Bog SAC
Upper Shannon
Corliskea/Trien/Cloonfelliv Bog SA
Corliskea/Trien/Cloonfell
Lough Corrib SAC
Coolcam Turlough SAC
Croaghill Turlough SAC
Lough Corrib SAC
Carrowkeel Turlough SAC
Corrib
Williamstown Turloughs SAC
Kilsallagh Bog SAC
Lisnageeragh Bog and Ballinastac
Lough Corrib SAC
Lough Lurgeen Bog/Glenamaddy Turlough
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Drawing Title
EU Designated Sites
Project Title
Slieveacurry Renewable Energy Development, Co Clare
Drawn By
Holly Witter
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Project No.
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5.4.1.3 National Biodiversity Data Centre Notable Records

A search of the National Biodiversity Data Centre (NBDC) website was conducted with a focus on records of protected fauna recorded from hectad M47. The results of the database search (excluding birds) are provided below in Table 5-11 and the results for bird species recorded within the hectad are provided in Table 5-12.

Table 5-13 includes records of non-native invasive species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015).

Table 5-11 Notable species that occur within 10km Grid Square M47 [excluding birds]

Species name	Designation
Common Whorl Snail (*Vertigo (Vertigo) pygmaea)*	Near Threatened
Prickly Snail *(Acanthinula aculeata)*	
Hydroporus scalesianus	
English Chrysalis Snail (*Leiostyla (Leiostyla) anglica)*	Vulnerable
Point Snail *(Acicula fusca)*	
Tree Snail *(Balea (Balea) perversa)*	
Moss Bladder Snail *(Aplexa hypnorum)*	
Heath Snail *(Helicella itala)*	
Irish Damselfly *(Coenagrion lunulatum)*	
Eurasian Badger (*Meles meles)*	Wildlife Acts
Smooth Newt (*Lissotriton vulgaris)*	
Eurasian Pygmy Shrew *(Sorex minutus)*	
Eurasian Red Squirrel *(Sciurus vulgaris)*	
European Otter *(Lutra lutra)*	Wildlife Acts, EU Habitats Directive – Annex II, Annex II
Freshwater White-clawed Crayfish *(Austropotamobius pallipes)*	Wildlife Acts, EU Habitats Directive – Annex II, Annex V
Large White-moss *(Leucobryum glaucum)*	EU Habitats Directive - Annex IV, Least Concern
Marsh Fritillary *(Euphydryas aurinia)*	EU Habitats Directive – Annex II, Vulnerable
Pipistrelle *(Pipistrellus pipistrellus sensu lato)*	Wildlife Acts, EU Habitats Directive – Annex IV
Soprano Pipistrelle *(Pipistrellus pygmaeus)*	
Wall (*Lasiommata megera)*	Endangered

Table 5-12 Notable bird species that occur within 10km Grid Square GM47

Species name	Designation
Barn Owl (*Tyto alba)*	Wildlife Acts, Red List

Species name	Designation
Black-headed Gull (*Larus ridibundus*)	
Common Redshank (*Tringa totanus)*	
Herring Gull (*Larus argentatus)*	
Twite (*Carduelis flavirostris)*	
Yellowhammer (*Emberiza citrinella)*	
Barn Swallow (*Hirundo rustica)*	Wildlife Acts, Amber List
Common Grasshopper Warbler *(Locustella naevia)*	
Common Kestrel (*Falco tinnunculus)*	
Common Linnet (*Carduelis cannabina)*	
Common Sandpiper (*Actitis hypoleucos)*	
Common Starling (*Sturnus vulgaris)*	
Common Swift (*Apus apus)*	
Great Cormorant (*Phalacrocorax carbo)*	
Great Crested Grebe (*Podiceps cristatus*)	
House Martin (*Delichon urbicum)*	
House Sparrow (*Passer domesticus)*	
Lesser Black-backed Gull (*Larus fuscus)*	
Little Grebe (*Tachybaptus ruficollis)*	
Mew Gull *(Larus canus)*	
Mute Swan (*Cygnus olor)*	
Northern Wheatear (*Oenanthe oenanthe)*	
Sand Martin (*Riparia riparia)*	
Sky Lark *(Alauda arvensis)*	
Spotted Flycatcher (*Muscicapa striata)*	
Stock Pigeon (*Columba oenas)*	
European Golden Plover (*Pluvialis apricaria*)	Wildlife Acts, EU Birds Directive – Annex I, Annex II, Annex III, Red List
Common Kingfisher (*Alcedo atthis)*	Wildlife Acts, EU Birds Directive – Annex I, Amber List
Hen Harrier (*Circus cyaneus)*	
Merlin (*Falco columbarius)*	
Whooper Swan (*Cygnus cygnus)*	
Corn Crake (*Crex crex)*	Wildlife Acts, EU Birds Directive – Annex I, Red List

Species name	Designation
Rock Pigeon (*Columba livia)*	Wildlife Acts, EU Birds Directive – Annex II
Common Pheasant (*Phasianus colchicus)*	Wildlife Acts, EU Birds Directive – Annex II, Annex III
Common Wood Pigeon (*Columba palumbus)*	
Mallard (*Anas platyrhynchos)*	
Red Grouse (*Lagopus lagopus)*	Wildlife Act, EU Birds Directive – Annex II, Annex III, Red List
Common Coot (*Fulica atra)*	Wildlife Acts, EU Birds Directive – Annex II, Annex II, Amber List
Common Pochard (*Aythya ferina)*	
Eurasian Teal (*Anas crecca)*	
Eurasian Wigeon (*Anas penelope*)	
Tufted Duck (*Aythya fuligula)*	
Common Snipe (*Gallinago gallinago)*	
Eurasian Woodcock (*Scolopax rusticola)*	
Eurasian Curlew (*Numenius arquata)*	Wildlife Acts, EU Birds Directive – Annex II, Red List
Northern Lapwing (*Vanellus vanellus)*	

Wildlife Acts (1976-2019), BoCCI Red List = Birds of Conservation Concern Red List;

Table 5-13 NBDC records for invasive species in hectad M47

Common Name	Scientific Name
Canadian Waterweed	*(Elodea canadensis)*
	Fallopia japonica x sachalinensis = F. x bohemica
Field Penny-cress	*(Thlaspi arvense)*
Sycamore	*(Acer pseudoplatanus)*
Common Garden Snail	*(Cornu aspersum)*
Jenkins' Spire Snail	*(Potamopyrgus antipodarum)*
American Mink	*(Mustela vison)*
European Rabbit	*(Oryctolagus cuniculus)*

5.4.1.4 Local Hydrology

The following information on the local and regional hydrological regime of the site is based on that described in Chapter 7 of this EIAR and is provided here for context. Further detail on the hydrological conditions on site are fully escribed in Chapter 7. 'There are no watercourses within or adjacent to the site. Nearest waterbody is the Dalgan River which is located approximately 450m to the north and west 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. Under the Water Framework Directive (WFD), the site is located within Corrib Catchment (Catchment ID 30) and Clare[Galway]_SC_010 sub-catchment (Sub catchment ID 30_10). The Corrib Catchment comprises 19 sub catchments with 97 river water bodies, 31 lakes, 1 transitional water body and 21 groundwater bodies'.

5.4.1.5 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.

5.4.1.6 Review of Article 17 Data

No EU Habitats Directive Article 17 habitat polygons were recorded within or immediately adjacent to the proposed replanting sites. The nearest Article 17 habitat is an Active Raised Bog located 1.9km away. There is no direct hydrological connectivity between the proposed afforestation site and the Article 17 habitat.

5.4.1.7 Conclusions of the Desktop Study

The afforestation site is not located within any site designated for nature conservation. The proposed afforestation site has no direct or indirectivity with downstream nationally designated sites and no potential for impact was identified. 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, 2009[4]). 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.

5.4.2 Description of Habitats within the Study Area

The site is split into three distinct parcels of land, one large area to the north of the road, and two smaller parcels to the south of the road. The lands to the north of the road consists of three fields classified as ***Improved agricultural grassland (GA1)*** and some areas of ***Wet grassland (GS4).*** The improved agricultural grassland is dominated by Yorkshire fog (*Holcus lanatus*), rye grass (*Lolium perenne*), and cock's foot (*Dactylis glomerata*), with creeping buttercup (*Ranunculus repens*), dock (*Rumex spp.*), plantain (*Plantago lanceolata*), thistle (*Cirsium spp.*), clover (*Trifolium spp.*), dandelion (*Taraxacum officinale*) and nettle (*Urtica dioica*) also present, se Plate 5-4. Soft rush (*Juncus effusus)* was also present on wetter areas of the fields (Plates 5-5). A ***treeline (WL2)*** consisting of ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), hawthorn (*Crataegus monogyna*) and ivy (*Hedera helix)* exists to the south and southwest of the southernmost field, as well as a ditch (Plate 5-4).

[4] *Marnell, 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.*

Plate 5-4 Example of Improved agricultural grassland (GA1) within the north of the site along with some treeline habitat (WL2).

The rest of the land is bordered by fence and hedgerow (***WL1***), consisting predominantly of hawthorn (*Crataegus monogyna*), bramble (*Rubus fruticosis*), nettle (*Urtica dioica*), and gorse (*Ulex europaeus*), (see Plate 5-5). Four mature conifers exist at the south of the hedgerow dividing the two northern fields.

Plate 5-5 Example of hedgerow (WL1) habitat occurring within the north of the site.

The lands within the south of the site are grazed by horses and also comprise of a mix of improved agricultural grassland (GA1) and wet grassland (GS4). The improved agricultural grassland is dominated by Yorkshire fog (*Holcus lanatus*), rye grass (*Lolium perenne*) with dock (*Rumex spp.*), clover (*Trifolium spp.*), creeping buttercup (*Ranunculus repens*), plantain (*Plantago lanceolata*), silverweed (*Potentilla anserina*) and nettles (*Urtica dioica*) also recorded, see Plate 5-6. The Wet

grassland is dominated by soft rush (*Juncus effusus*), see Plate 5-7. The hedgerows bordering these fields consist of hawthorn (*Crataegus monogyna*), willow (*Salix spp.*), bramble (*Rubus fruticosis*), gorse (*Ulex europaeus*) and some conifers.

Plate 5.6 Improved agricultural grassland (GA1) occurring within the north of the site

Plate 5.7 Soft rush dominated Wet grassland (GA4) occurring within the south of the site.

5.4.2.1 Invasive Species

No invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded within the site boundary during the site visit.

5.4.2.2 Significance of Habitats

Ecological evaluation within this section follows a methodology that is set out in Chapter 3 of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009).

No habitats which correspond to those that are listed in Annex I of the EU Habitats Directive were identified during the site visit. The grassland habitats that are present within the site, given their modified nature and low species diversity, are of *Local Importance (Lower Value)* as they contain areas which are of some local importance for wildlife. Hedgerow and treelines habitat was 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.

5.4.3 Fauna in the Existing Environment

Birds

Records of birds seen and heard on the forestry replacement site were taken. Common passerines were recorded incidentally within the site. 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 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 boundaries.

No species listed under Annex II of the Habitats Directive were recorded during the site visit.

Otter

No watercourses occur within or immediately adjacent to the site. Only heavily vegetated drainage ditches occur within the site which 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 development site.

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 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.

5.4.3.1 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.

5.4.4 Ecological Impact Assessment

5.4.4.1 Do Nothing' Impact

Were the site to remain unplanted the management on site would likely remain as it is presently i.e. wet agricultural grassland. 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.

5.4.4.2 Impacts During the Site Preparation and Planting Phase

5.4.4.2.1 *Loss of Floral Habitat*

Long-Term Neutral Impact

The development will result in the loss of both improved agricultural grassland and wet grassland habitats assigned local importance (lower value). These habitat types are common in a local, national and international context and their loss will constitute a neutral impact.

The loss of these habitats is not considered significant.

All hedgerows of *Local Importance (Higher Value)* within the site will be retained.

Mitigation

Despite the fact that the loss of habitats on the forestry replacement 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 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 suitable broadleaf and conifer species. This management would allow for the retention of some of the Local Value (Higher Importance) habitats.

Residual Impact

The replacement of grassland habitat with coniferous and broadleaf forestry is considered to be a Long-Term Neutral Impact. No significant effects are anticipated at any geographic scale.

5.4.4.2.2 *Loss of Faunal Habitat*

Long Term Neutral Impact

The proposed planting site is not of high value or importance as a faunal habitat, being dominated mostly by both improved agricultural grassland and wet grassland, providing limited cover or shelter for faunal species in treeline and hedgerow habitats. It is likely that the proposed planting of forestry will result in some loss of foraging for small mammals, along with local bird species. Grassland habitat is widespread in the local area and this loss is considered to be negligible.

The proposed afforestation site does not provide significant foraging or roosting habitat for protected bird species given the modified nature of habitats on site dominated by agricultural and 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.

Hedgerows and treelines 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.

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 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 at any geographic scale.

5.4.4.2.3 *Water Pollution*

Short-Term Slight Negative Impact

Following a precautionary approach, in the absence of best practice and design, there is potential for water pollution to occur through discharge from the drainage ditches on site to watercourses located downstream within the catchment. Therefore, from a highly precautionary perspective, potential localised water pollution effects in the form of release of suspended solids and associated siltation as a result of the proposed afforestation have been identified.

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 forestry replacement lands. 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;
- Apply a 5-metre-wide (minimum) uncultivated and unplanted water setback along relevant watercourses (as defined in Circular 12/2017) located within or adjoining the site. This setback is to remain undisturbed during establishment and throughout the forest rotation. Apply and maintain as per details set out in Tables 5 and 6 of the Environmental Requirements for Afforestation (DAFM, 2016).
- Adhere to all water protection measures relating to cultivation, herbicide application, the location of onsite storage depots and the disposal of waste, set out in the Environmental Requirements for Afforestation (DAFM, 2016).
- There will be no woody weed removal within 20 m of a drainage ditch.

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 Forest Service (2000) guidance document "Forestry and Water Quality Guidelines" are shown in 5-14.

Table 5-14 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	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

Residual Impact.

No significant impacts on water quality as a result of the proposed afforestation are anticipated at any geographic scale.

5.4.4.3 Impacts During Operational Phase (i.e. Harvesting/ Afforestation)

There will be no significant indirect or direct impacts on the biodiversity or designated sites once the site has been afforested.

From a precautionary perspective and following industry best practice, the below subsections provide standard best practice mitigation measures for the operational phase (i.e. Harvesting/ Afforestation) for the lifetime of the project to ensure no potential impact on water quality.

5.4.4.3.1 *Water quality mitigation*

Fertiliser

- Do not apply fertiliser within the water setback of an aquatic zone, or within 20 metres of the aquatic zone, whichever is greatest. Manual application only is permitted from this point back to 50 metres from the aquatic zone. Do not apply fertiliser within the water setback of all other water features. Do not apply fertiliser if heavy rainfall is predicted, or during heavy rainfall and / or high winds.

Herbicide

- Do not apply herbicides within the water setback of an aquatic zone, or within 20 metres of the aquatic zone, whichever is greatest.

Future Felling Operations

The project will adhere to all water protection measures, set out in the Felling & Reforestation Standards (v. Oct. 2019), which include:

Water exclusion zones

- Before operations commence, identify a 10m wide exclusion zone along the edge of all aquatic zones, hotspots and water abstraction points, and mark this clearly on a site map.
- Ensure all operators are aware on this exclusion zone and its purpose, through the pre-commencement awareness process and throughout operations.
- Machine traffic and timber stacking are not permitted within these zones.
- Trees within the reach of the harvester arm should be felled by harvester, and is needed and bunched outside the exclusion zone.
- Trees outside machine reach to be felled manually by chainsaw operators. Felled trees to be winched out of the exclusion zone where appropriate and safe to do so, or removed by extended harvester arm, for subsequent snedding and processing outside the exclusion zone.
- In all cases, fell trees away from the water feature.
- Retain existing native broadleaves present within these water exclusion zone, where safe to do so. However, if these are in danger of windthrow post-clearfell, consider pollarding them at an approximate height of 4 metres.
- Regarding aquatic zones, ensure banks remain undisturbed. No branches or debris are to enter the aquatic zone during operations. Immediately and with care, remove any branches that do fall in.
- Prevent the accumulation of brash, logs and debris in drains and aquatic zones

Silt & sediment control

- Prior to the commencement of operations, install silt traps within existing forest drains that connect with aquatic zones, either directly or indirect through other relevant watercourses.
- Apply silt fences where necessary, to block pathway for silt in areas where overland flow is possible.
- Silt traps and silt fences to be checked regularly and maintained.
- Cease all felling and extraction and other machine operations onsite during and after periods of rainfall which result in the possibility of the surface mobilisation of silt.

Reforestation

The project will adhere to Adhere to all water protection measures, set out in the Felling & Reforestation Standards (v. Oct. 2019), which include:

- Minimum required setbacks at reforestation will adhere to the specifications set out in Section 14 (Table 14.1), Felling & Reforestation Standards (v. Oct. 2019).
- Undertake measures that result in the creation of an uninterrupted setback along adjoining aquatic zones. Insert slow-water dams into existing forest drains before they cross into the newly-created water setback. Slow-water dams can comprise logs dropped length-ways onto the channel at various points outside of the setback. If appropriate divert drains into soakage areas outside the water setback. These measures will allow normal drainage to take place through soakage from outside the water setback, and all exceptional drainage (arising from heavy rainfall) to be directed to overland flow across the full width of the buffer.
- Drainage and cultivation operations associated with reforestation must be planned and implemented to minimise flow rates after rainfall. The standards set out in Section 3.7.1 of the Environmental Requirements for Afforestation and in the Forestry Standards Manual apply.

Residual Impact

No residual impacts are anticipated associated with the proposed afforestation site during the planted phase.

5.4.4.4 Impact on Designated Sites

The site was subject to Article 6(3) Appropriate Assessment Screening as part of the technical approval process as per Table 5-8. There are no European sites within in the Zone of Likely Impact. The impact on nationally designated sites was assessed as per Table 5-9 above and there were no Natural Heritage Areas (NHA) or proposed Natural Heritage Areas (pNHAs) identified within the Zone of Likely Impact.

5.4.4.5 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.

5.4.5 Conclusion

Following consideration of the residual effects (post mitigation) it is concluded that the proposed development 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 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.

5.5 Replanting Site 3: Sheehaun, Co. Roscommon

The proposed replanting land at Sheehaun, 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. The site location is presented in Figure 2-3.

5.5.1 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 Sheehaun site.

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

Using the Geographic Information System (GIS) software MapInfo (Version 10.0), designated sites within a 15-kilometre radius of the proposed afforestation site were identified. The European designated sites are listed below in Table 5-15 and all Nationally designated sites are listed in Table 5-16. In addition, the potential for connectivity with European Sites at distances of greater than 15km from the proposed alteration was also considered in this initial assessment. In this case, connectivity with European sites outside the 15km zone was identified and the relevant sites are included in Table 5-16 below. Nationally and EU designated sites are displayed in Figure 5-5 and 5-6.

Table 5-15 Identification of nationally Designated sites within the Likely Zone of Impact

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
Natural Heritage Area (NHA)		
Lisnanarriagh Bog NHA [002072]	3.7	There will be no direct effects as the project footprint is located entirely outside the designated site. Lisnanarriagh Bog NHA is located approximately 3.7km south of the proposed afforestation site and is buffered by agricultural, peatland and scrub habitats. No hydrological connectivity exists between the proposed development and the designated site. this NHA is designated for terrestrial habitats. No pathway for indirect effect between the proposal and the designated site exists. **No pathway for effect was identified and the site is not within the Likely Zone of Impact.**

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
Derrycanan Bog NHA [000605]	4.5	There will be no direct effects as the project footprint is located entirely outside the designated site. Derrycanan Bog NHA is located approximately 4.5km west of the proposed afforestation site and is buffered by agricultural, forestry and scrub habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development. This designated site is designated for terrestrial habitats. No pathway for indirect effect between the proposal and the designated site exists. **No pathway for effect was identified and the site is not within the Likely Zone of Impact.**
Forthill Bog NHA [001448]	14.9	There will be no direct effects as the project footprint is located entirely outside the designated site. Forthill Bog NHA is located approximately 14.9km south-east of the proposed afforestation site and are buffered by agricultural, forestry, bog and scrub habitats and Lough Ree. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development. This designated site is designated for terrestrial habitats. No pathway for indirect effect between the proposal and the designated site exists. **No pathway for effect was identified and the site is not within the Likely Zone of Impact.**
Proposed Natural Heritage Area (pNHA)		
Corbo Bog [000602	2.4	There will be no direct effects as the project footprint is located entirely outside the designated site. Corbo Bog pNHA is located approximately 2.4km south-west of the proposed afforestation site and is buffered by agricultural habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development and the nationally designated site. Therefore, no pathway for indirect effect between the proposal and the designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Lough Ree [000440]	2.7	There will be no direct effects as the project footprint is located entirely outside the designated site.

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
		The proposed afforestation site has surface water connectivity in excess of 7.4km downstream with Lough Ree pNHA. However, given distance downstream and nature and small scale of the works (replanting only) as permitted in the technical approval document there is no potential for indirect effects on the nationally designated site. Therefore, no pathway for indirect effect between the proposal and the designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Lough Bannow [000449]	6.0	There will be no direct effects as the project footprint is located entirely outside the designated site. Lough Bannow is located approximately 6km south-east of the proposed afforestation site and are buffered by agricultural, forestry, bog and scrub habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development and the nationally designated site. Therefore, no pathway for indirect effect between the proposal and the designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Fortwilliam Turlough [000448]	9.0	There will be no direct effects as the project footprint is located entirely outside the designated site. Fortwilliam Turlough pNHA is located approximately 9km south-east of the proposed afforestation site and are buffered by agricultural, forestry, bog, scrub habitats and Lough Ree. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed afforestation development and the nationally designated site. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Cordara Turlough [001821]	9.7	There will be no direct effects as the project footprint is located entirely outside the designated site. Cordara Turlough pNHA is located approximately 9.7km south-east of the proposed afforestation site and are buffered by Lough Ree, agricultural, forestry, bog and scrub habitats. Although the sites are located within the same hydrological catchment,

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
		no hydrological connectivity exists between the proposed afforestation site and the designated site. Therefore, no pathway for indirect effect between the proposal and the designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Royal Canal [002103]	9.8	There will be no direct effects as the project footprint is located entirely outside the designated site. There is no hydrological connectivity between the proposed afforestation site and this nationally designated site, located predominantly in a separate hydrological sub-catchment. Therefore, no pathway for indirect effect between the proposal and the designated site exists. **No pathway for effect was identified and the site is not within the Likely Zone of Impact.**
Ardakillin Lough [001617]	10.1	There will be no direct effects as the project footprint is located entirely outside the designated site. Ardakillin Lough pNHA is located approximately 10.1km north-west of the proposed afforestation site and are buffered by agricultural, forestry, bog and scrub habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed afforestation site and the designated site. Therefore, no pathway for indirect effect between the proposal and the designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Lough Forbes Complex [001818]	10.6	There will be no direct effects as the project footprint is located entirely outside the designated site. Lough Forbes Complex is located approximately 10.6km north-east of the proposed afforestation site and are buffered by various habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development and the nationally designated site. Therefore, no pathway for indirect effect between the proposal and the designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
Kilglass And Grange Loughs [000608]	11.4	There will be no direct effects as the project footprint is located entirely outside the designated site. Kilglass And Grange Loughs pNHA is located approximately 11.4km north of the proposed afforestation site and are buffered by various habitats including peatlands, forestry and agricultural habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development and the nationally designated site. Therefore, no pathway for indirect effect between the proposal and the designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Annaghmore Lough (Roscommon) [001626]	11.6	There will be no direct effects as the project footprint is located entirely outside the designated site. Annaghmore Lough (Roscommon) pNHA is located approximately 11.6km north-west of the proposed afforestation site and are buffered by various habitats including peatlands, forestry and agricultural habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development and the nationally designated site. Therefore, no pathway for indirect effect between the proposal and the nationally designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Brown Bog [000442]	13.1	There will be no direct effects as the project footprint is located entirely outside the designated site. There is no hydrological connectivity between the proposed afforestation site and this nationally designated site, located in a separate hydrological sub-catchment. Therefore, no pathway for indirect effect between the proposal and the designated site exists. **No pathway for effect was identified and the site is not within the Likely Zone of Impact.**
Shad Lough [001648]	13.6	There will be no direct effects as the project footprint is located entirely outside the designated site. Shad Lough pNHA is located approximately 13.6km north-west of the proposed afforestation site and is

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
		buffered by various habitats including peatlands, forestry and agricultural habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development and the nationally designated site. Therefore, no pathway for indirect effect between the proposal and the nationally designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Lough Slawn [001443]	13.7	There will be no direct effects as the project footprint is located entirely outside the designated site. Lough Slawn pNHA is located off the south-eastern border of Lough Ree in the same hydrological catchment as the proposed afforestation site. However, given distance downstream, nature and small scale of the works (replanting only) as permitted in the technical approval document there is no potential for indirect effects on the nationally designated site. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Corbally Turlough [001627]	13.9	There will be no direct effects as the project footprint is located entirely outside the designated site. Corbally Turlough pNHA is located approximately 13.9km north-west of the proposed afforestation site and is buffered by various habitats including peatlands, forestry and agricultural habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development and the nationally designated site. Therefore, no pathway for indirect effect between the afforestation site and the nationally designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Clooneen Bog [000445]	14.9	There will be no direct effects as the project footprint is located entirely outside the designated site. Clooneen Bog pNHA is located approximately 14.9km north-east of the proposed afforestation site and is buffered by various habitats including peatlands, forestry and agricultural habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
		exists between the proposed development and the nationally designated site. Therefore, no pathway for indirect effect between the afforestation site and the nationally designated site exists. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**

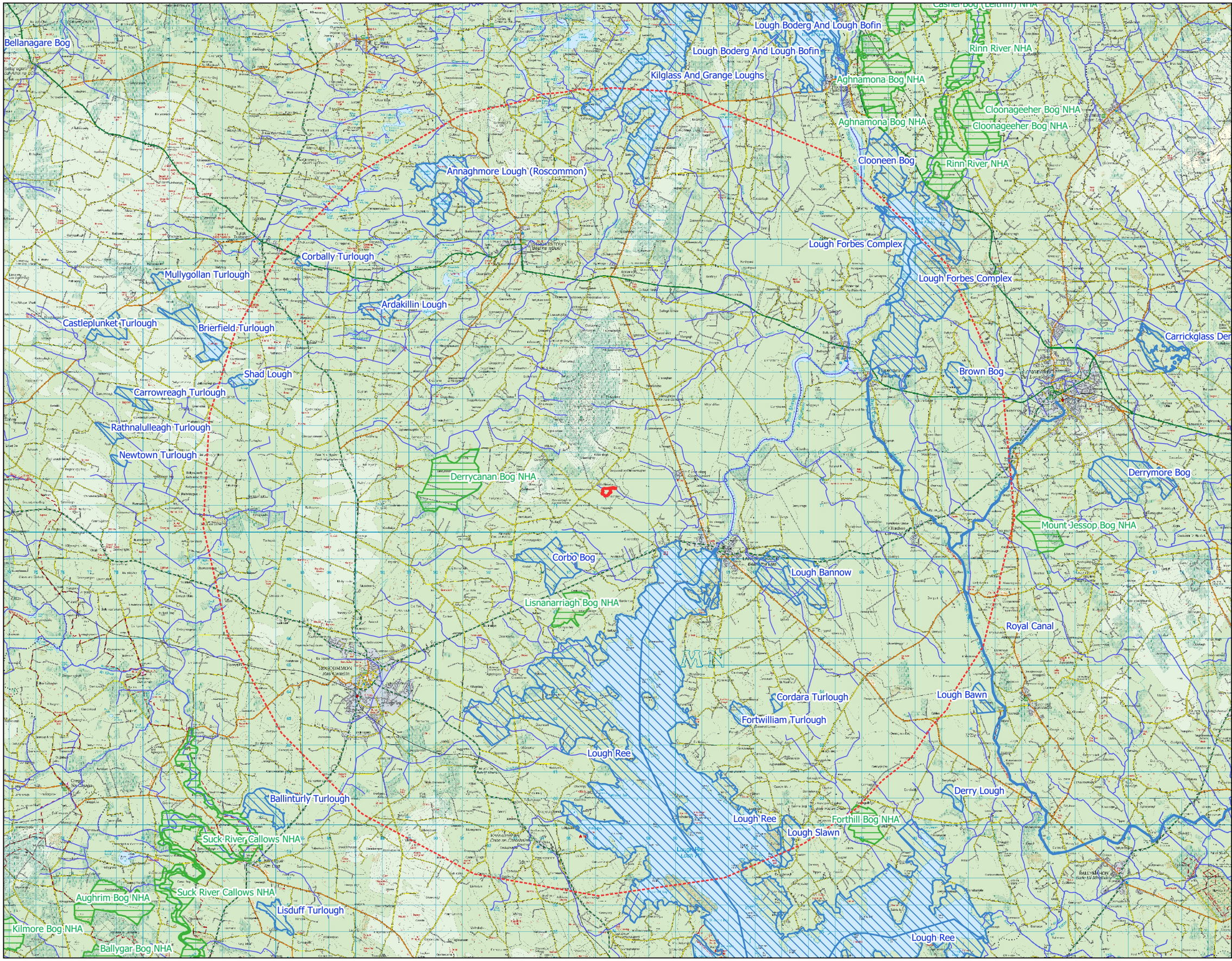
Table 5-16 Identification of Designated sites within the Likely Zone of Impact

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
Special Areas of Conservation (SAC)		
Corbo Bog SAC [002349]	2.4	There will be no direct effects as the project footprint is located entirely outside the designated site. Corbo Bog SAC is located approximately 2.4km south-west of the proposed afforestation site and is buffered by agricultural habitats. No hydrological connectivity exists between the proposed development site and this designated site. Impacts on the listed QI habitats can be ruled out due to terrestrial nature of the habitats, the distance from the proposed works area and the absence of a complete source-pathway-receptor chain for impact. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Lough Ree SAC [000440]	2.7 (7.4km hydrological distance)	There will be no direct effects as the project footprint is located entirely outside of the designated site. The proposed afforestation site has surface water connectivity in excess of 7.4km downstream with Lough Ree SAC via Gortgallan Stream which discharges into the River Shannon approximately 5.8km downstream of the proposed replanting site and then into this European site. However, given distance downstream and nature and small scale of the works (replanting only) as permitted in the technical approval document there is no potential for indirect effects on this SAC. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Fortwilliam Turlough SAC [000448]	9.0	There will be no direct effects as the project footprint is located entirely outside the designated site. Fortwilliam Turlough SAC is located approximately 9km south-east of the proposed afforestation site and is buffered by agricultural, forestry, bog, scrub habitats and Lough Ree. No

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
		hydrological connectivity exists between the proposed development and the designated site. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Lough Forbes Complex SAC [001818]	10.6	There will be no direct effects as the project footprint is located entirely outside the designated site. Lough Forbes Complex SAC is located approximately 10.6km north-east of the proposed afforestation site and are buffered by a variety of habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development and the European designated site. Impacts on all of the listed QI habitats can be ruled out due to terrestrial nature of the habitats, the distance from the proposed works area and the absence of a complete source-pathway-receptor chain for impact. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Annaghmore Lough (Roscommon) SAC [001626]	11.6	There will be no direct effects as the project footprint is located entirely outside the designated site. Annaghmore Lough (Roscommon) SAC is located approximately 11.6km north-west of the proposed afforestation site and is buffered by various habitats including peatlands, forestry and agricultural habitats. Although the sites are located within the same hydrological catchment, no hydrological connectivity exists between the proposed development and the nationally designated site. Impacts on the listed QI habitats/species can be ruled out due to terrestrial nature of the habitats/species, the distance from the proposed works area and the absence of a complete source-pathway-receptor chain for impact. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Brown Bog SAC [002346]	13.1	There will be no direct effects as the project footprint is located entirely outside the designated site. This SAC is located in a separate hydrological sub-catchment to the proposed afforestation works and there is no connectivity between the afforestation site and the SAC. Impacts on all of the listed QI habitats can be ruled out due to terrestrial nature of the habitats, the distance from the proposed works area and the absence of a complete source-pathway-receptor chain for impact.

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
		No pathway for effect was identified and the site is not within the Likely Zone of Impact.
Clooneen Bog SAC [002348]	14.9	There will be no direct effects as the project footprint is located entirely outside the designated site. Clooneen Bog SAC is located approximately 14.9km north-east of the proposed afforestation site and is buffered by various habitats including peatlands, forestry and agricultural habitats. No hydrological connectivity exists between the proposed development and the nationally designated site. Impacts on all of the listed QI habitats can be ruled out due to terrestrial nature of the habitats, the distance from the proposed works area and the absence of a complete source-pathway-receptor chain for impact. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
River Shannon Callows SAC [000216]	31.2	There will be no direct effects as the project footprint is located entirely outside of the designated site. The proposed afforestation site has surface water connectivity in excess of 41.5km downstream with River Shannon Callows SAC via Gortgallan Stream which discharges into the River Shannon approximately 5.8km downstream of the proposed replanting site, through Lough Ree and then into this European site. However, given distance downstream and nature and small scale of the works (replanting only) as permitted in the technical approval document there is no potential for indirect effects on this SAC. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**
Special Protection Areas (SPAs)		
Lough Ree SPA [004064]	4.2 (7.4km hydrological distance)	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site has surface water connectivity in excess of 7.4km downstream with Lough Ree SPA via Gortgallan Stream. No supporting habitat for SCI species was identified within the proposed afforestation site. Given the distance downstream, nature and small scale of the works (replanting only) as permitted in the technical approval document and the lack of supporting habitat there is no potential for indirect effects on the SPA.

Designated Site	Separation Distance (km)	Likely Zone of Impact Determination
		No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.
Ballykenny-Fisherstown Bog SPA [001401]	10.6	There will be no direct effects as the project footprint is located entirely outside the designated site. Ballykenny-Fisherstown Bog SPA is located approximately 10.6km north-west of the proposed afforestation site and is buffered by agricultural, forestry and peatland habitats. The proposed afforestation site lies outside the core foraging range of SCI species Greenland White-fronted Goose (5-8km as per SNH Version 3, 2016) for which the European site is designated. **No pathway for indirect effect was identified and the site is not within the Likely Zone of Impact.**
Middle Shannon Callows SPA [004096]	31.2	There will be no direct effects as the project footprint is located entirely outside the designated site. The proposed afforestation site has surface water connectivity in excess of 41.5km downstream with Middle Shannon Callows SPA via Gortgallan Stream. No supporting habitat for SCI species was identified within the proposed afforestation site. Given the long distance downstream, nature and small scale of the works (replanting only) as permitted in the technical approval document and the lack of supporting habitat there is no potential for indirect effects on the SPA. **No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.**



Drawing Title
Nationally Designated Sites

Project Title
Slieveacurry Renewable Energy Development, Co. Clare

Drawn By	Checked By
EC	MW
Project No.	Drawing No.
170224c	Figure 5-5
Scale	Date
1:125000	2021-10-26

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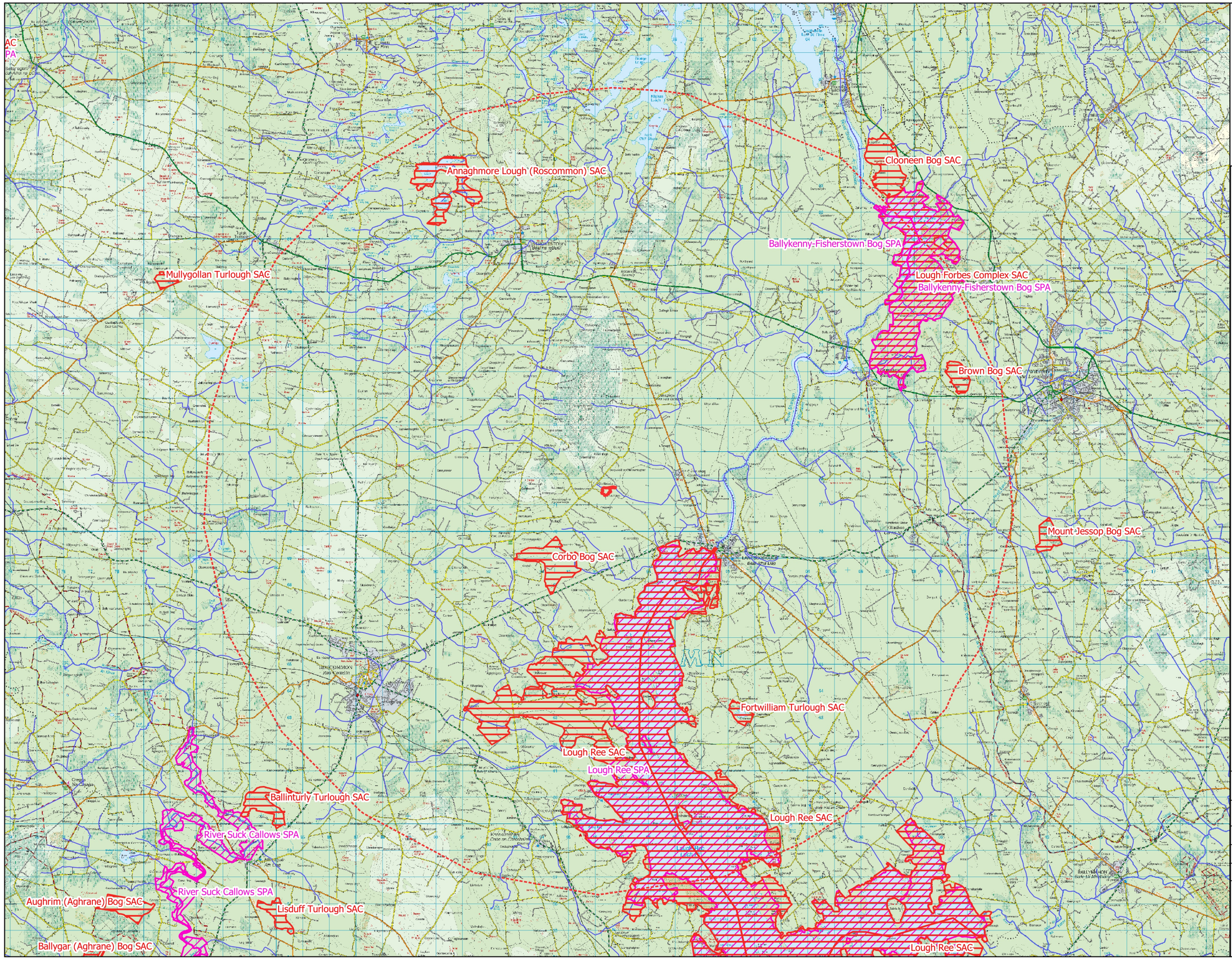

Map Legend

- Sheehaun Site Boundary
- 15km Buffer

Designated Sites

- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Watercourses

Drawing Title: EU Designated Sites

Project Title: Slieveacurry Renewable Energy Development, Co. Clare

Drawn By	Checked By
EC	MW
Project No.	**Drawing No.**
170224c	Figure 5-6
Scale	**Date**
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5.5.2.1 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, *Ireland Red List no 10 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 (M97), during the 1987-1999 atlas survey. No species protected under the Flora (Protection) Order, 1999 (as amended 2015) have been previously recorded within the hectad.

Rough chervil (*Chaerophyllum temulum)* and Irish whitebeam *(Sorbus hibernica)* listed on the Irish Red List (Vulnerable) have been previously recorded within the hectad. Fragrant Agrimony *(Agrimonia procera),* corn marigold *(Chrysanthemum segetum),* vervain *(Verbena officinalis)* and frog orchid *(Coeloglossum viride)* listed on the Irish Red List (Near threatened) have also been previously recorded within the hectad.

5.5.2.2 Biodiversity Ireland Database

A search of the National Biodiversity Data Centre (NBDC) website was conducted with a focus on records of protected fauna recorded from hectad M97. The results of the database search (excluding birds) are provided below in Table 5-4 and the results for bird species recorded within the hectad are provided in Table 5-5. Table 5-6 includes records of non-native invasive species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015).

Table 5-17 Notable species that occur within 10km Grid Square M97 [excluding birds]

Common Name	Scientific Name	Designation
Common frog	*Rana temporaria*	HD Annex V, WA
Daubenton's bat	*Myotis daubentonii*	HD Annex IV, WA
Eurasian badger	*Meles meles*	WA
Eurasian pygmy shrew	*Sorex minutus*	WA
Eurasian red squirrel	*Sciurus vulgaris*	WA
European otter	*Lutra lutra*	HD Annex II & IV, WA
Lesser noctule	*Nyctalus leisleri*	HD Annex IV, WA
Pine marten	*Martes martes*	HD Annex V, WA
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	HD Annex IV, WA
Soprano pipistrelle	*Pipistrellus pygmaeus*	HD Annex IV, WA

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

Table 5-18 Notable bird species that occur within 10km Grid Square M97

Common Name	Scientific Name	Designation
Black-headed gull	*Larus ridibundus*	BoCCI Red List [Breeding], WA
Common kingfisher	*Alcedo atthis*	BD Annex I, WA
Common pochard	*Aythya ferina*	BoCCI Red List [Wintering], WA
Common redshank	*Tringa totanus*	BoCCI Red List [Breeding & Wintering], WA
Corn crake	*Crex crex*	BD Annex I, BoCCI Red List [Breeding], WA
Dunlin	*Calidris alpine*	BD Annex I, WA
Eurasian curlew	*Numenius arquata*	BoCCI Red List[Breeding & Wintering], WA
Eurasian wigeon	*Anas penelope*	BoCCI Red List [Wintering], WA
Eurasian woodcock	*Scolopax rusticola*	BoCCI Red List [Breeding], WA
European Golden Plover	*Pluvialis apricaria*	B BD Annex I, CCI Red List [Breeding & Wintering], WA
Grey partridge	*Perdix perdix*	BoCCI Red List [Breeding], WA
Grey wagtail	*Motacilla cinerea*	BoCCI Red List WA
Hen harrier	*Circus cyaneus*	BD Annex I, WA
Herring gull	*Larus argentatus*	BoCCI Red List [Breeding], WA
Meadow pipit	*Anthus pratensis*	BoCCI Red List[Breeding], WA
Northern lapwing	*Vanellus vanellus*	BoCCI Red List [Breeding & Wintering],, WA
Northern pintail	*Anas acuta*	BoCCI Red List [Wintering], WA
Northern Shoveler	*Anas clypeata*	BoCCI Red List [Wintering], WA
Peregrine falcon	*Falco peregrinus*	BD Annex I, WA

Whooper swan	*Cygnus Cygnus*	Annex I, WA
Yellowhammer	*Emberiza citrinella*	BoCCI Red List [Breeding], WA

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

Table 5-19 NBDC records for invasive species in hectad M97

Common Name	Scientific Name
American mink	*Mustela vison*
Canadian waterweed	*Elodea canadensis*
Fallow deer	*Dama dama*

5.5.2.3 Water Quality

The proposed afforestation site is located within the Upper Shannon Catchment [26C]. The Gortgallan Stream runs along the northern border the site flowing in an easterly direction, discharging into the River Shannon approximately 5.8km downstream of the proposed replanting site.

There is no EPA water quality monitoring station downstream from the Gortgallan Stream to provide a River Water Quality assessment score (Q-value). The closest Q value monitoring station is located within the River Shannon, one 0.5km upstream of Lanesborogh Bridge and at Lanesborogh bridge. The most recent QValue Score for each of these sites was 3 – Poor Status. The Water Framework Directive (WFD) river waterbody risk score for the Gortgallan Stream was 'unassigned' any status. The WFD Ground Waterbody status 2013 – 2018 in the Curraghroe area in which the site lies is classified as 'Good'.

5.5.2.4 Freshwater Pearl Mussel Sensitive Areas

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

5.5.2.5 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 habitat has been identified as old oak woodland and is located approximately 3.5 km from the site. There is no direct hydrological connectivity between the proposed afforestation site and the Article 17 habitat.

5.5.2.6 Conclusions of the Desktop Study

The afforestation site is not located within any site designated for nature conservation. The proposed afforestation site has surface water connectivity (in excess of 7.4km downstream) with Lough Ree SAC and Lough Ree SPA. River Shannon Callows SAC [000216] and Middle Shannon Callows SPA [004096] are located over 41.5km hydrological distance downstream of the proposed replanting site. However, given distance downstream, nature and small scale of the works (replanting only) as permitted in the technical approval document there is no potential for indirect effects on the designated sites. The mammal species recorded within the relevant hectad have widespread range and distributions and are likely to be recorded frequently throughout Ireland. A number of rare and protected flora and fauna have been recorded from the hectad in which the proposed development is located.

5.5.3 Description of Habitats within the Study Area

The site is largely dominated by an ***improved agricultural grassland (GA1),*** grazed by sheep on the day of the site visit, and ***wet grassland (GS4)*** mosaic habitats. Field boundaries are demarcated by ***hedgerows (WL1)***, ***treelines (WL2)*** and ***drainage ditches (FW4)***. Some of the field boundaries are marked with fencing categorised as ***buildings and artificial surfaces (BL3).*** Heavily poached areas throughout the site were categorised as ***spoil and bare ground (ED2)*** (Plate 5-1).

The grassland habitat is extensively dominated by rye-grass species (*Lolium spp.*) and rushes (*Juncus* spp.). Other grassland species recorded include cock's-foot (*Dactylus glomerata*), creeping buttercup (*Ranunculus repens*), white clover *(Trifolium repens),* spear thistle *(Circium vulgare),* primrose *(Primula vulgaris),* hard fern *(Blechnum spicant),* lesser celandine *(Ficaria verna),* mouse-ear *(Cerastium fontanum)* and sorrel (*Rumex acaetosa*).

The ***hedgerows (WL1)*** and ***treelines (WL2)*** are dominated by hawthorn (*Crataegus monogyna*), ash *(Fraxinus excelsior),* gorse *(Ulex europaeus),* cleavers (*Galium aparine),* holly *(Ilex aquifolium),* bramble (*Rubus fructicosus* agg.) and some willow *(Salix* spp.). Areas of gorse *(Ulex europaeus)* and bramble (*Rubus fructicosus agg.*) ***scrub (WS1)*** are present throughout the site.

A number of the ***drainage ditches (FW4)*** within the field boundaries recorded throughout the site contained standing water and had become filled with vegetation (Plate 5-2).

The Gortgallan Stream flows in an easterly direction along the northern boundary of the site and is classified as a ***depositing/lowland river (FW2)***. A ***drainage ditch (FW4)*** was also recorded along the north-eastern boundary of the site and meets the Gortgallan Stream at the most northerly point of the proposed afforestation site (Plate 5-3).

Plate 5-1 The site was dominated by an improved agricultural grassland (GA1)/wet grassland (GS4) mosaic with field boundaries demarcated by hedgerows(WL1)/treelines (WL2). Heavily poached areas were categorised as spoil and bare ground (ED2).

Plate 5-2 A number of the field boundaries were demarcated by drainage ditches (FW4). Some recorded throughout the site contained standing water and had become filled with vegetation.

Plate 5-3 Gortgallan Stream flowing along the northern boundary of the site and is classified as an depositing/lowland river (FW2). A drainage ditch (FW4) was also recorded along the north-eastern boundary of the site along the and meets the Gortgallan Stream.

5.5.3.1 Invasive Species

No invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded within the site boundary during the site visit.

5.5.3.2 Significance of Habitats

Ecological evaluation within this section follows a methodology that is set out in Chapter 3 of the *'Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (NRA, 2009).

No habitats which correspond to those listed in the EU Habitats Directive were identified during the site visit. The buildings and artificial surfaces (BL3), grassland habitats, spoil and bare ground, drainage ditches and scrub habitats that are present within the site, given their highly modified nature, are of *Local Importance (Lower Value)* as they contain areas which are of some local importance for wildlife.

Hedgerows/treelines and the depositing/lowland river habitat were assigned a significance of *Local Importance (Higher Value)* as these habitats have a higher level of biodiversity within the context of the local environment, and in the case of the hedgerows, treelines and watercourses provide cover and commuting corridor links between habitats of higher ecological value.

5.5.4 Fauna in the Existing Environment

Birds

Records of birds seen and heard on the site of the proposed development were taken. Chiffchaff *(Phylloscopus collybita),* blackbird *(Turdus merula),* robin *(Erithacus rubecula)* and rook (*Corvus frugilegus*) were recorded incidentally within the site. 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 is 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 boundaries.

No species listed under Annex II of the Habitats Directive were recorded during the site visit.

Otter

A comprehensive search for otter was undertaken along a 10m riparian buffer of the Gortgallan Stream (NRA, 2008 and Reid, et al 2013). No otter resting or breeding sites and no evidence of otter was recorded within the development site, however, the watercourse along the site boundary is likely to be utilised by commuting and foraging otter.

Bats

There are no structures within the site which may provide suitable roosting habitat for bats. A large open landscape structure dominates the site and though linear features may be used by foraging and commuting bats, overall, the site is considered to have *low suitability* for bat species.

5.5.4.1 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 site of the proposed development provides some limited foraging, commuting and nesting habitats for these and other common bird species in general. Similar habitat is widespread in the locality.

5.5.5 Ecological Impact Assessment

5.5.5.1 'Do Nothing' Impact

Were the site to remain unplanted the management on site would likely remain as it is presently i.e. grazed by livestock and drained. 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.

5.5.5.2 Impacts During the Site Preparation and Planting Phase

5.5.5.2.1 *Loss of Floral Habitat*

Long-Term Neutral Impact

The development will result in the loss of some improved agricultural and poor wet grassland habitat and small areas of scrub habitat assigned local importance (lower value). These habitats are common in a local, national and international context and their loss will constitute a neutral impact.

The loss of these habitats is not considered significant.

All hedgerows and treelines of *Local Importance (Higher Value)* within the site will be retained.

Mitigation

Despite the fact that the loss of habitats on the site of the proposed development 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 treelines 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 suitable broadleaf and conifer species. This management would allow for the retention of some of the Local Value (Higher Importance) habitats.

Residual Impact

The replacement of agricultural grassland, wet grassland and scrub habitat with coniferous and broadleaf forestry is considered to be a Long-Term Neutral Impact. No significant effects are anticipated.

5.5.5.2.2 *Loss of Faunal Habitat*

Long Term Neutral Impact

The proposed planting site is not of high value or importance as a faunal habitat, being dominated mostly by wet agricultural grassland with small areas of scrub throughout and limited cover or shelter for faunal species in scrub and hedgerow habitats. It is likely that the proposed planting of forestry will result in some loss of foraging for small mammals, along with local bird species. Grassland, hedgerow, treeline and scrub habitat is widespread in the local area and this loss is considered to be negligible.

The proposed development 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 improved agricultural grassland and 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.

Hedgerows and treelines 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.

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 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.

5.5.5.2.3 *Water Pollution*

Short-Term Slight Negative Impact

Following a precautionary approach, in the absence of best practice and design, there is potential for water pollution to occur through discharge to the adjacent stream to the north and drainage ditches and therefore potential localised water pollution effects in the form of release of suspended solids, siltation and erosion as a result of the proposed afforestation.

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;*
- 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; and

- *Forestry Standards Manual* (DAFM, 2015).

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;
- A 10-metre-wide (minimum) uncultivated and unplanted water setback will be applied along aquatic zones and a 5 metre set back at relevant watercourses (as defined in Circular 12/2017) located within or adjoining the site. This setback is to remain undisturbed during establishment and throughout the forest rotation. Apply and maintain as per details set out in Tables 5 and 6 of the Environmental Requirements for Afforestation (DAFM, 2016).
- the project will adhere to all water protection measures relating to cultivation, herbicide application, the location of onsite storage depots and the disposal of waste, set out in the Environmental Requirements for Afforestation (DAFM, 2016).
- There will be no woody weed removal within 50 m of an aquatic zone or 20 m of a relevant watercourse.

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 Forest Service (2000) guidance document "*Forestry and Water Quality Guidelines*" are shown in Table 5-7.

Table 5-20 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	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

Residual Impact.

- No significant impacts on water quality as a result of the proposed afforestation are anticipated.

5.5.5.3 Impacts During Operational Phase (i.e. Harvesting/ Afforestation)

There will be no significant indirect or direct impacts on the biodiversity or designated sites once the site has been afforested.

From a precautionary perspective and following industry best practice, the below subsections provide standard best practice mitigation measures for the operational phase (i.e. Harvesting/ Afforestation) for the lifetime of the project to ensure no potential impact on water quality.

5.5.5.3.1 *Water quality mitigation*

Fertiliser

- Do not apply fertiliser within the water setback of an aquatic zone, or within 20 metres of the aquatic zone, whichever is greatest. Manual application only is permitted from this point back to 50 metres from the aquatic zone. Do not apply fertiliser within the water setback of all other water features. Do not apply fertiliser if heavy rainfall is predicted, or during heavy rainfall and / or high winds.

Herbicide

- Do not apply herbicides within the water setback of an aquatic zone, or within 20 metres of the aquatic zone, whichever is greatest.

Future Felling Operations

The project will adhere to all water protection measures, set out in the Felling & Reforestation Standards (v. Oct. 2019), which include:

Water exclusion zones

- Before operations commence, identify a 10m wide exclusion zone along the edge of all aquatic zones, hotspots and water abstraction points, and mark this clearly on a site map.
- Ensure all operators are aware on this exclusion zone and its purpose, through the pre-commencement awareness process and throughout operations.
- Machine traffic and timber stacking are not permitted within these zones.
- Trees within the reach of the harvester arm should be felled by harvester, and is needed and bunched outside the exclusion zone.
- Trees outside machine reach to be felled manually by chainsaw operators. Felled trees to be winched out of the exclusion zone where appropriate and safe to do so, or removed by extended harvester arm, for subsequent snedding and processing outside the exclusion zone.
- In all cases, fell trees away from the water feature.
- Retain existing native broadleaves present within these water exclusion zone, where safe to do so. However, if these are in danger of windthrow post-clearfell, consider pollarding them at an approximate height of 4 metres.
- Regarding aquatic zones, ensure banks remain undisturbed. No branches or debris are to enter the aquatic zone during operations. Immediately and with care, remove any branches that do fall in.
- Prevent the accumulation of brash, logs and debris in drains and aquatic zones

Silt & sediment control

- Prior to the commencement of operations, install silt traps within existing forest drains that connect with aquatic zones, either directly or indirect through other relevant watercourses.
- Apply silt fences where necessary, to block pathway for silt in areas where overland flow is possible.
- Silt traps and silt fences to be checked regularly and maintained.
- Cease all felling and extraction and other machine operations onsite during and after periods of rainfall which result in the possibility of the surface mobilisation of silt.

Reforestation

The project will adhere to Adhere to all water protection measures, set out in the Felling & Reforestation Standards (v. Oct. 2019), which include:

- Minimum required setbacks at reforestation will adhere to the specifications set out in Section 14 (Table 14.1), Felling & Reforestation Standards (v. Oct. 2019).
- Undertake measures that result in the creation of an uninterrupted setback along adjoining aquatic zones. Insert slow-water dams into existing forest drains before they cross into the newly-created water setback. Slow-water dams can comprise logs dropped length-ways onto the channel at various points outside of the setback. If appropriate divert drains into soakage areas outside the water setback. These measures will allow normal drainage to take place through soakage from outside the water setback, and all exceptional drainage (arising from heavy rainfall) to be directed to overland flow across the full width of the buffer.
- Drainage and cultivation operations associated with reforestation must be planned and implemented to minimise flow rates after rainfall. The standards set out in Section 3.7.1 of the Environmental Requirements for Afforestation and in the Forestry Standards Manual apply.

Residual Impact

No residual impacts are anticipated associated with the proposed afforestation site during the planted phase.

5.5.5.4 Impact on Designated Sites

The site was subject to Article 6(3) Appropriate Assessment Screening as part of the technical approval process as per Table 5-16 above. There are no European sites within in the Zone of Likely Impact. The impact on nationally designated sites was assessed as per Table 5-15 above and there were no Natural Heritage Areas (NHA) or proposed Natural Heritage Areas (pNHAs) identified within the Zone of Likely Impact.

5.5.5.5 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.

5.5.6 Conclusion

Following consideration of the residual effects (post mitigation) it is concluded that the proposed development 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 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. -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 Replanting Area 1: Cloonbony, Co. Longford

6.2.1.1 Geology and Subsoils

Information on the main geological formations and subsoils underlying Replanting Area 1, Cloonbony, Co. Longford.

Table 6-4 Information on geology and subsoil under site in Cloonbony, Co. Longford.

Site	Geological Formation	Subsoil Type
Cloonbony	Undifferentiated limestone	› Limestone Till › Cutover peat

The site at Cloonbony is underlain by limestone till and peat subsoil over undifferentiated limestone. The surrounding area is largely underlain by limestone till and cutover peat.

6.2.1.2 Geological Resource Importance

The GSI online Aggregate Potential Mapping Database shows that the proposed development site is located within an area mapped as being typically Moderate to high in terms of crushed rock aggregate potential and with a small section of the site having a moderate potential for granular aggregate potential (i.e. potential for gravel reserves).

The bedrock at the site could be classified as "Medium" importance and has the potential to be used on a "sub-economic" local scale for construction purposes. The bedrock has not been used in the past at the site for this purpose, and the proposed development 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.

6.2.1.3 Geological Heritage and Designated Sites

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

6.2.1.4 Potential Impacts

6.2.1.4.1 *'Do-Nothing' Scenario*

The lands have been Technically Approved and will be afforested should the Slieveacurry Renewable Energy Development proceed or not. If the land was not replanted, the current landuse for agriculture would continue at the site.

6.2.1.5 Planting Phase

6.2.1.5.1 *Likely and Significant Impacts and Associated Mitigation Measures*

The likely impacts of the proposed development 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. This site is located adjacent to an existing road network which will not require upgrading or alteration.

6.2.1.5.2 *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 2.3.3. Soils will remain in situ at the site and will not be removed offsite.

6.2.1.6 Operational Phase

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

6.2.1.6.1 *Residual Impact*

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

6.2.1.7 Significance of the Effects

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

6.2.1.8 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.

6.2.2 Replanting Area 2: Lisduff, Co. Mayo

6.2.2.1 Geology and Subsoils

Information on the main geological formations and subsoils underlying Replanting Area 2 (Lisduff) is shown in Table 6-5.

Table 6-5 Geology and Subsoil Information – Lisduff, Co. Mayo

Site	Geological Formation	Subsoil Type
Lisduff	Ballymore Limestone Formation consisting of dark fine grained limestone and shale.	› Limestone Gravels › Cut over raised peat › Limestone Till

The site at Lisduff is underlain by cutover raised peat, limestone till and limestone gravels over the Ballymore Limestone Formation which is comprised of dark fine grained limestone and shale.

The surrounding area is largely underlain with similar subsoil and bedrock to the site.

6.2.2.2 Geological Resource Importance

The GSI online Aggregate Potential Mapping Database shows that the proposed development site is located within an area mapped as being typically very high in terms of crushed rock aggregate potential and with some sections of the site having a high potential for granular aggregate potential (i.e. potential for gravel reserves).

The bedrock at the site could be classified as “High” importance and has the potential to be used on a “sub-economic” local scale for construction purposes. The bedrock has not been used in the past at the site for this purpose, and the proposed development 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.

6.2.2.3 Geological Heritage and Designated Sites

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

6.2.2.4 Potential Impacts

6.2.2.4.1 *'Do-Nothing' Scenario*

The lands have been Technically Approved and will be afforested should the Slieveacurry Renewable Energy Development proceed or not. If the land was not replanted, the current landuse of agriculture would continue at the site.

6.2.2.5 Likely and Significant Impacts and Associated Mitigation Measures

6.2.2.5.1 *Planting Phase*

The likely impacts of the proposed development 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 not be significant. There are no likely impacts of this afforestation on the underlying geology.

Construction of Site Roads and Tracks

Forestry felling can occur within 0.8 -1.0 km of access points (roads and tracks) to the main forest body. Due to the small size of this site, additional access tracks or roads will not be required. This site is located adjacent an existing road network with existing entrances which will not require alteration.

6.2.2.5.2 *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 2.3.3. Soils will remain in-situ at the site and will not be removed off-site.

6.2.2.5.3 *Operational Phase*

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

6.2.2.5.4 *Residual Impact*

There will be imperceptible impacts on soils and geology associated with the proposed afforestation.

6.2.2.6 Significance of the Effects

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

6.2.3 Replanting Area 3: Sheehaun, Co. Roscommon

6.2.3.1 Geology and Subsoils

Information on the main geological formations and subsoils underlying Replanting Area 1 (Sheehaun) is shown in Table 6-4.

Table 6-6 Geology and Subsoil Information - Sheehaun, Co. Roscommon

Site	Geological Formation	Subsoil Type
Sheehaun	Ballysteen Formation consisting of Dark muddy limestone, shale.	Sandstone and Shale Till

The site at Sheehaun is underlain by sandstone and shale till over the Ballysteen Formation which is comprised of Dark muddy limestone and shale.

The surrounding area is largely underlain by sandstone and shale till with areas of cutover peat overlying the Ballysteen Formation.

6.2.3.2 Geological Resource Importance

The GSI online Aggregate Potential Mapping Database shows that the proposed development 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 site does not have granular aggregate potential (i.e. potential for gravel reserves).

The limestone bedrock at the site could be classified as "Medium" importance and has the potential to be used on a "sub-economic" local scale for construction purposes. The bedrock has not been used in the past at the site for this purpose, and the proposed development does not propose to do so.

The site is mainly till with noted peat deposits east of the site. This 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.

6.2.3.3 Geological Heritage and Designated Sites

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

6.2.3.4 Potential Impacts

6.2.3.4.1 *'Do-Nothing' Scenario*

The lands have been Technically Approved and will be afforested should the Slieveacurry Renewable Energy Development proceed or not.

6.2.3.5 Planting Phase

6.2.3.5.1 *Likely and Significant Impacts and Associated Mitigation Measures*

The likely impacts of the proposed development 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 not be significant. There are no likely impacts of this afforestation on the underlying geology.

Construction of Site Roads and Tracks

Forestry felling can occur within 0.8 -1.0 km of access points (roads and tracks) to the main forest body. Due to the small size of this site, additional access tracks or roads will not be required. This site is located adjacent to an existing road network with existing entrances which will not require alteration.

6.2.3.5.2 *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 forestry service best practice guidelines described in detail in Section 2. Soils will remain in-situ at the site and will not be removed off-site.

6.2.3.6 Operational Phase

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

6.2.3.6.1 *Residual Impact*

There will be imperceptible impacts on soils and geology associated with the proposed afforestation.

6.2.3.7 Significance of the Effects

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

6.2.3.8 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 2 no. replanting site locations 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 Section 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 development 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 2-4 of this report.

7.3 Replanting Area 1: Cloonbony, Co. Longford

7.3.1 Baseline Environment and Local Hydrology

Ground level elevations at the replanting site are at 40m OD.

There are no streams or rivers within the site boundary, however the River Shannon is located approximately 230m to the west of the site and is separated from the site by agricultural fields, a railway track and an unnamed road. Kilnacarrow Stream a tributary of the River Shannon is located approximately 233m to the north 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.

7.3.1.1 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 (0.11 km^2) when compared with the Upper Shannon Catchment (1,500km^2) 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.

7.3.1.2 Regional Hydrology

The site is located within the Upper Shannon Catchment IE_26C and forms part of the Shannon[Upper] subcatchment_SC_080. 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 i.e. the Royal Canal.

7.3.1.3 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. There is a low probability that a small section to the northwest of the site might be flooded by a river in a very extreme flood event.

7.3.1.4 Surface Water Hydrochemistry

Slightly high pH values of surface waters would be typical of poorly drained mineral soil found on site. In addition, the underlying limestone bedrock would have slightly alkaline groundwater characteristics which would have some effect on surface water chemistry, specifically during dry periods when baseflow is likely to be more prevalent.

7.3.1.5 Hydrogeology

The underlying bedrock at the site is mapped as being undifferentiated limestone (refer to Section 6 – Soils & Geology). The GSI has classified the bedrock formation here as 'Rkc' Regionally Important Aquifer – Karstified (conduit).

7.3.1.6 Groundwater Vulnerability

The GSI and EPA has assigned a groundwater vulnerability rating of 'Moderate' to the west of the site which is likely to be as a result of the presence of greater than 10m of moderately permeable till. The east of the site has been 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.

7.3.1.7 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 River Shannon and Kilnacarrow Stream as having a 'Poor' status and are at risk of not achieving good status.

7.3.1.8 Groundwater Body Status

The EPA has classified the groundwater within the aquifer underlying the site as being of 'Good' status. The groundwater risk is currently under 'Review' by the EPA.

7.3.1.9 Designated Sites and Habitats

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

7.3.1.10 Water Resources

There are no borehole wells within or adjacent to the site. The nearest well (GSI name: 2027SWW125) is located 900m southwest of the proposed replanting area and was constructed in 1899.

7.3.1.11 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 very sensitive to pollution because the bedrock is classified as a regionally important Aquifer. However, the majority of the site is covered in limestone till and peat which acts as a protective cover to the underlying aquifer. Any contaminants which may be accidently released on-site are more likely to travel to nearby streams within surface runoff.

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.

7.3.2 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 2-4, 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 2-4.

7.3.3 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 development. 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.

7.3.4 Potential Impacts

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

7.3.4.1 'Do-Nothing' Scenario

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

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

7.3.4.2.1 *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 2-4. There are no surface water courses on or adjacent 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.

7.3.4.2.2 *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.

7.3.4.2.3 *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. This site is located adjacent an existing road network with which will not require upgrading or alteration.

7.3.4.3 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

7.3.4.3.2 *Residual Impact*

Indirect, slight, short term, low probability impact.

7.3.4.4 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.

7.3.4.4.1 *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

7.3.4.4.2 *Residual Impact*

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

7.3.4.5 Potential Hydrological Impacts on Designated Sites

The proposed afforestation site is located within the Upper Shannon 26C 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.

7.3.4.5.1 *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 development areas will be very high. The proposed development 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).

7.3.4.5.2 *Residual Impact*

No residual impacts.

7.3.4.6 Operational Phase

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

7.3.4.6.1 *Residual Impact*

No residual impacts.

7.3.4.7 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.

7.4 Replanting Area 2: Lisduff, Co. Mayo

7.4.1 Baseline Environment and Local Hydrology

Ground level elevations range between approximately 80m and 90m AOD (meters above Ordnance Datum).

There are no watercourses within or adjacent to the site. Nearest waterbody is the Dalgan River which is located approximately 450m to the north and west 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.

7.4.1.1 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 (0.13 km^2) when compared with the Corrib Catchment (3,113.85 km^2) 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.

7.4.1.2 Regional Hydrology

Under the Water Framework Directive (WFD), the site is located within Corrib Catchment (Catchment ID 30) and Clare[Galway]_SC_010 subcatchment (Sub catchment ID 30_10). The Corrib Catchment comprises 19 sub catchments with 97 river water bodies, 31 lakes, 1 transitional water body and 21 groundwater bodies.

7.4.1.3 Flood Risk Identification

OPW's river and coastal flood maps (www.floodinfo.ie) and the Department of Housing, Planning 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.

7.4.1.4 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 and shale 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.

7.4.1.5 Hydrogeology

According to the GSI www.gsi.ie, the site is underlain by the Ballymore Limestone Formation which consists of dark fine-grained limestone and shale (refer to Section 6 – Soils & Geology). The GSI has classified the Ballymore Limestone Formation as a Regionally Important Aquifer (Ll) – Karstified (conduit). The Limestone Gravels underlying the site have been classified as a locally important gravel aquifer.

7.4.1.6 Groundwater Vulnerability

The GSI and EPA has assigned a groundwater vulnerability rating of 'Moderate' to the lands south of the local road which is likely to be as a result of the presence of greater than 10m of moderately permeable till. The land parcel to the north of the local road have been assigned a groundwater vulnerability rating of 'High' which would indicate the presence of at least 10m of highly permeable gravels in these sections of the site.

7.4.1.7 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 Dalgan River as having a 'Good' status and not at risk.

7.4.1.8 Groundwater Body Status

The EPA has classified the groundwater within the aquifer underlying the site as being of 'Good' status. The groundwater in the Ballymore Limestone Formation is currently at risk. The Limestone Gravels are currently 'not at risk'.

7.4.1.9 Designated Sites and Habitats

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

7.4.1.10 Water Resources

There are no borehole wells within or adjacent to the site. The nearest well (GSI name: 1427SWW100) is located 1.9km northeast of the proposed replanting area and was constructed in 1899 for public supply.

7.4.1.11 Receptor Sensitivity

Due to the nature of afforestation, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the site would be 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 gravels underlying the site have been classified as a locally important gravel aquifer and the limestone bedrock is classified as a regionally important Aquifer. The site is considered to have an adequate topsoil and subsoil layer which will act as a growth medium and a protective cover to the underlying aquifer. Any contaminants which may be accidently released on-site are more likely to travel to nearby streams within surface runoff.

Surface waters such as the Dalgan River are sensitive to potential contamination. Surface water mitigation and controls are outlined in Section 7.4.4 below to ensure the 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.

7.4.2 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 2-4, 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 2-4.

7.4.3 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 development. 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.

7.4.4 Potential Impacts

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

7.4.4.1 'Do-Nothing' Scenario

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

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

7.4.4.3 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 2-4. 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;
- Nutrient release.

7.4.4.4 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.

7.4.4.5 Site Access

Forestry felling can occur within 0.8-1km 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. This site is located adjacent to an existing road network with existing entrances which will not require upgrading or alteration.

7.4.4.5.1 *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 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.

7.4.4.5.2 *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.

7.4.4.5.3 *Residual Impact*

Indirect, imperceptible, short term, low probability impact.

7.4.4.6 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.

7.4.4.6.1 *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.

7.4.4.6.2 *Residual Impact*

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

7.4.4.7 Potential Hydrological Impacts on Designated Sites

The proposed afforestation site is located within the Corrib 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.

7.4.4.7.1 *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 development areas will be very high. The proposed development site is located in the Corrib 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).

Potential impacts on designated sites are also addressed in Section 5 of this document.

7.4.4.7.2 *Residual Impact*

No residual impacts.

7.4.4.8 Significance of the Effects

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

7.4.4.9 Operational Phase

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

7.4.4.9.1 *Residual Impact*

No residual impacts.

7.5 Replanting Area 3: Sheehaun, Co. Roscommon

7.5.1 Baseline Environment and Local Hydrology

Ground level elevations range between approximately 43m and 50m AOD (meters above Ordnance Datum).

There are no streams or rivers within the site or adjacent to the site boundary. The closest watercourse to the site is the Gortgallan Stream, which runs along the northern border of the site, draining in an easterly direction, before flowing into the River Shannon approximately 5.8km downstream of the

proposed replanting site. The proposed afforestation site is located within the Upper Shannon Catchment [26C].

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

7.5.1.1 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 (0.073 km^2) when compared with the Upper Shannon Catchment (1,500 km^2) 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.

7.5.1.2 Regional Hydrology

Under the Water Framework Directive (WFD), the site is located within the Upper Shannon Catchment (Catchment ID26C) and Shannon[Upper]_SC_070 sub catchment (Sub catchment ID26C-8). The Upper Shannon catchment comprises 12 sub catchments with 58 river water bodies, 23 lake water bodies and 15 groundwater bodies.

7.5.1.3 Flood Risk Identification

OPW's river and coastal flood maps (www.floodinfo.ie) and the Department of Housing, Planning 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.

7.5.1.4 Surface Water Hydrochemistry

The limestone and shale bedrock (and related till subsoils) which underlie the area would have slightly alkaline groundwater characteristics which would have some effect on surface water chemistry specifically during dry periods when baseflow is likely to be more prevalent.

7.5.1.5 Hydrogeology

The underlying bedrock at the site is mapped as being comprised of Dark muddy limestone and shale. (refer to Section 6 – Soils & Geology). The GSI has classified the bedrock formation here as a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones.

7.5.1.6 Groundwater Vulnerability

The GSI and EPA has assigned a groundwater vulnerability rating of 'Medium' to the majority of the site with areas of 'Low' vulnerability.

7.5.1.7 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 Gortcallan stream as having an 'unassigned' status. The EPA has classified the Gortcallan stream as being 'Under review'.

7.5.1.8 Groundwater Body Status

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

7.5.1.9 Designated Sites and Habitats

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

7.5.1.10 Water Resources

There are no verified or unverified borehole wells located within 100 metres of the replanting lands, according to www.gsi.ie.

7.5.1.11 Receptor Sensitivity

Due to the nature of afforestation, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the site would be 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 given the bedrock is classified as a locally important Aquifer. However, the majority of the site is covered in sandstone and shale till and peat which acts as a protective cover to the underlying aquifer. Any contaminants which may be accidently released on-site are more likely to travel to nearby streams within surface runoff.

Surface waters such as the Gortgallan Stream are sensitive to potential contamination. Surface water mitigation and controls are outlined in Section 7.3.4 below to ensure the 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.

7.5.2 Proposed Site Drainage

The site will be drained in accordance with the Forestry Guidelines. 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 2-3, 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 2-3.

7.5.3 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 development. 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.

7.5.4 Potential Impacts

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

7.5.4.1 'Do-Nothing' Scenario

The lands have been Technically Approved and will be afforested should the Slieveacurry Renewable Energy Development proceed or not.

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

7.5.4.3 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 2-3. There are no surface water courses on or adjacent 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.

Mitigation measures and the overall residual impact is detailed in Section 7.3.4.4.1 and Section 7.3.4.4.2 below.

7.5.4.4 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.

Mitigation measures and the overall residual impact is detailed in Section 7.3.4.4.1 and Section 7.3.4.4.2 below.

7.5.4.5 Site Access

Forestry felling can occur within 0.8-1km 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. This site is located adjacent an existing road network with existing entrances which will not require upgrading or alteration.

7.5.4.5.1 *Proposed Mitigation Measures*

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;*
- 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; and
- Forest Service (2016) *Land Types for Afforestation*. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.

Mitigation 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 Forest Service (2000) guidance document *"Forestry and Water Quality Guidelines"* are shown in Table 7-2.

7.5.4.5.2 *Residual Impact*

Indirect, imperceptible, short term, low probability impact.

7.5.4.6 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.

7.5.4.6.1 *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.

7.5.4.6.2 *Residual Impact*

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

7.5.4.7 Potential Hydrological Impacts on Designated Sites

The proposed afforestation site is located within the Upper Shannon 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.

7.5.4.7.1 *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 development areas will be very high. The proposed development 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).

Potential impacts on designated sites are also addressed in Section 5 of this document.

7.5.4.7.2 *Residual Impact*

No residual impacts.

7.5.4.8 Operational Phase

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

7.5.4.8.1 *Residual Impact*

No residual impacts.

7.5.4.9 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 areas at Cloonbony, Co Longford, Lisduff, Co. Mayo and Sheehaun, Co. Roscommon. It includes a description of the relevant County Council landscape policy for each site and describes the sites' landscape values and sensitivity. The landscape of each area 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 Replanting Area 1: Cloonbony, Co. Longford

8.2.1 Longford County Development Plan 2015-2021

8.2.1.1 Forestry Policy and Objectives

The *Longford County Development Plan 2015-2021* contains policy information and objectives in relation to forestry. Please refer to Section 3.1.2.1 for forestry policies and objectives in the Longford CDP.

8.2.1.2 Landscape Policy and Objectives

This section of the report refers to the CDP and the Landscape Character Assessment of the county.

8.2.1.3 Landscape Character Assessment

The Longford County Council Landscape Character Assessment divides the County into 7 basic landscape character units (LCU).

The proposed development site lies within both the Unit 3 - 'Shannon Basin/Lough Ree' and Unit 6 – 'Peatlands' LCU.

8.2.1.3.1 *Unit 3 - 'Shannon Basin/Lough Ree'*

This unit is located along the western boundary of the County forming the border with Counties Leitrim, Roscommon and Westmeath and taking in the Rivers Shannon, Inny and Rinn and Lough Forbes and Lough Ree.

The sensitivity of the landscapes in this unit range from medium along the south eastern border of the unit to high sensitivity along the shores of the lake, islands, the riverbanks, and in the vicinity of the Aquifer.

8.2.1.3.2 *Unit 6 – 'Peatlands' LCU*

This area is located in the west of the County and includes the settlements of Lanesboro and Clondra and extends towards Ballymahon in the south. This area is dominated by extensive tracts of raised bog interspersed with mixed forestry and areas of scrubby vegetation.

The visual sensitivity of the landscapes in this unit are generally low. An exception to this designation is the vicinity of the Royal Canal, where sensitivity is high.

8.2.1.4 Scenic Routes

Table 6.1 and Appendix 6 of the County Development Plan lists the scenic routes within the county. The proposed replanting site at Cloonbony is not located along or adjacent to a scenic route.

8.2.2 Forestry and the Landscape Guidelines

The Forest Service have produced the *'Forestry and the Landscape Guidelines'* (Forest Service, 2000) which provide recommendations on forest planning and design which aim to ensure that the proposed forest is sympathetic to the landscape character of the location. The Guidelines identify scenarios for four main types of landscape character:

- Rolling Moorland
- Rolling Fertile Farmland
- Drumlins
- Mountain and Farmland complex

The replanting site at Cloonabony is best described as 'Rolling Fertile Farmland'. This Guidelines describe this landscape type as follows:

> *"This landscape type is a man-made 'working landscape'. The rolling hills are characterised by a patchwork of clearly defined fields with farmsteads and houses scattered throughout. These fields are typically under pasture or tillage. The scale of the landscape is usually relatively enclosed. Soil fertility should allow broadleaf plantations, with a potential for silvicultural systems other than clearfelling."*

For this landscape character type, the Guidelines recommend certain approaches to the planning and design of the plantation. Forest planning considerations include size, arrangement, location, and for this landscape type, small to medium forests, and coverage which is dispersed as opposed to extensive are recommended. The proposed replanting site is of similar scale to existing forestry plantations to the north of the site and is not extensive. Forest design considerations include shape, pattern, proportion, edge, margin, colour and texture. Hedgerows are to be retained where possible.

The Cloonabony site has been granted Technical Approval for afforestation. The Technical Approval document for each site includes as a condition that all Forest Service guidelines will apply to afforestation at these locations. In addition, the document specifies the approved species to be planted on the sites.

8.2.3 Baseline Landscape

8.2.3.1 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 at Cloonbony is located adjacent to a local road. Coniferous forestry is located to the north of the site. The land to the south, east and west is bordered by agricultural grassland and peat land. Field boundaries are evident. The site lies at 40m OD.

The proposed replanting area is located within the Upper Shannon Catchment. There are no streams or rivers within the site boundary, however the River Shannon is located approximately 230m to the west of the site and is separated from the site by agricultural fields, a railway track and an unnamed road.

The landcover of the site is composed primarily of poor agricultural grassland.

8.2.3.2 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 Cloonbony Site: Landscape Sensitivity

Feature	Description
Quality	The quality of the landscape in this area can be described as modified due to agriculture, peat extraction and forestry.
Integrity	The current development 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 no recorded archaeological features on the study site. The nearest recorded features is a class 1 togher (LF017-028), located approximately 530 metre to the southeast of the site.

Feature	Description
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 Low landscape sensitivity.

8.2.3.3 Landscape Context and Site Visibility

Views towards the site would be eastward from the local unnamed road that runs adjacent to the western boundary.

8.2.4 Impact Assessment

8.2.4.1 '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.

8.2.4.2 Site Preparation and Planting Phase

8.2.4.2.1 *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 a mixture of agricultural and forestry 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.

8.2.4.2.2 *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.

8.2.4.3 Operational Phase

8.2.4.3.1 *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.

8.2.4.3.2 *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 peat land, 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.

8.2.4.4 Proposed Mitigation Measures

8.2.4.4.1 *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.

8.2.4.5 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.

8.2.4.6 Cumulative Impacts

Cumulative impacts are described as additional changes to the landscape or visual amenity caused by the proposed development 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 2 and the existing land-uses. There is coniferous forestry located to the north of the site, and the cumulative impact arising from the proposed replanting in conjunction with the existing forestry plantations and future development is assessed as Long Term, Imperceptible Neutral Impact.

8.3 Replanting Area 2: Lisduff, Co. Mayo

8.3.1 Landscape Policy Context

8.3.1.1 Mayo County Development Plan 2014-2020

This section of the report refers to the Mayo County Development Plan 2014 – 2020 and the Landscape Character Assessment of County Mayo, as well as to the Environmental Requirements for Afforestation document.

8.3.1.1.1 *Landscape Character Areas*

Landscape policy is covered in Chapter 4 of the Mayo County Development Plan 2014 – 2020 (CDP) and covers 'Landscape Protection' and 'Views and Prospects'.

Policy on Landscape Protection is as follows:

LP-01 It is an objective of the Council, through the Landscape Appraisal of County Mayo, to recognise and facilitate appropriate development in a manner that has regard to the character and sensitivity of the landscape and to ensure that development will not have a disproportionate effect on the existing or future character of a landscape in terms of location, design and visual prominence.

LP-02 It is an objective of the Council that all proposed development shall be considered in the context of the Landscape Appraisal of County Mayo with reference to the four Principal Policy Areas shown on Map 3A Landscape Protection Policy Areas and the Landscape Sensitivity Matrix, provided such policies do not conflict with any specific objectives of this Plan.

LP-03 It is an objective of the Council to protect the unique landscape of the County which is a cultural, environmental and economic asset of inestimable value.

In the Landscape Appraisal of County Mayo landscape character units with similar visual landscape elements were grouped together into four categories, as follows:

1. *Montaine Coastal*
2. *Lowland Coastal*
3. *Uplands, Moors, Heath or Bogs*
4. *Drumlins and Lowlands*

The Lisduff site fall into Landscape Policy Area 4. Drumlins and Lowlands. These undulating areas of pasture, woodland and forest are considered to have a generally similar ability to absorb development. Many of these areas are underlain by glacial drumlins and incorporate low-lying lakelands.

8.3.1.1.2 Vulnerable Features

The Lisduff site is not located in an area classed as vulnerable or in close proximity to vulnerable features as defined in Chapter 3 of the Landscape Appraisal of County Mayo. The nearest vulnerable area is located approximately 3.4 kilometres to the northwest of the site.

8.3.1.1.3 Views and Prospects

The CDP contains the following policy pertaining to views and prospects:

VP-01 It is an objective of the Council to ensure that development does not adversely interfere with views and prospects worthy of preservation and protection as outlined on Map 4, or on the views to and from places and features of natural beauty or interest (e.g. coastline, lakeshores, protected structures, important historic sites) when viewed from the public realm.

The proposed replanting site at Lisduff is not located along or adjacent to a scenic route.

8.3.2 Forestry and the Landscape Guidelines

The Forest Service have produced the *'Forestry and the Landscape Guidelines'* (Forest Service, 2000) which provide recommendations on forest planning and design which aim to ensure that the proposed forest is sympathetic to the landscape character of the location. The Guidelines identify scenarios for four main types of landscape character:

- Rolling Moorland
- Rolling Fertile Farmland
- Drumlins
- Mountain and Farmland complex

The replanting site at Lisduff is best described as 'Rolling Fertile Farmland'. This Guidelines describe this landscape type as follows:

> *"This landscape type is a man-made 'working landscape'. The rolling hills are characterised by a patchwork of clearly defined fields with farmsteads and houses scattered throughout. These fields are typically under pasture or tillage. The scale of the landscape is usually relatively enclosed. Soil fertility should allow broadleaf plantations, with a potential for silvicultural systems other than clearfelling."*

For this landscape character type, the Guidelines recommend certain approaches to the planning and design of the plantation. Forest planning considerations include size, arrangement, location, and for this landscape type, small to medium forests, and coverage which is dispersed as opposed to extensive are recommended. The proposed replanting site is of similar scale to existing forestry plantations to the northeast of the site and is not extensive. Forest design considerations include shape, pattern, proportion, edge, margin, colour and texture. Hedgerows are to be retained where possible.

The Lisduff site has been granted Technical Approval for afforestation. The Technical Approval document for each site includes as a condition that all Forest Service guidelines will apply to afforestation at these locations. In addition, the document specifies the approved species to be planted on the sites.

8.3.3 Baseline Landscape

8.3.3.1 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 occupies 13.5 hectares with elevations ranging between 80m and 90m AOD. The landcover of the site and the surrounding fields is composed primarily of agricultural grassland. Coniferous forestry is located to the northeast of the site. There are a number of existing forestry plantations located within 5km of the proposed replanting site.

The proposed replanting area is located within the Corrib Catchment. There are no watercourses within or adjacent to the site. The nearest waterbody is the Dalgan River which is located approximately 450m to the north and west of the site.

8.3.3.2 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 proposed 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 8-2.

Table 8-2 Lisduff Landscape Sensitivity

Feature	Description
Quality	The quality of the landscape of the proposed site and its immediate environs can be described as modified.
Integrity	The current development site has been modified by the interaction of man with the environment, primarily in the form of agriculture.
Distinctiveness	There is no particular feature of distinctiveness on the site.
Popularity	A sense of popularity is created where landscape features are widely recognised or appreciated. There are no such features on this site.
Rarity	The proposed replanting site is not considered to represent a rare or unique landscape type, at a local or regional scale. The site is not located within a designated ecological area. The closest Natura 2000 site, i.e. Special Area of Conservation (SAC) or Special Protection Area (SPA), is the River Moy SAC, located approximately 4.1 kilometres northwest of the subject 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 no recorded archaeological features on the study site. The nearest recorded features comprises a group of 3 records (two enclosures and a ringfort) located approximately 180m to the west of the replanting site.
Sense of Public Ownership & Social Importance	A sense of public ownership arises due to ease of accessibility, visibility or a widely shared meaning. This is privately owned land and there is no sense of public ownership.

Following the assessment presented in Table 8-2, the proposed replanting site is considered to be of low landscape sensitivity.

8.3.3.3 Landscape Context and Site Visibility

Views towards the site would be northwards and southwards from the local unnamed road that separates the three parcels of land proposed for afforestation.

8.3.4 Impact Assessment

8.3.4.1 '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 use of land for agriculture would continue at the site.

8.3.4.2 Site Preparation and Planting Phase

8.3.4.2.1 *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 land uses. Forestry planting is already an established use in the general area of the site. 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.

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

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

8.3.4.3 Operational Phase

8.3.4.3.1 *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, and therefore the proposed replanting is contributing to the patchwork of forestry plantations. The predicted impact of the proposed replanting on landscape character is a Long Term, Imperceptible Neutral Impact.

8.3.4.3.2 *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 peat land, 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 within open land. Felling will be carried out in accordance with the Forestry and the Landscape Guidelines. The predicted long-term visual impact of the proposed replanting is therefore a Long Term, Imperceptible Neutral Impact.

8.3.4.4 Proposed Mitigation Measures

8.3.4.4.1 *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 2.3.2 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.

8.3.4.5 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.

8.3.4.6 Cumulative Impacts

Cumulative impacts are described as additional changes to the landscape or visual amenity caused by the proposed development 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 2 and the existing land-uses. There is coniferous forestry located to the north of the site, and the cumulative impact arising from the proposed replanting in conjunction with the existing forestry plantations and future development is assessed as Long Term, Imperceptible Neutral Impact.

8.4 Replanting Area 3: Sheehaun, Co. Roscommon

8.4.1 Landscape Policy Context

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

8.4.1.1 Roscommon County Development Plan 2014 – 2020 (As Varied)

8.4.1.1.1 *Landscape Character Areas*

The Sheehaun site is located within both LCA 5: Slieve Bawn and Feorish Bogland Basin. Slieve Bawn forms the western edge from where the landform gently slopes eastward draining into low lying bogland where it meets the eastern boundary defined by the meandering Shannon. The mountain is one of the highest ridges in the county, peaking at 262m ASL and creates strong visual separation between the Shannon River and the remainder of the county in this area. Higher ground is predominantly covered in wet grassland with extensive areas of coniferous plantation as well as transitional woodland scrub. The lower region, occupying most of this landscape character area, is made up of cutover raised bog, most of which has been commercially harvested. Elevated views from Slieve Bawn to the east are of a highly mechanised landscape of commercial peatland and the peat burning electricity plant in the distance at Lanesborough.

Much of the land in the area remains sparsely populated and isolated, although there is a broad network of roads leading into the cutover bog. The main settlement in the area is the village of Lanesborough.

The principles for landscape management include careful consideration of the siting and planting regime of new forestry plantations, in small scale irregular plantations with a good proportion of deciduous trees and recommend irregular edges which follow the landform and a varied age structure.

8.4.1.1.2 *Landscape Values*

The landscape values classify each of the landscape character areas into one of the following four classes:

- Exceptional Value
- Very High Value
- High Value
- Moderate Value.

The Shannon System running along the eastern boundary of the county has been classified as of Very High Value. The Shannon System is of high aesthetic and ecological quality and the other upland areas provide important scenic amenities. LCA 5 which the replanting site is located in, is adjacent to the River Shannon and therefore is classified as Very High Value.

8.4.1.1.3 *Scenic Routes*

A draft map of Scenic Routes and Scenic Views is presented in Appendix 1 of the Landscape Character Assessment of Roscommon and includes all routes within the county which are designated as Scenic Routes. The proposed replanting site at Sheehaun is not located along or adjacent to a scenic route. The nearest scenic route to the proposed site is the R7, which is approximately 2.5 kms south of the site. The R7: Scenic route runs along the N63 with views to south overlooking Lough Ree.

8.4.2 Forestry and the Landscape Guidelines

The Forest Service have produced the *'Forestry and the Landscape Guidelines'* (Forest Service, 2000) which provide recommendations on forest planning and design which aim to ensure that the proposed forest is sympathetic to the landscape character of the location. The Guidelines identify scenarios for four main types of landscape character:

- Rolling Moorland
- Rolling Fertile Farmland
- Drumlins
- Mountain and Farmland complex

The replanting site at Sheehaun is best described as 'Rolling Fertile Farmland'. This Guidelines describe this landscape type as follows:

> *"This landscape type is a man-made 'working landscape'. The rolling hills are characterised by a patchwork of clearly defined fields with farmsteads and houses scattered throughout. These fields are typically under pasture or tillage. The scale of the landscape is usually relatively enclosed. Soil fertility should allow broadleaf plantations, with a potential for silvicultural systems other than clearfelling."*

For this landscape character type, the Guidelines recommend certain approaches to the planning and design of the plantation. Forest planning considerations include size, arrangement, location, and for this landscape type, small to medium forests, and coverage which is dispersed as opposed to extensive are recommended. The proposed replanting site is of similar scale to existing forestry plantations to the north and north west of the site and is not extensive. Forest design considerations include shape, pattern, proportion, edge, margin, colour and texture. Hedgerows are to be retained where possible.

The proposed replanting site has been granted Technical Approval for afforestation. The Technical Approval document includes as a condition that all guidelines (which includes the Forest Service landscape guidelines) will apply to afforestation at the site. The Guidelines advocate planting separate adjacent forests on this landscape type to create larger areas of cover, which is what the proposed replanting will achieve in conjunction with the adjacent plantations. In addition, the document specifies the approved species to be planted on the site.

Landscape Recommendations for Forest Harvesting: For this landscape type, the Guidelines recommend:

> *"Clearfelling in farmland and drumlins is typically not as sensitive as it is on moorland. The sense of landscape utility through farming activities lends an ethos of human process and change, thus increasing acceptability."*

8.4.3 Baseline Landscape

8.4.3.1 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 at Sheehaun is located adjacent to a local road. Coniferous forestry is located to the north and northwest of the site, which is a feature of the wider landscape. The land to the north, south and west is bordered by agricultural grassland. Field boundaries are evident. The site lies at between at 43m and 50m AOD.

The proposed replanting area is located within the Upper Shannon Catchment. There are no streams or rivers within the site or adjacent the site boundary. The closest watercourse to the site is the Gortgallan Stream runs along the northern border the site. The landcover of the site is composed primarily of grassland.

8.4.3.2 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 proposed 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 8-3 Sheehaun Landscape Sensitivity

Feature	Description
Quality	The quality of the landscape of the proposed site and its immediate environs can be described as modified.
Integrity	The current development site has been modified by the interaction of man with the environment, primarily in the form of agriculture, peat cutting and forestry.
Distinctiveness	There is no particular feature of distinctiveness on the site.
Popularity	A sense of popularity is created where landscape features are widely recognised or appreciated. There are no such features on this site.
Rarity	The proposed replanting site is not considered to represent a rare or unique landscape type, at a local or regional scale. The site is not located within a designated ecological area. The closest Natura 2000

Feature	Description
	site, i.e. Special Area of Conservation (SAC) or Special Protection Area (SPA), is the Corbo Bog SAC, located approximately 2.4 kilometres south/southwest of the subject site, at its nearest point.
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 no recorded archaeological sites or monuments located within site, and no significant sense of cultural meaning attributed to the site. The nearest recorded features is an earthwork (RO036-017), located approximately 500 metres west of the site.
Sense of Public Ownership & Social Importance	A sense of public ownership arises due to ease of accessibility, visibility or a widely shared meaning. This is privately owned land and there is no sense of public ownership.

Following the assessment presented in Table 8.1, the proposed replanting site is considered to be of low landscape sensitivity.

8.4.3.3 Landscape Context and Site Visibility

Open views from the local roads adjacent to the site are intermittent. Views of coniferous forestry are a feature of the wider area. Views from the site are dominated by the surrounding agricultural lands, peat cutting and coniferous plantations.

8.4.4 Impact Assessment

8.4.4.1 '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.

8.4.4.2 Site Preparation and Planting Phase

8.4.4.2.1 *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 a mixture of agricultural and forestry 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.

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

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

8.4.4.3 Operational Phase

8.4.4.3.1 *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 contributing to the patchwork of forestry plantations. The predicted impact of the proposed replanting on landscape character is a Long Term, Imperceptible Neutral Impact.

8.4.4.3.2 *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 within open land. Felling will be carried out in accordance with the Forestry and the Landscape Guidelines. The predicted long-term visual impact of the proposed replanting is therefore a Long Term, Imperceptible Neutral Impact.

8.4.5 Proposed Mitigation Measures

8.4.5.1 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 2.3.2 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.

8.4.6 Residual Impacts

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

8.4.7 Cumulative Impacts

Cumulative impacts are described as additional changes to the landscape or visual amenity caused by the proposed development 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 2 and the existing land-uses. There is coniferous forestry located to the north and northwest of the site, and the cumulative impact arising from the proposed replanting in conjunction with the existing forestry plantations 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. Each of the proposed sites have 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 development 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 Replanting Area 1: Cloonbony, Co. Longford

9.3.1 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 no recorded archaeological features on the study site.

The nearest recorded features is a class 1 togher (LF017-028), located approximately 530 metre to the southeast of the site.

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

9.3.2 Potential Impacts

9.3.2.1 'Do-Nothing' Scenario

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

9.3.2.2 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 no recorded monuments or structures on the site and therefore there will be no direct impacts.

9.3.2.3 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 no recorded monuments or structures in the vicinity of the site and therefore there will be no indirect impacts.

9.3.2.4 Cumulative Impacts

There will be no cumulative impact associated with the afforestation of the site as there are no features close to the 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 site on features of cultural heritage significance.

9.3.3 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.

9.4 Replanting Area 2: Lisduff, Co. Mayo

9.4.1 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 no recorded archaeological features on the study site.

The nearest recorded features comprises a group of 3 records (two enclosures and a ringfort) located approximately 180m to the west of the replanting site.

9.4.2 Potential Impacts

9.4.2.1 'Do-Nothing' Scenario

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

9.4.2.2 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 no recorded monuments or structures on the site and therefore there will be no direct impacts.

9.4.2.3 Potential Indirect Impacts on the Archaeological/ Architectural Heritage

Potential indirect impacts may arise where a monument or area of archaeological potential is situated in relatively 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.

The nearest recorded monuments comprises a group of 3 records: enclosures (MA103-005 and MA103-006) and a ringfort rath (MA103-004). The recorded monuments are located approximately 180m to the west of the replanting site. A 50m Zone of Notification remains around the recorded monument cluster. Intervisibility between these assets and the proposed replanting areas are impeded by intervening vegetation of field boundaries. Therefore, indirect impacts are considered to be imperceptible.

9.4.2.4 Cumulative Impacts

It is not expected that there will be any cumulative impact associated with the proposed afforestation provided the project is completed in accordance with the Guidance document and employing the mitigation measures described above.

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 site on features of cultural heritage significance.

9.4.3 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.

9.5 Replanting Area 3: Sheehaun, Co. Roscommon

9.5.1 Existing Environment

The electronic database of recorded monuments (www.archaeology.ie) was used to compile a list of known sites which occur in the vicinity of the site. There are no recorded archaeological features on the study site.

The nearest recorded feature is an earthwork (RO036-017), located approximately 500 metres west of the site.

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

9.5.2 Potential Impacts

9.5.2.1 'Do-Nothing' Scenario

The lands have been Technically Approved and will be afforested should the Slieveacurry Renewable Energy Development proceed or not.

9.5.2.2 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 no recorded monuments or structures on the site and therefore there will be no direct impacts.

9.5.2.3 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 no recorded monuments or structures in the vicinity of the site and therefore there will be no indirect impacts.

9.5.2.4 Cumulative Impacts

There will be no cumulative impact associated with the afforestation of the site as there are no features close to the 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 development, on features of cultural heritage significance.

9.5.3 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 and in the vicinity of the 2 no. site locations comprise agriculture and forestry. 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 polyaromatic 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 PM_{10}) 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 ($\mu g/m^3$) and parts per billion (ppb). The notation PM_{10} 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 (µg/m3)	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 (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Particulate matter 2.5 ($PM_{2.5}$)	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 2.5 ($PM_{2.5}$) 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 $mg/m^3.h$ averaged over 5 years	6,000 $mg/m^3.h$
Information Threshold	1 hour average	180 mg/m^3	-
Alert Threshold	1 hour average	240 mg/m^3	-

AOT_{40} 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 Slieveacurry Renewable 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 30thNovember to 12thDecember 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 Replanting Area 1: Cloonbony, Co. Longford

10.2.3.1 Baseline Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Mullingar which is located approximately 51 kilometres from the site, is the nearest weather and climate monitoring station to the proposed development site that has meteorological data recorded for the 30-year period from 1979 - 2008. Meteorological data recorded at Mullingar 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 19.2° Celsius.

Table 10-3 Data from Met Éireann Weather Station at Mullingar, 1979 to 2008

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	7.4	7.9	9.8	12.1	14.9	17.3	19.2	18.9	16.7	13.2	9.9	7.9	12.9
Mean daily min	1.5	1.5	2.8	4.1	6.3	9.2	11.1	10.8	8.9	6.2	3.5	2.2	5.7
Mean temperature	4.5	4.7	6.3	8.1	10.6	13.2	15.2	14.8	12.8	9.7	6.7	5.0	9.3
Absolute max.	13.8	15.4	19.1	21.6	25.0	28.3	29.7	29.1	25.0	20.1	17.3	14.6	29.7
Absolute Min.	-14.9	-6.6	-8.0	-4.4	-2.6	0.2	3.8	2.1	0.0	-4.4	-6.9	-12.4	-14.9
Mean No. of Days with Air Frost	9.9	8.9	5.5	3.1	0.4	0.0	0.0	0.0	0.0	1.5	5.4	8.2	43.0
Mean No. of Days with Ground Frost	17.9	16.2	14.0	10.8	5.1	0.8	0.0	0.1	1.7	6.3	12.1	15.4	100.4
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	90.8	89.8	87.6	81.9	78.3	79.7	82.1	84.8	87.6	89.9	91.7	91.8	86.3
Mean at 1500UTC	83.4	77.8	72.8	68.1	67.1	69.1	69.9	70.6	72.1	77.0	82.2	85.9	74.7
SUNSHINE (Hours)													
Mean daily duration	1.8	2.5	3.2	4.9	5.8	5.0	4.6	4.6	3.9	3.2	2.2	1.6	3.6
Greatest daily duration	8.2	9.9	10.9	13.6	15.4	15.9	15.3	14.4	12.2	10.1	8.6	7.3	15.9
Mean no. of days with no sun	10.3	7.2	5.3	2.9	1.9	2.2	1.8	1.9	3.3	5.7	8.4	11.0	62.0
RAINFALL (mm)													
Mean monthly total	91.7	72.0	78.3	62.1	68.7	70.5	61.8	80.8	73.8	102.1	82.4	97.1	941.3
Greatest daily total	30.3	24.7	29.5	27.6	26.1	52.9	26.6	58.2	42.1	48.8	43.7	38.8	58.2
Mean num. of days with >= 0.2mm	19	17	20	15	16	16	16	17	17	19	18	19	209
Mean num. of days with >= 1.0mm	15	13	15	11	12	11	11	13	12	14	13	14	154
Mean num. of days with >= 5.0mm	6	5	5	4	5	4	3	5	4	6	6	7	60
WIND (knots)													
Mean monthly speed	9.0	9.1	9.1	7.7	7.3	6.7	6.4	6.3	6.7	7.5	7.8	8.3	7.6
Max. gust	67	71	59	56	58	48	48	50	51	59	62	73	58.5
Max. mean 10-minute speed	38	36	36	30	34	26	27	28	32	36	32	39	32.8
Mean num. of days with gales	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.8

WEATHER (Mean No. of Days With:)													
Snow or sleet	5.0	4.4	3.5	1.6	0.2	0.0	0.0	0.0	0.0	0.0	0.4	2.7	17.8
Snow lying at 0900UTC	2.7	0.9	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	5.7
Hail	0.6	0.9	2.0	2.0	1.1	0.2	0.1	0.1	0.1	0.5	0.2	0.3	8.1
Thunder	0.1	0.2	0.2	0.3	0.9	0.9	1.2	0.8	0.1	0.1	0.1	0.1	4.9
Fog	3.4	3.0	2.4	2.0	1.8	1.3	1.9	2.9	4.0	4.1	4.1	4.3	35.1

10.2.3.2 Potential Impacts – Planting Phase

10.2.3.2.1 *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.

10.2.3.3 Potential Impacts – Operational Phase

10.2.3.3.1 *Long Term Slight Positive Impact*

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

10.2.3.4 Residual Impacts

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

10.2.3.5 Significance of the Effects

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

10.2.4 Replanting Area 2: Lisduff, Co. Mayo

10.2.4.1 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 16.5 kilometres from the site, is the nearest weather and climate monitoring station to the proposed development 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 1971 - 2000 is shown in Table 10-4 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 10-4 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 >= 0.2mm	21	18	21	16	16	15	17	18	18	21	21	22	224
Mean num. of days with >= 1.0mm	18	15	17	12	12	11	12	13	14	17	18	17	176
Mean num. of days with >= 5.0mm	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

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

10.2.4.2 Potential Impacts – Planting Phase

10.2.4.2.1 *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.

10.2.4.3 Potential Impacts – Operational Phase

10.2.4.3.1 *Long Term Slight Positive Impact*

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

10.2.4.4 Residual Impacts

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

10.2.4.5 Significance of the Effects

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

10.2.5 Replanting Area 3: Sheehaun, Co. Roscommon

10.2.5.1 Baseline Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Mullingar which is located approximately 50 kilometres from the site, is the nearest weather and climate monitoring station to the proposed development site that has meteorological data recorded for the 30-year period from 1979 - 2008. Meteorological data recorded at Mullingar over the 30-year period from 1979 - 2008 is shown in Table 10-3 Data from Met Éireann Weather Station at Mullingar, 1979 to 2008

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	7.4	7.9	9.8	12.1	14.9	17.3	19.2	18.9	16.7	13.2	9.9	7.9	12.9
Mean daily min	1.5	1.5	2.8	4.1	6.3	9.2	11.1	10.8	8.9	6.2	3.5	2.2	5.7
Mean temperature	4.5	4.7	6.3	8.1	10.6	13.2	15.2	14.8	12.8	9.7	6.7	5.0	9.3
Absolute max.	13.8	15.4	19.1	21.6	25.0	28.3	29.7	29.1	25.0	20.1	17.3	14.6	29.7
Absolute Min.	-14.9	-6.6	-8.0	-4.4	-2.6	0.2	3.8	2.1	0.0	-4.4	-6.9	-12.4	-14.9
Mean No. of Days with Air Frost	9.9	8.9	5.5	3.1	0.4	0.0	0.0	0.0	0.0	1.5	5.4	8.2	43.0
Mean No. of Days with Ground Frost	17.9	16.2	14.0	10.8	5.1	0.8	0.0	0.1	1.7	6.3	12.1	15.4	100.4
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	90.8	89.8	87.6	81.9	78.3	79.7	82.1	84.8	87.6	89.9	91.7	91.8	86.3
Mean at 1500UTC	83.4	77.8	72.8	68.1	67.1	69.1	69.9	70.6	72.1	77.0	82.2	85.9	74.7
SUNSHINE (Hours)													
Mean daily duration	1.8	2.5	3.2	4.9	5.8	5.0	4.6	4.6	3.9	3.2	2.2	1.6	3.6
Greatest daily duration	8.2	9.9	10.9	13.6	15.4	15.9	15.3	14.4	12.2	10.1	8.6	7.3	15.9
Mean no. of days with no sun	10.3	7.2	5.3	2.9	1.9	2.2	1.8	1.9	3.3	5.7	8.4	11.0	62.0
RAINFALL (mm)													
Mean monthly total	91.7	72.0	78.3	62.1	68.7	70.5	61.8	80.8	73.8	102.1	82.4	97.1	941.3
Greatest daily total	30.3	24.7	29.5	27.6	26.1	52.9	26.6	58.2	42.1	48.8	43.7	38.8	58.2
Mean num. of days with >= 0.2mm	19	17	20	15	16	16	16	17	17	19	18	19	209

Mean num. of days with >= 1.0mm	15	13	15	11	12	11	11	13	12	14	13	14	154
Mean num. of days with >= 5.0mm	6	5	5	4	5	4	3	5	4	6	6	7	60
WIND (knots)													
Mean monthly speed	9.0	9.1	9.1	7.7	7.3	6.7	6.4	6.3	6.7	7.5	7.8	8.3	7.6
Max. gust	67	71	59	56	58	48	48	50	51	59	62	73	58.5
Max. mean 10-minute speed	38	36	36	30	34	26	27	28	32	36	32	39	32.8
Mean num. of days with gales	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.8
WEATHER (Mean No. of Days With:)													
Snow or sleet	5.0	4.4	3.5	1.6	0.2	0.0	0.0	0.0	0.0	0.0	0.4	2.7	17.8
Snow lying at 0900UTC	2.7	0.9	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	5.7
Hail	0.6	0.9	2.0	2.0	1.1	0.2	0.1	0.1	0.1	0.5	0.2	0.3	8.1
Thunder	0.1	0.2	0.2	0.3	0.9	0.9	1.2	0.8	0.1	0.1	0.1	0.1	4.9
Fog	3.4	3.0	2.4	2.0	1.8	1.3	1.9	2.9	4.0	4.1	4.1	4.3	35.1

overleaf. The wettest months are October and December, April and July are usually the driest. July is the warmest month with an average temperature of 15.2° Celsius.

Table 10-5 Data from Met Éireann Weather Station at Mullingar, 1979 to 2008

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
mean daily max	7.4	7.9	9.8	12.1	14.9	17.3	19.2	18.9	16.7	13.2	9.9	7.9	12.9
mean daily min	1.5	1.5	2.8	4.1	6.3	9.2	11.1	10.8	8.9	6.2	3.5	2.2	5.7
mean temperature	4.5	4.7	6.3	8.1	10.6	13.2	15.2	14.8	12.8	9.7	6.7	5	9.3
absolute max.	13.8	15.4	19.1	21.6	25	28.3	29.7	29.1	25	20.1	17.3	14.6	29.7
absolute min.	-14.9	-6.6	-8.0	-4.4	-2.6	0.2	3.8	2.1	0.0	-4.4	-6.9	-12.4	-14.9
RELATIVE HUMIDITY (%)													
mean at 0900UTC	90.8	89.8	87.6	81.9	78.3	79.7	82.1	84.8	87.6	89.9	91.7	91.8	86.3
mean at 1500UTC	83.4	77.8	72.8	68.1	67.1	69.1	69.9	70.6	72.1	77.0	82.2	85.9	74.7
SUNSHINE (Hours)													
mean daily duration	1.8	2.5	3.2	4.9	5.8	5.0	4.6	4.6	3.9	3.2	2.2	1.6	3.6
greatest daily duration	8.2	9.9	10.9	13.6	15.4	15.9	15.3	14.4	12.2	10.1	8.6	7.3	15.9
mean num. of days with no sun	10.3	7.2	5.3	2.9	1.9	2.2	1.8	1.9	3.3	5.7	8.4	11.0	62.0
RAINFALL (mm)													
mean monthly total	91.7	72.0	78.3	62.1	68.7	70.5	61.8	80.8	73.8	102.1	82.4	97.1	941.3
greatest daily total	30.3	24.7	29.5	27.6	26.1	52.9	26.6	58.2	42.1	48.8	43.7	38.8	58.2
mean num. of days with >= 0.2mm	19	17	20	15	16	16	16	17	17	19	18	19	209
mean num. of days with >= 1.0mm	15	13	15	11	12	11	11	13	12	14	13	14	154
mean num. of days with >= 5.0mm	6	5	5	4	5	4	3	5	4	6	6	7	60
WIND (knots)													
mean monthly speed	9.0	9.1	9.1	7.7	7.3	6.7	6.4	6.3	6.7	7.5	7.8	8.3	7.6
max. gust	67	71	59	56	58	48	48	50	51	59	62	73	58.5
max. mean 10-minute speed	38	36	36	30	34	26	27	28	32	36	32	39	32.8
mean num. of days with gales	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.8
WEATHER (Mean No. of Days With:)													
now or sleet	5.0	4.4	3.5	1.6	0.2	0.0	0.0	0.0	0.0	0.0	0.4	2.7	17.8
hail	0.6	0.9	2.0	2.0	1.1	0.2	0.1	0.1	0.1	0.5	0.2	0.3	8.1

thunder	0.1	0.2	0.2	0.3	0.9	0.9	1.2	0.8	0.1	0.1	0.1	0.1	4.9
fog	3.4	3.0	2.4	2.0	1.8	1.3	1.9	2.9	4.0	4.1	4.1	4.3	35.1

10.2.5.2 Potential Impacts – Planting Phase

10.2.5.2.1 *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.

10.2.5.3 Potential Impacts – Operational Phase

10.2.5.3.1 *Long Term Slight Positive Impact*

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

10.2.5.4 Residual Impacts

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

10.2.5.5 Significance of the Effects

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

10.3 Noise

10.3.1 Replanting Area 1: Cloonbony, Co. Longford

10.3.1.1 Receiving Environment

The nearest sensitive location to the afforestation site is the residential dwelling located approximately 490 metres to the south of the site. In general, the existing noise climate is typical of a rural agricultural location. There are existing peat harvesting sites and a small number of agricultural yards in the vicinity of the site.

10.3.1.2 Likely and Significant Impacts and Associated Mitigation Measures

10.3.1.2.1 *'Do-Nothing' Scenario*

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

10.3.1.3 Planting Phase

10.3.1.3.1 *Construction Activities*

There will potentially be an increase in noise levels in the vicinity of the proposed development 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 in order to mitigate the potentially imperceptible short-term negative impact associated with this phase of the development. 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.

10.3.1.4 Operational Phase

10.3.1.4.1 *Negative Slight Short-term Impact*

There will be an intermittent increase in noise levels in the vicinity of the proposed development 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 development. 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.

10.3.2 Replanting Area 2: Lisduff, Co. Mayo

10.3.2.1 Receiving Environment

The nearest sensitive locations to the Lisduff afforestation site is mixture of farm and residential dwellings on the local road which separates the three parcels of afforestation land. In general, the existing noise climate is typical of a rural agricultural location.

10.3.2.2 Likely and Significant Impacts and Associated Mitigation Measures

10.3.2.2.1 *'Do-Nothing' Scenario*

The land has been Technically Approved and will be afforested should the proposed Slieveacurry Renewable Energy Development proceed or not. If the land was not replanted, the current land use of agriculture would continue at the site.

10.3.2.3 Planting Phase

10.3.2.3.1 *Construction Activities*

There will potentially be an increase in noise levels in the vicinity of the proposed development 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 in order to mitigate the potentially imperceptible short-term negative impact associated with this phase of the development. 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.

10.3.2.4 Operational Phase

10.3.2.4.1 *Negative Slight Short-term Impact*

There will be an intermittent increase in noise levels in the vicinity of the proposed development 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 development. 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.

10.3.3 Replanting Area 3: Sheehaun, Co. Roscommon

10.3.3.1 Receiving Environment

The nearest sensitive locations to the afforestation site are the residential dwellings located along the local road to the south west of the site. In general, the existing noise climate is typical of a rural agricultural location. There are existing forestry plantations located in the vicinity of the site, along with a small number of agricultural yards.

10.3.3.2 Likely and Significant Impacts and Associated Mitigation Measures

10.3.3.2.1 *'Do-Nothing' Scenario*

The land has been Technically Approved and will be afforested should the proposed Slieveacurry Wind Farm proceed or not.

10.3.3.3 Planting Phase

10.3.3.3.1 *Construction Activities*

There will potentially be an increase in noise levels in the vicinity of the proposed development 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 in order to mitigate the potentially imperceptible short-term negative impact associated with this phase of the development. 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.

Residual Impacts

Potential residual impacts will be imperceptible and temporary in nature

Significance of the Effects

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

10.3.3.4 Operational Phase

10.3.3.4.1 *Negative Slight Short-term Impact*

There will be an intermittent increase in noise levels in the vicinity of the proposed development 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 development. 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 at this site.

10.3.3.5 Cumulative Effect

Potential cumulative effects on air quality, climate and noise between the replanting site and other developments in the vicinity were also considered as part of this assessment. The developments considered as part of the cumulative effect assessment are described in Section 2.3 of this report. No projects or plans were identified that would be incompatible with the proposed replanting site to give rise to significant cumulative impacts.

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 Further Information Response document include population, employment, health and safety, land-use, residential amenity, community facilities and services, and tourism.

11.1 Replanting Area 1: Cloonbony, Co. Longford

11.1.1 Baseline Environment

The proposed replanting land at Cloonbony is located approximately 2 km northeast of the town of Lanesborough. The replanting site is located within the District Electoral Division (DED) of Rathcline. The number of households recorded within the DED during the 2016 Census was 595 households. The proposed replanting site is located adjacent to a local road. The nearest sensitive location to the afforestation site is the residential dwelling located approximately 490 metres to the south of the site.

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 Rathcline DED is within the 'All others gainfully occupied and unknown', 'Non-manual' and 'Manual skilled' categories at 117 persons, 99 persons and 86 persons, respectively. The total population in this DED in Census 2016 was 1,443.

11.1.1.2 Land-use

The current land-use on the proposed replanting area is agriculture. This site is located within a rural, working landscape in which agriculture and peat cutting form the primary land-uses. Existing forestry can be found immediately 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 Lanesborough, approximately 2km south of the site.

11.1.1.4 Tourism

Ireland is divided into seven tourism regions. The Mid East/Midlands Region, in which the site of the replanting site is located, comprises Counties Kildare, Louth, Laois, Longford, Meath, Offaly, Westmeath and Wicklow.

The nearest tourist attractions to the replanting area is the Corlea Bog Amenity Walk and Corlea Trackway Visiting Centre which is located approximately 10km to the southeast 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 Slieveacurry Renewable Energy Development proceed or not. If the land was not replanted, the current use of land for agriculture 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 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.

11.2 Replanting Area 2: Lisduff, Co. Mayo

11.2.1 Baseline Environment

The Lisduff site is approximately 2.4 km southwest of the town of Ballyhaunis, Co. Mayo. The site is located within the District Electoral Division (DED) of Ballyhaunis. The number of households recorded within the DED during the 2016 Census was 1,058 households. The overall level of residential development in the area around the site is low, with intermittent farms and some houses located along the local road that separates the three parcels of land that make up the afforestation site. The nearest major settlement to the proposed replanting site is Ballyhaunis, located approximately 2.4 kilometres to the northeast of the site.

11.2.1.1 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 Ballyhaunis DED is within the 'All others gainfully occupied and unknown', 'Manual skilled' and 'Semi-skilled' at 268, 181 and 138 persons, respectively. The total population in this DED in Census 2016 was 3,057.

11.2.1.2 Land-use

The current land-use on the proposed replanting area is agriculture. This site is located within a rural, working landscape in which agriculture form the primary land-uses. Existing forestry can be found immediately to the northeast of the site. There are also a number of existing forestry plantations located within 5km of the proposed replanting site.

11.2.1.3 Community Facilities and Amenities

There are no community facilities or amenities located within or in the vicinity of the proposed replanting site. The nearest retail services, schools and community facilities to the sites are located in the village of Ballyhaunis, approximately 2.4 kilometres to the northeast of the site.

11.2.1.4 Tourism

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

There are no tourist attractions located in the vicinity of the proposed replanting site. The nearest tourist destinations are Knock Shrine located approximately 10 kilometres to the northwest of the site and Urlaur Abbey which is located approximately 12.4 kilometres to the northeast of the site.

11.2.2 Potential Impacts

11.2.2.1 'Do-Nothing' Scenario

In the event that the proposed Slieveacurry Renewable Energy Development does not proceed, the proposed replanting land at Lisduff will still be afforested, as per the specifications of the Technical Approval document for the site. If the land was not replanted, the current use of land for agriculture would continue at the site.

11.2.2.2 Population

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

11.2.2.3 Employment

The preparation and planting of the proposed replanting land 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.

11.2.2.4 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 2005 and the Safety, Health and Welfare at Work (General Application) Regulations 2007 as amended, 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 land. The residual potential for a significant negative impact on worker and public health and safety is therefore reduced to minimal.

11.2.2.5 Land-use

The current land-use on the proposed replanting area is agriculture. This site is located within a rural, working landscape in which agriculture form the primary land-uses. There are a number of existing forestry plantations located within 5km of the proposed replanting site. The impact of the change in land-use is therefore neutral, i.e. a change which does not affect the quality of the environment.

11.2.2.6 Residential Amenity

Planting at the site will have a short-term, slight negative impact on the residential amenity of dwellings dotted along the local road that separates the parcels of land as a result of the of site activity/disturbance during the replanting phase. In the longer term, nearby views from these houses will be restricted by forestry. However, existing forestry can be found to the northeast of the site and therefore, the additional forestry attributed by the replanting site will be visually indistinguishable from the existing surrounding forestry.

11.2.2.7 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.

11.2.2.8 Tourism

Afforestation of the proposed replanting land will have no impact on tourism. There are no tourist facilities or attractions located on or in the immediate vicinity of the proposed replanting land.

11.2.2.9 Significance of Effects

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

11.2.2.10 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.

11.3 Replanting Area 3: Sheehaun, Co. Roscommon

11.3.1 Baseline Environment

The Sheehaun site is located approximately 3.5 kilometres to the northwest of Lanesborough, Co. Longford and 10 kilometres to the northeast of Roscommon town, Co. Roscommon. The site is located within the District Electoral Division (DED) of Kilgefin. The proposed replanting site is accessed from a local road to the west of the site. The overall level of residential development in the area around the site is low, and comprises one-off houses located along the local road. The nearest major settlement to the proposed replanting site is Lanesborough, located approximately 3.5 kilometres to the southeast of the site.

11.3.1.1 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 Kilgefin DED is within the 'Non-manual' and 'Lower Professional' categories at 70 persons and 48 persons, respectively. The total population in this DED in Census 2016 was 318.

11.3.1.2 Land-use

The current land-use on the proposed replanting area is agriculture. This site is located within a rural, working landscape in which agriculture and forestry form the primary land-uses. There are areas of existing coniferous forestry to the north, south and east of the site.

11.3.1.3 Community Facilities and Amenities

There are no community facilities or amenities located within or in the vicinity of the proposed replanting site. The nearest retail services, schools and community facilities to the sites are located in the town of Lanesborough, located approximately 3.5 kilometres to the southeast of the site.

11.3.1.4 Tourism

Ireland is divided into eight tourism regions. The West region, in which the Sheehaun site is located, comprises Counties Galway, Mayo and Roscommon. There are no tourist attractions located in the vicinity of the proposed replanting sites. The nearest tourist attractions or facilities are located in the

village of Lanesborough, including B&B's, Pubs and a marina. The nearest walking route, 'Lanesborough Commons Walk' is located to the south of the Lanesborough town.

11.3.2 Impact Assessment and Proposed Mitigation Measures

11.3.2.1 'Do-Nothing' Scenario

The lands have been Technically Approved and will be afforested should the Slieveacurry Renewable Energy Development proceed or not.

11.3.2.1.1 *Population*

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

11.3.2.1.2 *Employment*

The preparation and planting of the proposed replanting land 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.

11.3.2.1.3 *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 2005 and the Safety, Health and Welfare at Work (General Application) Regulations 2007 as amended, 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 land. The residual potential for a significant negative impact on worker and public health and safety is therefore reduced to minimal.

11.3.2.1.4 *Land-use*

Afforestation of the proposed 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 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.

11.3.2.1.5 *Residential Amenity*

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

11.3.2.1.6 *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, as described in Section 12.1.1.4 above. 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.

11.3.2.1.7 *Tourism*

Afforestation of the proposed replanting land will have no impact on tourism. There are no tourist facilities or attractions located on or in the immediate vicinity of the proposed replanting land. Forestry is an established land-use in this area, and a common feature in the landscape.

11.3.2.2 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.

11.3.2.3 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 Replanting Area 1: Cloonbony, Co. Longford

12.1.1 Transportation

The site is accessed off a local unnamed road which bounds the site to the west. 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. This site is located adjacent an existing road network with which will not require upgrading or alteration.

12.1.2 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.

12.1.3 Potential Impacts

12.1.3.1 'Do-Nothing' Scenario

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

12.1.3.2 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.

12.1.3.3 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.

12.1.3.4 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.

12.1.3.5 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.

12.2 Replanting Area 2: Lisduff, Co. Mayo

12.2.1 Transportation

The proposed replanting site is accessed via an unnamed road which travels between the parcels of land.

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 can occur within 0.8-1 km of access points (roads and tracks) to the main forest body. Due to the small size of the proposed replanting area, additional access tracks or roads will not be required.

12.2.2 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. The use of the proposed replanting lands for coniferous forestry will have a positive effect on the economic assets of the site.

12.2.3 Potential Impacts

12.2.3.1 'Do-Nothing' Scenario

In the event that the proposed development at the Slieveacurry Renewable Energy Development does not proceed, the proposed replanting land at Lisduff will still be afforested, as per the specifications of the Technical Approval document for the site.

12.2.3.2 Traffic

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

12.2.3.3 Land-use

The use of the proposed replanting land for coniferous forestry will have a positive effect on the economic assets of the site. In terms of the wider landscape, afforestation of the proposed site will be assimilated easily into the received environment.

12.2.3.4 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.

12.2.3.5 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.

12.3 Replanting Area 1: Sheehaun, Co. Roscommon

12.3.1 Transportation

The proposed replanting site is accessed via a local road, which runs along the southern border 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 can occur within 0.8-1 km of access points (roads and tracks) to the main forest body. Due to the small size of the proposed replanting area, additional access tracks or roads will not be required.

12.3.2 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. The use of the proposed replanting lands for coniferous forestry will have a positive effect on the economic assets of the site.

12.3.3 Potential Impacts

12.3.3.1 'Do-Nothing' Scenario

The lands have been Technically Approved and will be afforested should the Slieveacurry Renewable Energy Development proceed or not.

12.3.3.2 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.

12.3.3.3 Land-use

The use of the proposed replanting land for coniferous forestry will have a positive effect on the economic assets of the site. In terms of the wider landscape, afforestation of the proposed site will be assimilated easily into the received environment.

12.3.3.4 Significance of the Effects

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

12.3.3.5 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

2003 36748

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

Copy S. Hagan

JOHN O'REILLY
GREEN BELT LTD
MAIN STREET
VIRGINIA
CO CAVAN

02/04/2020

Bertie Hynes

Application for Technical Approval for an Afforestation Licence

Forest Owner	FO138908B
Contract Number	CN85359
Townland	Cloonbony
County	Longford
Approved Area (ha)	10.06
Fencing Length (lm)	950.00

RECEIVED
05 APR 2020

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

28 day hold up 30/4/20

3. Satisfactory completion of the work not later than 02/04/2023.

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.

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, it is open to you to appeal against it to the Forestry Appeals Committee (FAC) which operates independently of this Department. In accordance with the provisions of the Forestry Appeals Committee Regulations 2018 (S.I. No. 68 of 2018) a notice of appeal must be submitted in writing to the chairperson of the FAC within 28 days of the date of this letter. A Notice of Appeal Form and the Procedures for Appeals to the FAC can be found on www.agriappeals.gov.ie/forestryappealscommittee/. Copies can also be obtained by calling the FAC on Lo Call 076 106 4418 or 057 863 1900. The notice of appeal must include your name and address, grounds of appeal including the facts and contentions on which you intend to rely together with such documentary evidence that you wish to submit in support of your appeal.

Yours sincerely

COLIN GALLAGHER
Approval Section
Forestry Division

APPENDIX A

Department of Agriculture, Food and the Marine

Operational Proposals for Technical Approval for an Afforestation Licence

Forest Owner Number	FO138908B
Contract Number	CN85359
Townland	Cloonbony
County	Longford
Area Approved	10.06(ha)
Fencing Length (LM)	950.00

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	Required
2.	Drainage Comment	500
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	50
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	500
Ground Prep.		
1.	Woody Weed Removal	Yes
2.	Ripping	Yes
3.	Pit Plant	Not Entered
4.	Mole Drainage	Not Entered
5.	Mounding	Yes
6.	Ploughing	Not Entered
9.	Other Details	50
Planting Method		
1.	Angle Notch	Not Entered
2.	Pit	Not Entered
3.	Machine	Not Entered

4.	Slit	Yes
5.	Other Details	50
Road Access		
1.	Road Access	Provided
Standard Stocking		
1.	Standard Stocking	Yes
2.	Details	50
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	Not Entered

Fencing Details (metres)				
	Stock	200	Stock-Sheep	750
	Stock-Rabbit	0	Upgrade to Deer	0
	Deer-Rabbit	0	Deer	0
	Upgrade Existing Fence(s)	N	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	6.73	GPC 3	CHF	SS	6.29	22	Pure		
				BI	1.11	6			
2	3.33	GPC 3	CHF	SS	2.83	22	Pure		
				BI	.5	6			

CN85359

Scale 1: 5000

Legend

- Afforestation
- Latest Imagery
- Townlands

Printout from eSpatial iSMART

eSpatial

Certified Species Information

Contract Number	CN85359
Townland	Cloonbony
County	Longford
6" OS No:	LD12

Plot No	GPC	Parcel No	GPC Area(H)	Land Use Type	Species Area	Species	Mixture Type	Excl Area(h)	Excl Type
1	3	48398709	6.73	CHF	7.4	BI,SS	Pure	0	
2	3	48398708	3.33	CHF	3.33	BI,SS	Pure	0	
		TOTALS	**10.06**		**10.73**			**0**	

Remarks:

Area Surveyed By: **Date:**

Species Certified By: **Date:**

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

MS NOREEN FAHY
HOLYWELL
BALLYHAUNIS
CO MAYO

21/02/2019

Application for Technical Approval for an Afforestation Licence

Forest Owner	FO139178S
Contract Number	CN82775
Townland	Lisduff, Derreens
County	Mayo
Approved Area (ha)	13.5
Fencing Length (lm)	1,900.00

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 19/02/2022.

4. Compliance with Operational Proposals and Specifications enclosed.

5. Compliance with Departmental guidelines and requirements for Landscape, Water Quality, Harvesting, Biodiversity and Archaeology.

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

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 to the specific Archaeological conditions attached,
- Only fencing that is required will be eligible for grant aid,
- Adhere to Environmental Requirements for Afforestation,
- All guidelines to apply

Specific Archaeological Conditions:
100m square archaeological exclusion zone to be established around the feature of archaeological potential within the proposed development area, as illustrated. To be laid out under archaeological supervision. Fencing plus access.
A structured programme of archaeological monitoring by a suitably qualified archaeologist retained at the licence holder's own expense (or that of his/her Registered Forester) will also be necessary for all ground preparation and drainage works undertaken in relation to the development in the remainder of the field containing the feature of archaeological potential, as highlighted in pink on the map accompanying the archaeological report.
See attached archaeological report and accompanying illustrative map for further details, including specific measurements.
Barry Fitzgibbon
Archaeologist Grade III
01.02.2019

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

_____

APPENDIX 4

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

Department of Agriculture, Food and the Marine

Operational Proposals for Technical Approval for an Afforestation Licence

Forest Owner Number	FO139178S
Contract Number	CN82775
Townland	Lisduff, Derreens
County	Mayo
Area Approved	13.5(ha)
Fencing Length (LM)	1,900.00

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	500
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	50
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	500
Ground Prep.		
1.	Woody Weed Removal	Not Entered
2.	Ripping	Not Entered
3.	Pit Plant	Not Entered
4.	Mole Drainage	Not Entered
5.	Mounding	Yes
6.	Ploughing	Not Entered
9.	Other Details	50
Planting Method		
1.	Angle Notch	Not Entered
2.	Pit	Not Entered
3.	Machine	Not Entered

Certified Species Information

Contract Number	CN82775
Townland	Lisduff, Derreens
County	Mayo
6" OS No:	MO102

Plot No	GPC	Parcel No	GPC Area(H)	Land Use Type	Species Area	Species	Mixture Type	Excl Area(h)	Excl Type
1	3	48223736	.87	CHF	.87	ADB,SS	Integrated Mix	0	
2	3	48223720	5.55	CHF	5.55	ADB,SS	Integrated Mix	0	
3	3	48223698	6.72	CHF	6.72	ADB,SS	Integrated Mix	0	
4	3	48223722	.26	Bio	0		None	0	
5	3	48243729	.1	Bio	0		None	0	
		TOTALS	**13.5**		**13.14**			**0**	

Remarks:

Area Surveyed By: **Date:**

Species Certified By: **Date:**

190135966 - Malachy Murphy
VSC

RECEIVED
30 MAY 2019

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

JOHN O'REILLY
GREEN BELT LTD
MAIN STREET
VIRGINIA
CO CAVAN

28 day up 24/6/19
28/05/2019

Application for Technical Approval for an Afforestation Licence

copy to Joe Tansey

Forest Owner	FO130973S
Contract Number	CN82803
Townland	Sheehaun (morton)
County	Roscommon
Approved Area (ha)	7.73
Fencing Length (lm)	1,400.00

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

* Note Cont on Pg 4

3. Satisfactory completion of the work not later than 28/05/2022.

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

- Only required fencing as stipulated in Section 12 of the Forestry Standards Manual will be eligable for payment,
- Adhere to Environmental Requirements for Afforestation,
- All guidelines to apply,
- Adhere to forestry & water quality guidelines

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

APPENDIX A

Department of Agriculture, Food and the Marine

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

Operational Proposals for Technical Approval for an Afforestation Licence

Forest Owner Number	FO130973S
Contract Number	CN82803
Townland	Sheehaun (morton)
County	Roscommon
Area Approved	7.73(ha)
Fencing Length (LM)	1,400.00

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	500
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	50
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	500
Ground Prep.		
1.	Woody Weed Removal	Yes
2.	Ripping	Not Entered
3.	Pit Plant	Not Entered
4.	Mole Drainage	Not Entered
5.	Mounding	Yes
6.	Ploughing	Not Entered
9.	Other Details	50
Planting Method		
1.	Angle Notch	Yes
2.	Pit	Not Entered
3.	Machine	Not Entered

4.	Slit	Not Entered
5.	Other Details	50
Road Access		
1.	Road Access	Provided
Standard Stocking		
1.	Standard Stocking	Yes
2.	Details	50
Weed Control		
1.	Herbicide Control yr0	Not Entered
2.	Herbicide Control yr1	Yes
3.	Herbicide Control yr2	Yes
3.	Herbicide Control yr4	Not Entered
4.	Manual	Not Entered
4.	Herbicide Control yr3	Not Entered

Fencing Details (metres)	Stock	1400	Stock-Sheep	0
	Stock-Rabbit	0	Upgrade to Deer	0
	Deer-Rabbit	0	Deer	0
	Upgrade Existing Fence(s)	N	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	7.48	GPC 3	CHF	SS	6.7	24	Pure		
				PO	1.2	8			
2	.25	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

Only required fencing as stipulated in Section 12 of the Forestry Standards Manual will be eligable for payment,
Adhere to Environmental Requirements for Afforestation,
All guidelines to apply,
Adhere to forestry & water quality guidelines

Contract: **CN82803**

Scale 1: 5000

Certified Species Information

Contract Number	CN82803
Townland	Sheehaun (morton)
County	Roscommon
6" OS No:	RN36

Plot No	GPC	Parcel No	GPC Area(H)	Land Use Type	Species Area	Species	Mixture Type	Excl Area(h)	Excl Type
1	3	49016894	7.48	CHF	7.9	PO,SS	Pure	0	
2	3	49016856	.25	Bio	0		None	0	
		TOTALS	**7.73**		**7.9**			**0**	

Remarks:

Area Surveyed By: **Date:**

Species Certified By: **Date:**