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GEOSOLUTIONS

Illaunbaun Wind Farm - Environmental Impact Assessment Report

Chapter 20 – Forestry

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LIST OF ACRONYMS

AA	Appropriate Assessment
ALD	Common Alder
BA	Bachelor of Art
BSc	Bachelor of Science
DAFM	Department of Agriculture, Food and the Marine
DBH	Diameter at Breast Height
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
GIS	Geographic Information System
LP	Lodgepole Pine
MSc	Master of Science
MSIF	Member of the Society of Irish Foresters
NHA	Natural Heritage Area
NPWS	National Parks and Wildlife Service
SAC	Special Area of Conservation
SMR	Sites and Monuments Record
SPA	Special Protection Area
SS	Sitka Spruce
YC	Yield Class

GLOSSARY OF TERMS

Afforestation	The establishment of a forest in areas where the preceding land use was not forestry.
Aquatic zone	Any natural river, stream or lake which feature on an Ordnance Survey 6-inch map.
Clear-felling	The final stage in a typical commercial forestry crop cycle, where an entire standing crop of trees is removed from an area.
Construction felling	Relates to the construction phase of a wind farm development, where the temporary removal of trees is required to facilitate the construction works (e.g. borrow pits for stone; temporary site compounds).
Coupe	A small area of forest within a compartment that is harvested in a single operation.
Diameter at breast height (DBH)	A standard unit of measurement in forestry used to estimate tree volume/weight – the diameter of a tree is measured with a DBH tape at 1.3 metres (4.5 feet) above the ground.
Endemic windblow	The uprooting of trees in forests during typical winter storm events.
Eutrophication	A process where a high concentration of nutrients is introduced into a watercourse which promotes excessive growth of algae and can deplete oxygen levels in the water and deleteriously affect aquatic life.
Exclusion zone	A specific area where harvesting machines are not permitted to enter for environmental protection.
Hectare	A unit of land area equal to 10,000 square metres, or 2.4711 acres.
Infrastructure felling	Relates to trees that are permanently removed from a site in order to make way for infrastructure associated with a wind farm, such as access roads and turbine bases.
Keyhole felling	Selective felling confined to areas intersecting with infrastructure footprints, reducing the extent of felling required.
Mounding	A method of ground preparation formed by an excavator digging drains at regular intervals (typically 12 metres) and heaping the spoil in mounds. Trees are then planted into the mounds, which provide an elevated, vegetation-free planting zone which promotes better root development.
Natural regeneration	Describes the renewal of forests via seeds that fall from trees and germinate *in situ*.

Pallet wood	Wood cut from the middle section of trees – used for packaging, panels and garden furniture.
Plantation	A forest or tree crop established by the planting of saplings or seedling, especially for commercial purposes.
Relevant watercourse	Any watercourse (other than an aquatic zone) that could potentially serve as a pathway for the movement of large amounts of sediment and/or nutrients from a site to an aquatic zone. These include existing channels, drains or other potential pathways that may contain flowing water during / immediately after periods of rain.
Rotation	The number of years required to establish and grow a timber crop to a specified condition of maturity and harvested.
Setback area	Setback areas are used at afforestation or reforestation to introduce a buffer strip between a new forest and sensitive habitats or features.
Stakewood	Wood taken from the middle section of a tree during first thinning – used for stakes and fencing products.
Stand	An aggregation of trees occupying a specific area, which are uniform enough in composition (species), age and arrangement to be distinguishable from forestry in adjoining areas - considered a homogenous unit for management purposes.
Top height	The average height of a number of top height trees in a stand, where one top height tree is the tree of largest diameter at breast height (DBH) in a 0.01 ha sample plot.
Turbulence felling	Felling in the vicinity of turbines for the purpose of avoiding air turbulence that can be created by the forest canopy. It is carried out in order to increase the efficiency of the turbines and to reduce stress on the turbine components.
Windblow	The uprooting and overturning of a tree or a number of trees by wind force – often due to restricted rooting or canopy disruption.
Yield Class (YC)	An estimate of the productivity of yield of a forest, expressed as cubic metres per hectare per year (m^3/ha/year).

20 FORESTRY

20.1 INTRODUCTION

This chapter of the Environmental Impact Assessment (EIA) Report presents the assessment of the likely significant effects (as per the "EIA Regulations") of the Proposed Development on Forestry arising from the construction and operation of the Proposed Development. The primary purpose of this report is to describe the existing forestry within the receiving environment and to analyse any potential development-related effects on it.

This chapter comprises the following elements:

- Summary of relevant policy and guidance
- Methodology followed and data sources used in assessing the impacts of the Proposed Development
- Description of the baseline forestry conditions
- Assessment of likely effects arising from the construction of the Proposed Development
- Identification of mitigation measures in respect of any potential significant effects
- Summary of the compensatory planting requirements associated with the construction of the Proposed Development

20.1.1 RELEVANT LEGISLATION AND GUIDELINES

The policy, legislation, plans and guidance applicable to this chapter are presented in Table 20-1.

Table 20-1: Relevant Policy and Guidance

Name	Publisher	Year	Scale
Forestry Act 2014	Government of Ireland	2014	National
S.I. No. 191/2017 – Forestry Regulations 2017	Government of Ireland	2017	National
S.I. No. 31/2020 - Forestry (Amendment) Regulations	Government of Ireland	2020	National
Forestry Standards Manual	Department of Agriculture, Food and the Marine (DAFM)	2024	National
Environmental Requirements for Afforestation	Department of Agriculture, Food and the Marine (DAFM)	2024	National
Afforestation Scheme 2023-2027 Document	Forestry Division, Department of Agriculture, Food and the Marine (DAFM)	2024	National

Name	Publisher	Year	Scale
Standards for Felling & Reforestation	Department of Agriculture, Food and the Marine (DAFM)	2019	National
Felling and Reforestation Policy	Forest Service, Department of Agriculture, Food and the Marine (DAFM)	2017	National
Forest Protection Guidelines	Forest Service, Department of Communications, Marine and Natural Resources	2002	National
Code of Best Forest Practice	Forest Service, Department of the Marine and Natural Resources	2000	National
Forest Biodiversity Guidelines	Forest Service, Department of the Marine and Natural Resources	2000	National
Forest Harvesting and the Environment Guidelines	Forest Service, Department of the Marine and Natural Resources	2000	National
Forestry and Water Quality Guidelines	Forest Service, Department of the Marine and Natural Resources	2000	National
Forestry and the Landscape Guidelines	Forest Service, Department of the Marine and Natural Resources	2000	National
Forestry and Archaeology Guidelines	Forest Service, Department of the Marine and Natural Resources	2000	National

20.2 ASSESSMENT METHODOLOGY

The methodology for this report included a review of all relevant legislation and guidance documents, a desk-based study to determine all relevant environmental/harvesting considerations, a site walkover to inspect forestry overlapping with the Proposed Development infrastructure, assessment of potential effects of the Proposed Development construction on forestry, and the identification of all relevant mitigation for the associated works, including the confirmation of compensatory afforestation requirements.

20.2.1 STATEMENT OF COMPETENCE

This report was a collaborative undertaking, prepared by the following Veon Forestry/GIS team members:

- Daragh Little: B.Ag.Sc in Forestry, M.S.I.F., 30+ years of experience.
- Martin Murphy: BSc (Hons) in Forestry, MSc (Agr), M.S.I.F., 2+ years of experience.
- Gráinne Murphy: BA in Geography, MSc in Geospatial Data Analysis, 4+ years of experience.

20.2.2 DATA SOURCES

The following data sources were used during the preparation of this report:

- IFORIS Online Mapping System – Department of Agriculture, Food and the Marine
- EPA Maps – Environmental Protection Agency (EPA)
- GIS spatial datasets: Special Area of Conservation (SAC); Special Protection Area (SPA); Natural Heritage Area (NHA) – National Parks and Wildlife Service (NPWS)
- EPA Maps application – Environmental Protection Agency (EPA)
- Heritage Maps Viewer – Heritage Council of Ireland
- Forest inventory data – Coillte

20.2.3 ASSESSMENT OF EFFECTS

Potential effects arising from the planned felling works for the construction of the Proposed Development were considered for existing forestry within the Proposed Development area.

20.3 BASELINE: FORESTRY IN RECEIVING ENVIRONMENT

20.3.1 SITE OVERVIEW

The Proposed Development Site is situated in western County Clare, approximately 4.2 km northeast of Milltown Malbay and 5.2 km southeast of Lahinch. Given the scale of the Proposed Development, the area incorporates a number of townlands: Tooreen, Slievenalicka, Illaunbaun, Lackamore and Drumbaun, although no infrastructure is proposed in the Lackamore townland(Figure 20-1).

The main approach roads to the site are the N67 and the N85. The wider area comprises a mixture of coniferous forestry and open peatland. The construction and operation of six turbines is planned with a tip height of 150 metres. The expected energy output of the Proposed Development is 75,000+MWh per annum - sufficient to power 15,000+ homes.

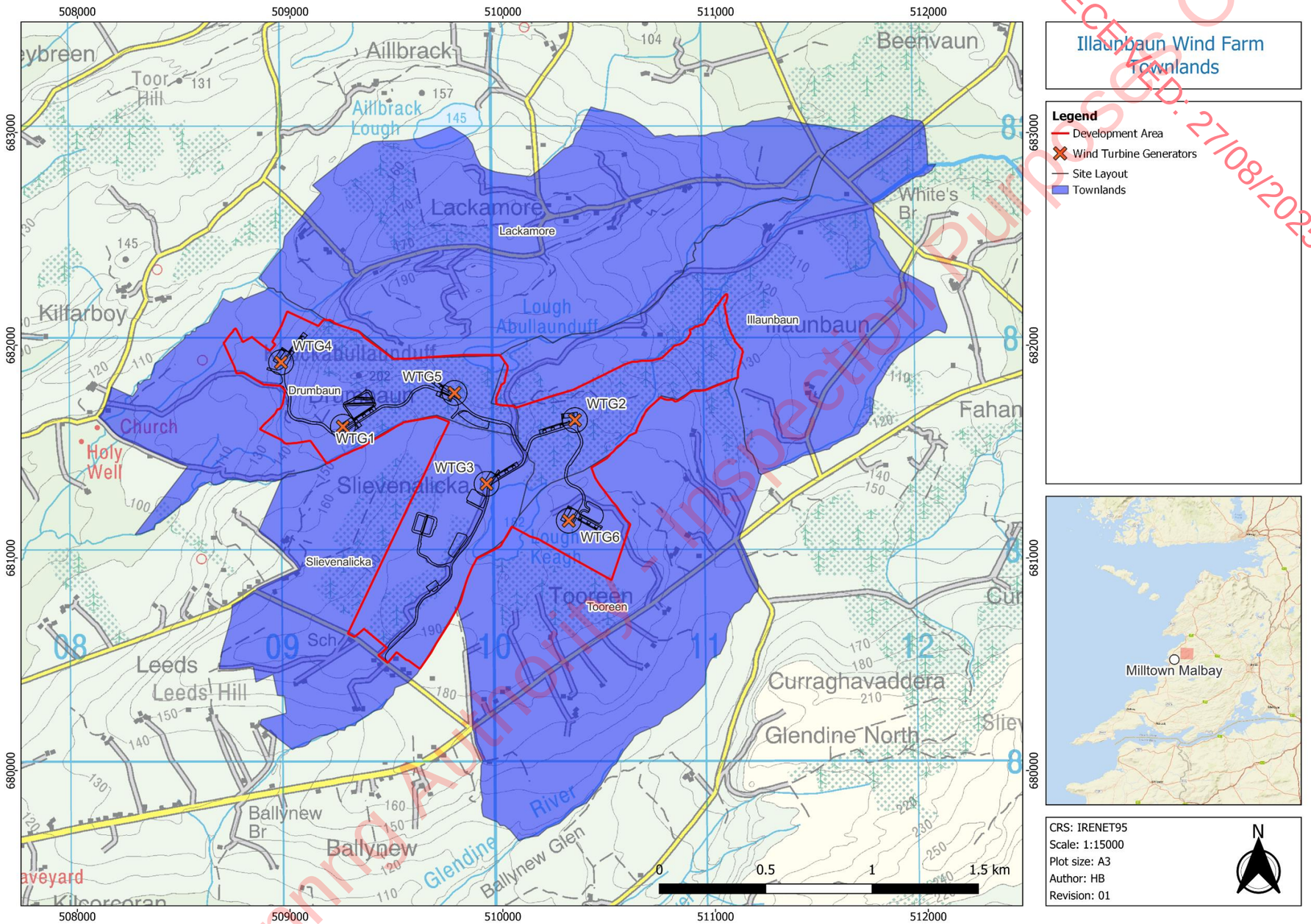

Figure 20-1: Location of the Proposed Development

20.3.2 EXISTING BASELINE FORESTRY

The Proposed Development area encompasses approximately 83 hectares of forestry. Approximately 47 hectares (57%) of this forestry is privately-owned, with the remainder being managed or owned by Coillte. The majority of this forestry is plantation forestry, which is being managed on a commercial basis. The resulting timber may be converted into construction timber and other wood products (e.g. stakewood or pallet wood) over the course of each respective rotation. The range of services that these types of forests would typically provide would be low, but would encompass carbon capture and some (limited) biodiversity. The locations of the forestry within the Proposed Development area are illustrated in Figure 20-2.

The elevation of the forestry varies from approximately 194-116 m above sea level, and the soil type present is predominantly peat. There are aquatic zones present with the development area, which exist within and adjacent to forestry (Table 20-2).

Table 20-2: EPA Aquatic zones adjacent to forestry

EPA Code	Name	Forestry Plot
N/A	Unnamed	P1
28B03	Ballinphonta	P2
28D20	Drumbaun 28	P4
N/A	Abullaunduff (Lough)	P4
N/A	Keagh (Lough)	C2
N/A	Unnamed	C6/C11/C12
28I03	Illaunbaun	C12

No recorded archaeological site or features exist within the Proposed Development area, though one is found contiguous to (i.e. ≤ 200 m) plot P1 - Table 20-3.

Table 20-3: Known archaeological features contiguous to forestry plots[1]

SMR No.	Townland	Class	ITM Coordinates
CL023-044	Drumbaun	Ringfort – rath	508592, 681938

There is no overlap with any designated conservation areas within the Proposed Development area, though several are found within 15 km of the Proposed Development area, as shown in Figure 20-3 and Table 20-4.

[1] *Data from the [NMS SMR] dataset accessed through the Heritage Maps Viewer at www.heritagemaps.ie*

Table 20-4: Designated conservation areas within 15 km of the Proposed Development

#	Name	Site Code
1	Cragnashingaun Bogs NHA	002400
2	Slievecallan Mountain Bog NHA	002397
3	Lough Naminna Bog NHA	002367
4	Lough Acrow Bogs NHA	002421
5	Carrowmore Point to Spanish Point and Islands SAC	001021
6	Carrowmore Dunes SAC	002250
7	Inagh River Estuary SAC	000036
8	Mid-Clare Coast SPA	004182
9	Cliffs of Moher SPA	004005

Figure 20-2: Existing forestry within the Proposed Development area

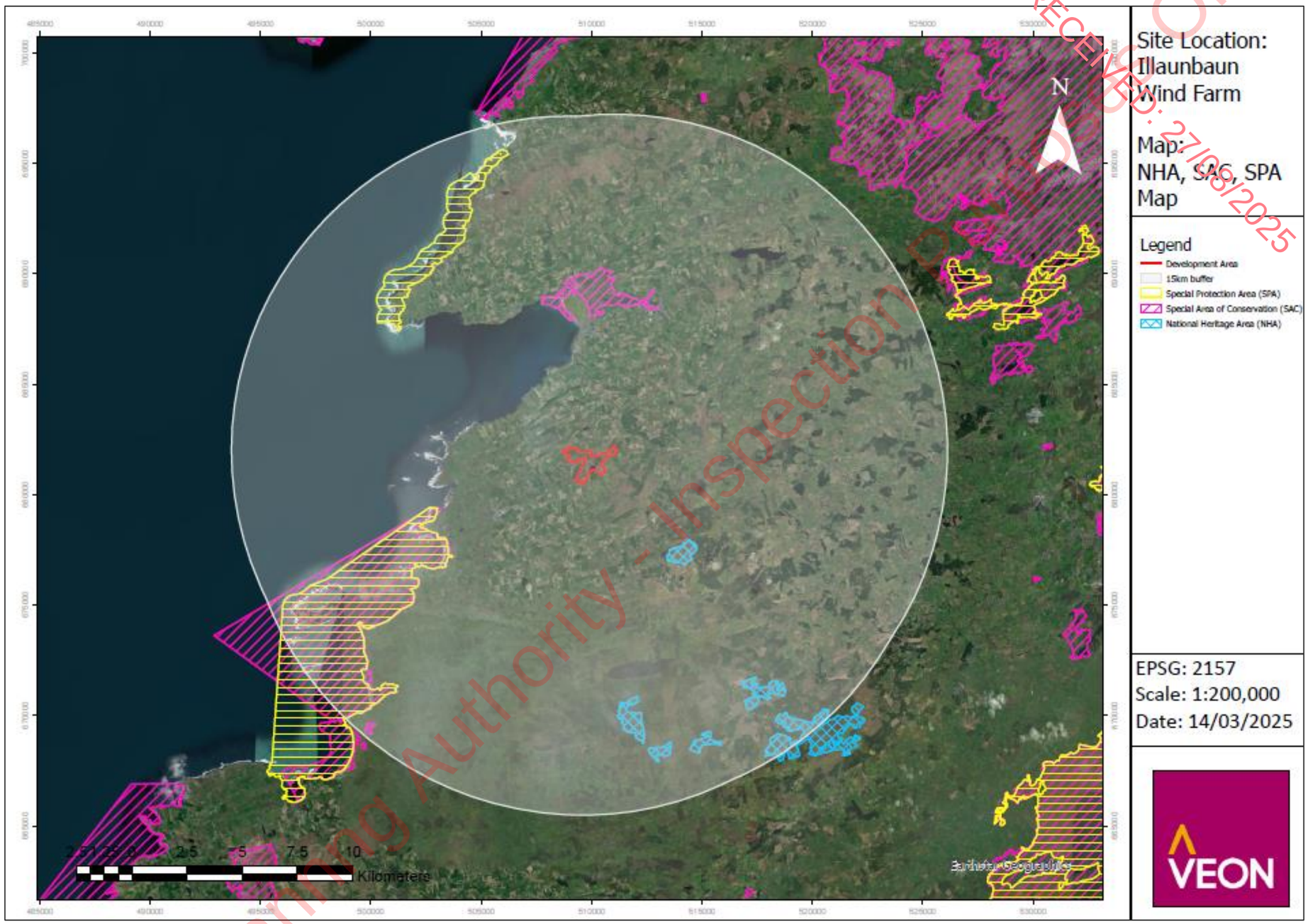

Figure 20-3: Designated conservation areas within 15 km of the Proposed Development

20.3.2.1 FORESTRY INTERACTING WITH THE PROPOSED DEVELOPMENT FOOTPRINT

The Proposed Development infrastructure footprint is illustrated in Figure 20-4.

To enable the construction of the Proposed Development, areas of forestry that interact with the infrastructural footprint will first need to be cleared of trees. In addition to the turbines, the planned access roads and other infrastructural elements of the Proposed Development will also interact with some of these forested areas. A summary of the affected forestry is presented in Table 20-5.

Table 20-5: Overview of forestry interacting with Proposed Development footprint

Forestry plot	Tree species	Planting Year	Est. Yield Class
P1	SS/ALD	2015	22
P2	SS	1993	8
P3	SS	1995	12
P4	SS	1996	8
P6	Open space	-	-
P7	SS	-	-
C2	LP/SS	1977	4/8
C3	SS	1977	6
C4	SS	1977	10
C5	SS	1977	6
C6	SS	1977	8
C7	Open space	-	-
C9	LP	1977	4

From a commercial standpoint, the forestry due to be felled to facilitate the Proposed Development construction is mostly characterised by poor timber quality, with low yield class productivity. The age profile of the overlapping forestry ranges from 10–48 years old, and the trees, despite some areas of good growth, are in the main growing inconsistently due to the poor underlying soils and would require a long rotation before clear-felling.

Figure 20-4: Infrastructure footprint of the Proposed Development

20.3.2.2 OVERVIEW OF FORESTRY PLOTS (AS MAPPED)

Forestry plot P1 is shown in Figure 20-5, where felling will occur to facilitate the construction of WTG4. This is a private forestry plot comprising a crop of young Sitka spruce (*Picea sitchensis*), with Alder (*Alnus glutinosa*) planted around the edges. An average top height of 5 metres was recorded, and the plot is underlain by wet, peat soil. The trees were observed to be growing well at this location.

Figure 20-5: Existing forestry in plot P1Forestry plot P2 is shown in Figure 20-6, where keyhole felling will occur to facilitate the construction of WTG1. This is a privately owned forestry plot comprising pure Sitka spruce. No thinning has taken place to date and tree growth is inconsistent. An average top height of 10 metres was recorded. The plot is underlain by very wet peat with an old turf bank present in the middle of the plot.

Figure 20-6: Existing forestry in plot P2

Figure 20-7 illustrates the private forestry plot P3, where felling will occur for access roads and infrastructure associated with turbine WTG5. This plot was planted with Sitka spruce and the trees are underlain by very wet, deep, peat soil and have not been thinned to date. An average top height of 13 metres was recorded. Growth overall is variable, with trees displaying good form in better areas of the plot. Windblow amongst individual stems was evident during the walkover.

Figure 20-7: Existing forestry in plot P3

Forestry P4 is shown in Figure 20-8, where trees will be removed to facilitate infrastructure and the access road associated with turbine WTG5. This plot comprises a pure crop of Sitka spruce, which has received no thinning to date, with heavy branching evident. The plot is underlain by wet peat soil and tree growth is mixed within the plot: some areas are displaying reasonable growth, while growth in other areas was observed to be very poor. An average top height of 9 metres was recorded, though trees under 3 metres were observed in some parts of the plot.

Figure 20-8: Existing forestry in plot P4

Figure 20-9 illustrates plot P6, which will accommodate a segment of the proposed access road. This plot predominantly comprises open ground, with occasional stunted Sitka Spruce trees scattered throughout. The vegetation in this area is underlain by very wet peaty soil.

Figure 20-9: Open space in plot P6

Figure 20-10 illustrates the location of plot P7, where a section of the proposed access roads is planned. This plot contains a mixture of open space and a stand of Sitka spruce to the north of the plot – the spruce trees in this stand have a top height of 10 metres and trees were observed to be growing well.

Figure 20-10: Existing forestry in plot P7

Forestry plot C2 is shown in Figure 20-11. This plot is owned/managed by Coillte and consists of a crop of Lodgepole pine (*Pinus contorta*) and Sitka spruce with a top height of 15 metres. This is a poor, exposed section of forestry on the edge of the lake. It is underlain by very wet peat, and tree growth is variable at this location.

Figure 20-11: Existing forestry in plot C2

Forestry in plot C3 is shown in Figure 20-12. This is another Coillte plot, comprising a crop of pure Sitka spruce that has not been thinned to date. This is a very wet plot, underlain by peat soil, with windblown and poor-quality trees with heavy branching present.

Figure 20-12: Existing forestry in plot C3

Forestry plot C4 is shown in Figure 20-13. This is a Coillte plot which consists of a pure crop of Sitka spruce with a top height of 18 metres. This was observed to be a very wet peat plot and the trees have not been thinned to date, displaying inconsistent growth and appearing unstable.

Figure 20-13: Existing forestry in plot C4

Forestry plot C5 is shown in Figure 20-14, where felling to accommodate a section of access roading is planned. This is another plot owned by Coillte and consists of a pure crop of Sitka spruce. Tree growth was observed to be very poor in this plot, with an average top height of 8 metres recorded. The plot also features areas of open space dominated by mosses and heather, and natural regeneration of Lodgepole pine (*Pinus contorta*) was evident in places.

Figure 20-14: Existing forestry in Plot C5

Plot C6 is shown in Figure 20-15. This plot comprises a stand of Sitka spruce that has not been thinned to date. Tree conditions are very variable in the plot, with heavy branching evident and an average top height of 15 metres recorded. The underlying peat soil is very wet. A proportion of trees are due to be removed in this plot to facilitate the turbine hardstand and the bat buffer area.

Figure 20-15: Existing forestry in plot C6

Plot C7 is shown in Figure 20-16, where another section of the proposed infrastructure will marginally overlap with. This is also Coillte land and currently consists of open space with no tree species present.

Figure 20-16: Open space in plot C7

Figure 20-17 illustrates the Coillte forestry plot C9, which comprises a pure crop of Lodgepole pine that has not been thinned to date. The underlying peat soil is very wet, and tree growth is very poor at this location, with lots of windblown pine stems evident. An average top height of 13 metres was recorded, and the trees are approaching 50 years of age, highlighting the poor growth in this part of the Proposed Development site.

Figure 20-17: Existing forestry in plot C9

20.4 ASSESSMENT OF EFFECTS

20.4.1 "DO-NOTHING" SCENARIO

The forestry present in the Proposed Development Site is being managed as part of commercial rotations and would thus be due for harvesting in the future, irrespective of whether a wind farm is being constructed or not.

20.4.2 CONSTRUCTION PHASE IMPACTS

While the impacts of the felling activities are considered at this, the application stage, it is noted that the felling of trees for wind farm construction is subject to, and can only occur following, the grant of a felling licence by the Minister for Agriculture, Food and the Marine. Planning permission for the Proposed Development may not be granted or, if granted, may have amendments introduced by condition(s). Therefore, the application for a felling licence can only, in practical terms, be made once planning permission for the Proposed Development has been granted.

20.4.2.1 HARVESTING OF TREES

Harvesting within a forestry context typically describes the felling (i.e. cutting down) of standing trees, the cutting of logs into size categories, the extraction of timber from the forest to the roadside, and the loading of timber onto timber lorries for transportation to a sawmill. During wind farm construction, 'keyhole'-type felling is typically carried out, which concentrates on the felling of trees standing within the wind farm infrastructure layout. To enable construction of the Proposed Development, the overlapping areas of forestry will first need to be cleared of trees. Mature and semi-mature forestry containing merchantable timber will be harvested conventionally via mechanised harvesting.

Mechanised harvesting is currently the predominant method of tree felling in Ireland and involves purpose-built ground-based machines called harvesters. These are self-propelled machines, fitted with specialised cutting heads that are capable of felling and processing tree stems**.** The machine operator controls the movement of the machine from the harvester cab, which contains an onboard computer system that can be programmed to cut standing trees to the size and length specified by the customer. The harvester will process trees down to 7 cm in size. The remainder of the tree will be placed on the rack in front of the harvester, along with the branches, to act as a brash mat for the harvester to travel on, reducing the risk of soil damage.

A typical forestry harvester is illustrated in Figure 20-18.

Figure 20-18: A conventional forestry harvesting machine

To remove timber from the forest, specialised wheeled machines called Forwarders (Figure 20-19) are the most widely used timber extraction system in Ireland. A forwarder contains a base machine similar to a harvester but comprises a powered trailer with a hydraulic grapple arm attached for picking up logs. A forwarder follows a harvester to collect and extract logs to the roadside, where timber is then stacked for loading onto timber lorries. These machines can remove circa 9–12 tonnes per journey (Teagasc, n.d.).

Figure 20-19: A conventional forestry forwarding machine

Manual felling by chainsaw may also be required in certain areas. Any young or small trees of no merchantable value will be removed prior to construction via the most appropriate method of clearance to be determined at the time of construction - a professional forester's judgement will determine if harvesting for biomass is an option. Timber will be transported from the site using industry-standard timber lorries.

In areas where trees are young or small in size, the proposed felling should not increase the risk of wind damage - these trees should have time to stabilise and adapt to the new conditions before the risk of endemic windblow arises.

In areas where trees are taller (circa ≥ 13 metres in height) and are growing over wet, poorly drained peat soil, future windblow may arise following keyhole felling. The newly exposed edge trees at these locations (that would now stand immediately adjacent to the coupe) would have reduced capacity to absorb wind forces as the support of neighbouring trees has been removed. These trees would not have had time to adapt to the new wind environment, thus rendering them vulnerable to blowing over (Mitchell, 1995; Peltola et al., 2013; Quine and Gardiner, 2007). Additionally, wind blowing on the opened canopy would now typically be more turbulent, and the soil beneath the canopy gaps would be increasingly exposed to precipitation, which may reduce its resistance to erosion (Forest Service, 2002). Additional felling to windfirm edges may be required at these locations.

20.4.2.2 OTHER POTENTIAL IMPACTS ASSOCIATED WITH TREE FELLING

Beyond the risk to remaining forestry, there are a number of other potential impacts to consider:

- **Soil quality:** harvesting and extraction of timber could impact soil quality, with the potential for erosion, sedimentation and rutting where works are not carefully managed - this risk is also applicable to a "Do-nothing" scenario. The effects on soils are assessed in detail in Chapter 9: Land, Soils, Geology and Hydrogeology of the EIAR.
- **Water quality:** tree felling could impact water quality via sediment or nutrient inputs into environmental receptors such as aquatic zones, lakes or relevant watercourses - this risk is also applicable to a "Do-nothing" scenario. The effects on water quality are assessed in detail in Chapter 10: Hydrology and Water Quality, and Flood Risk of the EIAR.
- **Wildlife Habitats:** the harvesting of areas of trees could lead to disturbance or loss of wildlife habitats - this risk is also applicable to a "Do-nothing" scenario. The effects of loss or change of biodiversity are assessed in detail in Chapter 8: Ecology - Biodiversity and Ornithology of the EIAR.
- **Archaeology:** harvesting operations which involve the movement of heavy machinery can cause structural damage to archaeological sites (e.g. the levelling of ringfort banks) if not properly planned (Forest Service, 2000d). However, as outlined in Section 1.2, no recorded features exist within the development area. The effects of loss or change of archaeological and cultural heritage are assessed in detail in Chapter 16: Archaeological, Architectural and Cultural Heritage of the EIAR.

- **Road traffic and noise disturbance**: the felling of merchantable trees will require timber lorries to transport the timber from the site, which will result in an increase in road traffic and potential noise disturbance - this risk is also applicable to a "Do-nothing" scenario. However, timber harvesting and haulage will occur during daylight hours, and any resulting noise would resemble that of agricultural machinery in the local environs. The effect of noise and traffic is assessed in detail in Chapters 13: Noise and Vibration and 19: Traffic and Transport of the EIAR, respectively.
- **Carbon sequestration:** the permanent removal of trees for the Proposed Development will reduce the carbon sequestration capacity of the affected forestry - this risk is not applicable to a "Do-nothing" scenario where the felled trees would be replanted within two years of harvesting as part of normal forest management. However, in keeping with current policy (DAFM, 2017), an equivalent area of alternative land(s) will be planted on a compensatory basis for all infrastructure felling areas associated with the Proposed Development, where young trees will start to absorb carbon as they grow. Furthermore, trees felled as part of this development will be converted to timber products, where carbon will be stored long-term.

20.4.3 OPERATIONAL PHASE IMPACTS

All infrastructural felling areas will remain unplanted throughout the Proposed Development operational phase. The construction felling areas will have been replanted *in situ* and maintained until successfully established. Other forested areas around the site will continue to be managed by the respective owners according to silvicultural and licence prescriptions. No operational phase impacts on forestry are thereby predicted.

20.5 MITIGATION MEASURES (FORESTRY)

20.5.1 CONSTRUCTION PHASE MITIGATION MEASURES

20.5.1.1 FORESTRY

Considering the proximity of the site to the western coast and the underlying wet, peat soil, taller trees (circa ≥ 13 metres in height) will be at a risk of future windblow following keyhole felling. For the proposed felling for WTG2 and the access roading in plots C4, C6 and C9, where the trees are taller, additional felling around the infrastructure felling areas to windfirm edges is recommended to reduce the risk of potential wind damage. These felling areas will be outside the Proposed Development infrastructure felling footprint and would be replanted *in situ* once felled. This felling would be conducted following consultation/agreement between the developer and the respective forest owners and using existing felling licences if possible. Any areas not under a felling licence would be subject to a new felling licence application, and the trees would be replanted in situ around the wind farm within a period of two years, as required by the Forestry Act 2014.

Plot P3, where felling for WTG5 and the associated roading and infrastructure is due to occur, would also be considered vulnerable to windblow and may also require additional felling to windfirm edges. However, the risk of adverse windblow encroaching deep into the stand may be tempered by the inconsistent tree growth at this location, with the stand featuring both open areas and areas where small trees are present.

The enhancement of the existing forest drainage network on the Proposed Development site is also recommended in advance of any proposed harvesting works to promote better tree stability.

20.5.1.2 HARVESTING AND REMOVAL OF TREES

An overview of standard mitigation for tree harvesting works is provided below, based on existing standards and guidelines (DAFM, 2019; DAFM 2024b) - additional measures may be required as per felling licence conditions:

- Proposed works to be carried out in strict adherence with all relevant standards/guidance:
  - Forest Biodiversity Guidelines (Forest Service, 2000a)
  - Forest Harvesting and the Environment Guidelines (Forest Service, 2000b)
  - Forestry and Water Quality Guidelines, (Forest Service, 2000c)
  - Forestry and Archaeology guidelines, (Forest Service, 2000d)
  - Forestry and the Landscape Guidelines (Forest Service, 2000e)
  - Forest Protection Guidelines (Forest Service, 2002)
  - Felling and Reforestation Policy (DAFM, 2017)
  - Standards for Felling & Reforestation (DAFM, 2019)
  - Environmental Requirements for Afforestation (DAFM, 2024)
  - Forestry Standards Manual (DAFM, 2024b)
- Contingency plans to be designed according to Section 5 of the *Standards for Felling & Reforestation* (DAFM, 2019), and to be readily available and triggered if necessary.
- Felling and extraction to cease during and after periods of rainfall that could result in the surface mobilisation of silt until conditions improve.
- In advance of works, a safety statement to be issued, and the responsible forester to erect all relevant safety signage. Forester to also walk the Proposed Development site with contractors to highlight any environmental sensitivities or site risks.
- Harvesting works to adhere to construction working hours as specified in the Construction Environmental Management Plan (CEMP).
- On-site supervision to be present to ensure all harvesting operations are carried out according to standards, and to confirm mitigation measures are effective.
- All relevant forestry harvesting exclusion zones (DAFM, 2019) to be identified and clearly marked on site maps and on the Proposed Development site before any works commence:
  - A 10 m-wide exclusion zone to be established from the edges of any aquatic zones, water hotspots or abstraction points.
  - A 5 m-wide machinery exclusion zone to be established from the edges of any relevant watercourses.

  - An appropriate exclusion zone (≥ 20-30 m) to be observed from the outer edges of any archaeological features – See *Environmental Requirements for Afforestation* (DAFM, 2024). In the event an unrecorded archaeological feature is found during harvesting works, it must be immediately reported to the National Museum of Ireland or the Garda Síochána. A minimum exclusion zone of 20 m must be established around the feature until the site of the find has been investigated (Forest Service, 2000d).
  - An appropriate exclusion zone to be observed for any wildlife habitats present within the harvesting area – location of any habitats to be well known by all operators before works commence.

- Prior to harvesting works, silt traps to be installed within existing forest drains that connect with aquatic zones, either directly or indirectly through other relevant watercourses. Silt traps to be constructed along the length of drains and to be monitored and maintained as required throughout works.
- Storage, maintenance, and refuelling areas to be sited in dry and sheltered locations, at least 50 metres from aquatic zones and 20 metres from relevant watercourses. No rinsing of fuel, chemical or oil containers to occur on the site.
- Harvesting machinery to be fitted with up-to-date spill kits to mitigate against an accidental spillage.
- Temporary bridging points to be used where machinery routes must cross existing water features - direct crossing over a stream bed is not permitted. Water features to be crossed at a right angle to the flow of water and any crossing to be via an appropriate structure – see Standards for Felling & Reforestation (DAFM, 2019). Temporary bridging points to be removed as no longer required and relevant areas restored to their original condition, with due care afforded to avoid the release of any sediment or harvesting residues.
- Any drains crossed during the extraction phase to be kept clear of residues/debris to ensure no drainage issues arise for the remaining trees – this can be a major attributor to windblow.
- Works scheduled to occur near existing power lines to be conducted according to Section 7 of the *Forestry Standards Manual* (DAFM, 2024b) and the *Code of Practice for Avoiding Danger from Overhead Electricity Lines*[2].
- Dense brash mats to be laid along all machinery routes. Additional brash to be deployed on any sections of soft ground subject to high levels of machinery passage. Brash mats to be replaced as soon as they exhibit signs of wear.
- Contractors to monitor machinery routes and to use extra brash where available to pre-empt the risk of soil damage. A new track containing a new brash mat layer to be promptly established where ground conditions begin to visibly deteriorate.

[2] Code of Practice for Avoiding Danger from Overhead Electricity Lines

- Harvesting machinery must not enter any exclusion zones: trees standing within an exclusion zone that are outside the reach of the harvester arm to be manually felled by an experienced chainsaw operator and removed by an extended harvester arm for processing and stacking outside of the exclusion zone. Trees to be directionally felled away from sensitive features.
- It will typically be a condition of a felling licence that urea shall be applied to freshly cut conifer stumps where the soil is a mineral soil or where peat depth is < 25cm (excluding the litter layer): the urea should contain a non-toxic dye to aid the forester in confirming that all relevant stumps have been treated. Urea must not be applied to stumps within 10 metres of an aquatic zone or a relevant watercourse (DAFM, 2019).
- Regular visual monitoring of relevant watercourses and aquatic zones to occur to check for any silt/sediment discharge from harvesting works.
- Timber stacking areas to be located at least 50 metres from aquatic zones, and 100 metres from residential dwellings wherever possible.
- Load sizes on forwarders to be monitored during timber extraction to ensure no overloading occurs.
- Hauliers to leave timber stacks in safe and stable condition during timber loading.
- Any waste/hazardous materials that accumulate throughout operations to be carefully removed from the site once harvesting is complete.
- Any harvesting debris evident within drains or silt traps to be removed.
- Forest infrastructure to be inspected for signs of damage and to be repaired where necessary.

20.5.1.3 COMPENSATORY AFFORESTATION (INFRASTRUCTURE FELLING)

Forest Service policy outlines different tree removal scenarios (DAFM, 2017). Table 20-6 summarises the six main scenarios where permanent tree removal may be permitted, and whether alternative afforestation and/or the repayment of grants and premiums are required (where approved).

Table 20-6: Scenarios where permanent removal of forestry may be considered (DAFM, 2017)

Scenarios	Felling Licence application required?	Alternative Afforestation required?	Refunding of Grants & Premiums required?
1. Overriding environmental considerations (e.g. to protect habitats/species listed as qualifying interests within SPAs and SACs)	Yes	No	No
2. Supporting renewable energy and energy security (e.g. wind farm installation)	Yes	See Table 20-7	See Table 20-7

Scenarios	Felling Licence application required?	Alternative Afforestation required?	Refunding of Grants & Premiums required?
3. Commercial development (e.g. development of an industrial park)	Yes	Yes	Yes
4. Conversion to agricultural land	Yes	Yes	Yes
5. Public utilities (e.g. erection of an electricity power line)	No	No	Yes
6. Other land use change (may be considered on a case-by-case basis on application)	Yes	Case-by-case	Case-by-case

Note: Adapted from Felling and Reforestation Policy (DAFM, 2017), pp. 30. © Forest Service, Department of Agriculture, Food & the Marine.

The proposed felling for the construction of the Proposed Development relates to 'Scenario 2' in Table 20-6 and would therefore require the submission of a felling licence to the Forest Service (DAFM). Table 20-7 illustrates the requirements for each category of tree felling associated with wind farm development.

Table 20-7: Requirements of each felling category for wind farm development (DAFM, 2017)

Category of tree felling	Reforestation of Felled area required?	Alternative Afforestation required? (See Note 1)	Refunding of Grants & Premiums required? (See Note 2)
Infrastructure felling	No	Yes	Yes
Construction felling	Yes	No	No
Turbulence felling (≤20 ha - for entire project)	Yes	No	No
Turbulence felling (>20 ha - for entire project)	Yes	Yes – 10% 0f turbulence fell area	No
Note 1: If 'YES', the alternative site must be an area equivalent in size (See Section 5.7 of the 'Felling and Reforestation Policy'). If the forest area proposed for permanent removal is still in receipt of premiums and/or is still in contract under the Afforestation Grant & Premium Scheme, the alternative site may be eligible under the Afforestation Grant & Premium Scheme.			
Note 2: If 'YES', the refunding of any afforestation grants and premiums already paid out by the Forest Service is required if the forest area proposed for permanent removal is still in receipt of premiums and/or is still in contract under the Afforestation Grant & Premium Scheme. Also, if 'YES' or 'NO', if premiums are still being paid, premium payments on the area will cease.			

***Note*: Adapted from Felling and Reforestation Policy (DAFM, 2017), pp. 33. © Forest Service, Department of Agriculture, Food & the Marine.**

To facilitate the construction of the Proposed Development, 11.59 hectares of existing forestry will need to be permanently removed through infrastructure felling (Table 20-8).

Table 20-8: Proposed infrastructure felling areas for the Proposed Development

Infrastructure	Area of forestry to be removed (ha)	Felling Type	Alternative land required for compensatory afforestation (ha)
Access track/Cable trench	1.68	Infrastructure	1.68
WTG1	0.72	Infrastructure	0.72
WTG2	3.04	Infrastructure	3.04
WTG3	0.00	Infrastructure	0.00
WTG4	2.88	Infrastructure	2.88
WTG5	2.91	Infrastructure	2.91
WTG6	0.00	Infrastructure	0.00
Substation	0.36	Infrastructure	0.36
Total:	11.59		11.59

The Developer is fully committed to the compensatory afforestation of an equivalent area of alternative land(s) to ensure no net forestry loss occurs as a result of the Proposed Development. The afforestation of any alternative land will first be subject to written Technical Approval from the Minister for Agriculture, Food & the Marine under the Forestry Act 2014, and in accordance with the Forestry Regulations 2017 (S.I. No. 191 of 2017). Technical approval will be sought, and a non-grant-aided afforestation licence application will be submitted to the Forest Service (DAFM) for all proposed alternative sites. The relevant details of alternative planting sites will be provided when applying for a felling licence for the project: address of alternative site(s); Forest Service pre-planting approval number(s); name and address of the owner of alternative site(s).

The Forest Service may also require the developer to report on the reduction in productivity of the forest area associated with different wind farm forest management and landscape plans, and the potential loss of soil and biomass CO_2. The following will also apply with regard to the afforestation of any alternative land sites:

- The proposed afforestation of alternative land must be evaluated and approved by the Forest Service under the Forestry Act 2014 (and associated Regulations) before an associated felling licence can be granted.

- An application for Technical Approval to plant under the Afforestation scheme must be made online by a registered forester using DAFM's iFORIS iNET system: the Applicant and Registered Forester must complete all required forms, maps and declarations and compile any relevant supporting information for online submission.
- All afforestation applications must be made up of a minimum of 20% broadleaf tree species by area.
- The standard procedures regarding the evaluation of afforestation applications will generally apply, regarding protocols, referrals, Appropriate Assessment (AA) screening, EIA determination etc.
- An afforestation licence granted by the Department is only valid up to and including the expiry date specified in the Technical Approval letter.
- It will be a condition on the associated felling licence (where issued) that all alternative land approved for afforestation is planted and managed as forestry land, as per the relevant standards set out in the *Forestry Standards Manual* (DAFM, 2024b).

20.5.1.4 REPLANTING *IN SITU* (CONSTRUCTION FELLING)

To facilitate construction works for the Proposed Development, the temporary removal of 1.55 hectares of forestry is also required (Table 20-9).

Once the construction phase for the Proposed Development is completed, the construction felling areas will be repaired and replanted *in situ*. It is envisaged that these areas will be replanted with the original tree species present where these were purely conifer stands, a suitable native broadleaf component (e.g. as a 20% mixture) should be incorporated to increase the biodiversity value of the restocked areas.

Table 20-9: Proposed construction felling areas for the Proposed Development

Infrastructure	Area of forestry to be removed (ha)	Felling Type	Alternative land required for compensatory afforestation (ha)
Construction Compound	0.00	N/A	0.00
Borrow Pit #1	0.06	Construction	0.00
Borrow Pit #2	0.20	Construction	0.00
PRA 1	0.06	Construction	0.00
PRA 2	1.23	Construction	0.00
PRA 3	0.00	N/A	0.00

Total:	1.55		0.00

All associated replanting works to be conducted in accordance with the *Standards for Felling & Reforestation* (DAFM, 2019) and the *Environmental Requirements for Afforestation* (DAFM, 2024):

- Appropriate planting setback areas to be implemented as required (DAFM, 2024):
  - Aquatic zone:

Table 20-10: Aquatic zone setbacks (DAFM, 2024)

Slope leading to the aquatic zone	Setback width	Setback width for soils with peat component or where within sub basin of high-status objective waterbodies
Moderate (even to 1-in-7 / 0-15%)	10 m	20 m
Steep (1-in-7 to 1-in-3 / 15-30%)	15 m	25 m
Very steep (1-in-3 / > 30%)	20 m	25 m

  - Relevant watercourse or Water hotspot: **5 m**
  - Water abstraction point: **20 m**
  - Hedgerow: **5 m**
  - Archaeology: **20 m / 30 m**
  - Public roads (conifers): **20 m** (include a 10 m-wide broadleaf strip between a 10 m unplanted setback and the edge of the conifer planting)
  - Public roads (broadleaves): **10 m**
  - Residential dwellings: **60 m**
  - Roofed Farm Buildings: **10 m**
- Fertiliser or herbicide to be applied on a strictly where necessary basis only.
- Granular fertiliser (if required) to be applied to conifers only in strict accordance with Section 13 of the *Standards for Felling & Reforestation* (DAFM, 2019).
- Herbicide use, where required to control competing vegetation, to be in strict accordance with Section 13 of the *Standards for Felling & Reforestation* (DAFM, 2019) and to be limited to 1–2 applications during the first four years of tree growth.
- Silt traps to be monitored and maintained throughout reforestation works and until the site has 'greened up' with new ground vegetation.

20.6 ASSESSMENT OF RESIDUAL EFFECTS

The residual effects of the Proposed Development are the reduction of forested land within the Proposed Development site, totalling 11.59 hectares. In the absence of compensatory planning, a net loss of forestry would occur and would result in a moderate effect. However, with the developer's commitment to the compensatory afforestation of an equivalent area of alternative land(s), a net loss of forestry will be avoided, and the effects on forestry would thus be considered not significant. Additionally, the construction felling areas (1.55 ha) will be repaired and replanted *in situ* once the construction phase is completed, thereby no significant effects are predicted.

20.7 SUMMARY

To facilitate the construction of the Proposed Development, the removal of 13.14 hectares of existing forestry by mechanised timber harvesting is required. Under the provision that the proposed mitigation measures are adopted, no significant residual impacts on forestry are expected.

Table 20-11: Summary Table

Potential Effect	Construction or Operation	Beneficial or Adverse or Neutral	Extent (Site or Local or National or Transboundary)	Short-term or Long- term	Direct or Indirect	Permanent or Temporary	Reversible or Irreversible	Significance of Effect	Proposed mitigation	Residual Effects
Infrastructure felling of 11.59 hectares of existing forestry	Construction	Adverse	Site	Long-term	Direct	Permanent	Reversible	Moderate	Compensatory afforestation of 11.59 ha of alternative land(s)	Not significant
Construction felling of 1.55 hectares of existing forestry	Construction	Adverse	Site	Short-term	Direct	Temporary	Reversible	Moderate	Replanting *in situ* of felled areas once construction is complete	Not significant

20.8 REFERENCES

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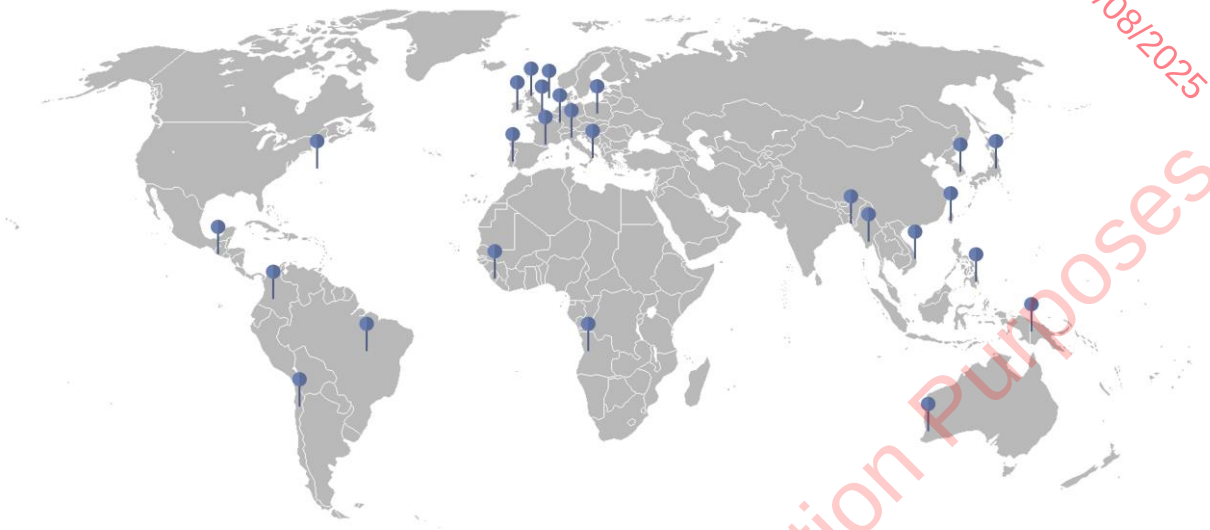

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