Chapter 13

Forestry

Contents

Glossary

Term	Definition
Brash mat	The branches from trees are felled and processed then laid in an area for forest machines to drive over and reduce ground damage.
Continuous cover forestry	Management that avoids the use of very large clear-felling coupes and tries to always maintain a canopy cover.
Coppice	Area of woodland in which trees are cut regularly in rotation to provide small roundwood produce.
High Forest	Productive woodland which cannot otherwise be classified as coppice, research area or seed stand.
Silviculture	The growing and cultivation of trees for timber.
Sub-compartment database	A description of the land managed by Natural Resources Wales usually accessed through GIS.
Timber zone	The area between brash mats.
Understorey	Layer of vegetation/trees beneath the main canopy of a forest.
Yield Class	A measurement of the productivity of a given site with growing trees based o on the incremental increase of wood produced per annum.

List of Abbreviations

Abbreviation	Description
AOD	Above Ordnance Datum
ASNW	Ancient Semi-Natural Woodland
ES	Environmental Statement
FCW	Forestry Commission Wales
FDP	Forest Design Plan
FRP	Forest Resource Plan
FSC	Forest Stewardship Council
GIS	Geographical Information System
ha	Hectare
LISS	Low Impact Silvicultural System (normally a type of continuous cover system)
NPTCBC	Neath Port Talbot County Borough Council
NRW	Natural Resources Wales
NRW-EDT	Natural Resources Wales Energy Development Team
OLAT	Operational Land & Assets Team
PEFC	Programme for the Endorsement of Forest Certification
SCDB	Sub-compartment database
UKFS	United Kingdom Forest Standard
UKWAS	United Kingdom Woodland Assurance Standard
WGWE	Welsh Government Woodland Estate

13.1 INTRODUCTION

13.1.1 This chapter has been prepared by ARC Woodlands Ltd and assesses the potential effects of the proposed Y Bryn Wind Farm (proposed development) on forest land that is owned by the Welsh Government and managed on their behalf by Natural Resources Wales (NRW). This land is known as the Welsh Government Woodland Estate (WGWE).

13.1.2 The chapter describes the existing or baseline conditions and the forest management proposals necessary to build the proposed development infrastructure including turbines, roads and ancillary structures. The chapter then assesses the proposed development's impact on the existing conditions in the context of the existing forest management.

13.1.3 The assessment identified the key issues as:

- The risk of windthrow created by felling trees to accommodate wind farm infrastructure; and
- The effect on the existing Forest Design Plan (FDP).

13.1.4 The chapter concludes that the impact of the proposed development on forestry is insignificant with tree felling minimised to areas which are equivalent or similar in size to areas felled by NRW under normal forest management. As a result it is considered that the impact on NRWs Forest Resource Plan (FRP) will be incorporated without significant impact to the Forest Resource Plans long term aims.

13.1.5 The forestry study area future baseline, if considered without the proposed development taking place, is expected to remain broadly similar to the conditions found presently. The forest area would still be subject to dynamic change in localised areas through the ongoing management of NRW. These changes would involve felling, thinning and replanting subject to felling controls. It's possible that there might be small increases in areas of trees managed through LISS (Low Impact Silvicultural System) and possibly increased areas of broadleaved trees and open ground however the long term primary objectives would be as indicated in Figure 13.5.

13.2 METHOD OF ASSESSMENT

13.2.1 The assessment is based on the existing FRPs, NRW mapping data for the study area, field survey and consultation. Desk based work assessed the relevant national policies relating to forestry and forest management guidance produced by professional bodies.

Study Area

13.2.2 The forestry study area (Figure 13.1) consists primarily of land managed by NRW and is defined by Y Bryn site boundary and includes additional forest areas that were contiguous. The study area has also been extended to include small areas of woodland on the proposed access routes.

Desk Based Study

13.2.3 The primary source of forest information for the study area is the NRW Woodland sub-compartment data which is derived from NRW's Geographical Information System (GIS) and is a physical description of the forest land managed by NRW. The data is updated frequently by NRW and used by them to support decision making over the entire NRW estate.

Field Survey

13.2.4 Field survey work was undertaken to further assess current forest conditions and to validate the sub-compartment database (SCDB). Infrastructure locations were visited over two days in September 2021 with mobile GIS containing NRW forest data. Onsite observations of tree species, silvicultural treatments, crop edges and approximate ages were cross referenced with the NRW data. Some of the location visits where made accompanied by the NRW Energy Delivery Team (NRW-EDT) forester.

Planning Policy and Guidance

13.2.5 The following policies and standards are relevant to the forestry assessment:

UK Forestry Policy

13.2.6 Forestry policy in the UK is a devolved matter with the National Forestry bodies collaborating in maintaining and developing overarching Sustainable Forest Management standards and guidance for the whole of the UK in the form of the UK Forestry Standard 2017[1] (UKFS). The UKFS has been endorsed by the UK and devolved governments and is used by them, together with national forestry policy, to provide the framework for delivery of international agreements of sustainable forest management.

13.2.7 The UKFS also provides the forestry practice standards for the independent UK Woodland Assurance Standard[2]. Timber markets have increasingly demanded evidence for assurance that timber comes from sustainably managed sources. The UK Woodland Assurance Standard (UKWAS) is used by independent certification providers including the Forest Stewardship Council (FSC) and the Program for the Endorsement of Forest Certification (PEFC) and demonstrates legal and sustainable forest management. All NRW managed woodlands are certified through the UKWAS with both the FSC and PEFC systems.

13.2.8 Regulatory functions for both private and national estate forests were previously administered by Forestry Commission Wales (FCW). NRW, the successor body, has taken on the responsibilities of the FCW for private forest regulatory work and management of the national forest estate.

The UK Forestry Standard

13.2.9 The UKFS 2017[1] is the key document in the production of national standards for forest certification and it is aligned with European and international protocols for sustainable development. It is also the guiding document for the Woodlands for Wales[3] document and the Woodlands for Wales Action Plan[4]. The UKFS recognises that much of the UK's forestry is dominated by Sitka spruce and that most of the woodland resource is planted and non-native. The UKFS goes on to recognise that many of the afforested areas in the latter half of the 20th century were planted with a limited range of species and that few have developed structural diversity on poor upland soils. It recognises that felling and restocking is an important opportunity to begin to improve forest design and increase diversity. The UKFS notes the following summarised guidance on felling:

- Identify felling and replanting boundaries early so that crop edges can be managed to increase stability when exposed;
- Maintain diverse stand structures and silvicultural approaches including older trees, occasional windthrow, understorey layers, open space and natural regeneration;
- When planning felling, adjoining coupes should not be felled until neighbours are either 5-15 years old or at least 2 m in height;

[1] *UK Forestry Standard (2017).* Available from - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/687147/The_UK_Forestry_Standard.pdf [Accessed 29/03/2023]

[2] UK. UKWAS steering group. (2017) *UK Woodland Assurance Standard.* Edinburgh.

[3] *Welsh Governments strategy for woodlands and trees (2018)* Available from - https://www.gov.wales/sites/default/files/publications/2018-06/woodlands-for-wales-strategy_0.pdf [Accessed 29/03/2023]

[4] Welsh Government, (2018). *Woodlands for Wales Action Plan.* Available from - https://www.gov.wales/sites/default/files/publications/2018-03/woodlands-for-wales-action-plan.pdf [Accessed 29/03/2023]

- Use felling and restocking to redesign forest to provide buffer areas, drainage, habitats and improved landscape design; and
- Design improvements to the network of open ground and streams to provide and assist forest stability.

Woodlands for Wales 2018

13.2.10 The Welsh Government's forestry and woodlands strategy document is Woodlands for Wales: The strategy[3], first published in 2001, sets out a 50-year vision and was developed with reference to the Well-being of Future Generations (Wales) Act 2015[5] and the Environment (Wales) Act 2016[6]. The strategy is underpinned by four themes:

- Responding to climate change:

'Coping with climate change and helping to reduce our carbon footprint: helping make Wales an innovative, productive, and low carbon society which recognises the limits of the global environment'.

- Woodlands for people:

'*serving local needs for health, education, and jobs: enabling Wales to be a society in which peoples physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood: that enables people to fulfil their potential no matter what their background or circumstances; and that we enjoy attractive, viable, safe and well connected communities'*.

- A competitive and integrated forest sector:

'innovative, skilled industries supplying renewable products from Wales; helping Wales to develop a skilled and well educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work'; and

- Environmental quality:

'making a positive contribution to biodiversity, landscapes and heritage, and reducing other environmental pressures; so that we are a nation which maintain and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change)'.

13.2.11 The document goes on to set out 20 outcomes and how the Welsh Government expects to achieve these with the help of good regulation for existing and new woodlands; clear incentives with good use of public funds; and through well informed advice and guidance available for use with matters associated with forestry, woodland and trees.

Consultation

13.2.12 As part of the scoping process for the proposed development, the methodology for the forestry assessment was shared with consultees and a summary of the scoping responses are included in Table 13.1 (full copies of scoping report and scoping direction can be found in Appendix 3). The primary consultee for the forestry proposals has been NRW's Specialist Forestry Advisor within its Energy Delivery Team. Draft felling plans produced by the developer were prepared and shared with NRW-EDT so that desk analysis of the plans as well as on site discussions could take place. After several iterations the plans reflected NRW's requirements regarding the minimisation of the risk of windthrow, coupe design, and acknowledgment of the current NRW felling plans.

Table 13.1: Scoping responses relating to forestry

Scoping Consultee	Comment summary	Response
NRW	Indicated that NRW is the only consultee regarding the management of the Welsh Government Forest Estate. Turbine locations should minimise impacts on habitats, minimise deforestation and minimise the impact on crop stability through windthrow.	Forest management proposals have been discussed with NRW-EDT.
Neath Port Talbot County Borough Council (NPTCBC)	Requested consideration of current standards relating to afforestation of deep peat and the aspirations of the Welsh Peatland Action Programme. Due regard for harvesting techniques which conserve soil conditions.	The Forestry Commission concluded in 2000[7] that there should be a strong presumption against expansion of woodland onto active and degraded raised bog and any extensive area of raised bog or any peatland where afforestation could alter hydrology. The current FRP was produced before the National Peatland Action Programme was produced. Extensive peat probing has been undertaken across the proposed development and areas of deep peat avoided for infrastructure placement. The preservation of peat is discussed in Chapter 10.
	Felling and restocking plan required and indication of expected tree growth rates	The felling areas are shown within the Figure 13.6 and the proposed restocking areas is shown on Figure 13.7. The area available for replanting is small and consists of primarily of four areas and some smaller roadside areas. Growth rates within these areas will depend on the species replanted but it should be expected that 60 cm is achievable once the trees are established.

Source: ARC Woodlands Ltd

13.3 BASELINE

Description of the Forest Study Area

13.3.1 The study area consists of upland forestry areas located between Port Talbot, Margam, Maesteg and Cynonville. The planting of forest in these areas and in the surrounding areas started in the 1920's and continued until the 1950s. The primary species planted in the initial establishment of the forest were spruces, pines, larches and beech. The tree species that can be found today in the study area are broadly similar and are detailed in Table 13.5.

[5] *Well-being of Future Generations (Wales) Act 2015*. Available from - https://www.legislation.gov.uk/anaw/2015/2/contents/enacted [Accessed 29/03/2023]

[6] *Environment (Wales) Act 2016*. Available from - https://www.legislation.gov.uk/anaw/2016/3/contents/enacted [Accessed 29/03/2023]

[7] Patterson, G. Anderson, R. (2000) *Forests and Peatland Habitats, Guideline Note*. Forestry Commission, Edinburgh.

13.3.2 In 1953, these forests and the surrounding ones became known by the Forestry Commission as Coed Morgannwg, and since this time, the Forestry Commission, and now NRW, has managed these forests to provide timber, recreation opportunities, wildlife habitat and employment. Mynydd Margam and Y Bryn are brought together in a management unit by NRW called Margam Forest and Mynydd Penhydd along with other woodlands in a unit known as Afan.

13.3.3 The forest areas are located at heights ranging from 100 m to 350 m above ordnance datum (AOD) on steep slopes which run up to gently rounded hill tops and plateaus. The forests are exposed to the south-west and the soils vary from sandy loams to heavy clay loams with some areas of peat (further information on hydrology, geology and hydrogeology is provided in Chapter 10 of the Environmental Statement (ES)) .

13.3.4 Presently, on the elevated parts of the forest, the dominant species is Sitka spruce with lower sections and valley sides having more species diversity. There are also small areas of Ancient Woodland and open areas within the forest. The forest roads and paths are well used recreationally by walkers and horse riders and there are trails built for mountain bikers which are also well used (see Chapter 15 for further information).

13.3.5 Forest management operations happen routinely throughout the study area. The most obvious of these is timber harvesting by clear felling and thinning. Other works include the preparation of felled areas for restocking, hand or sometimes machine planting of saplings, treatment of young crops to prevent damage or control weed growth, and building and maintaining forest roads, including the necessary winning and processing of stone from on-site borrow pits.

Forest Resource Plans (FRW)

13.3.6 The forest within the study area is within two NRW FRP areas. The northern section of the study area is part of the Afan FRP and the southern section is part of the Margam FRP. The FRP is used by NRW to manage and communicate information about the forest and contains long- and short-term objectives for the forest, such as the harvesting plan and other management objectives.

Table 13.2: FRP areas (Hectares (ha))

NRW FRP	Area of FRP	Study Area (ha)
Margam	2104 ha	1699 ha
Afan	3837 ha	830 ha

Source: ARC Woodlands Ltd

13.3.7 The Margam FRP shares some common objectives with many NRW woodlands which are the result of general trends resulting from UK forestry policy. These objectives include:

- Diversifying forest species composition to increase reliance to pests and disease;
- Increasing the use of thinning to allow greater silvicultural choices;
- Increasing the use systems of management that don't rely on clear felling. (NRW use the term Low Impact Silvicultural Systems (LISS)); and
- Increase the area of conifer woodland that can be reverted to semi natural type woodland especially on Ancient Woodland Sites.

13.3.8 Margam has specific issues which the FRP identifies. In summary these are:

- Managing the impact of recent felling of larch trees (felled due to disease) and taking advantage of opportunities to replant and expand native woodland species;
- Managing the deer population to allow native woodland and conifer woodland to succeed; and
- Tackling crime and anti-social behaviour in the forest.

13.3.9 The FRP for Afan contains many similar themes to the Margam plan with diversifying species, thinning and native woodland being key priorities. The plan emphasises the recreational aspects of the forest, in particular the high number of visitors drawn to the mountain bike facilities.

Woodland Type

13.3.10 The study area is currently actively managed as mostly high forest with smaller areas of continuous cover management. The structure of the forest is dynamic and will change as coupes are felled and replanted and are eventually felled again. NRW's sub compartment database was queried over the study area to provide area figures for conifer and broadleaved species, as well as open space and other land use areas. Land use categories are mapped and shown in Figure 13.2.

Table 13.3: Study area land use (ha)

Conifer Species	Broadleaved Species	Felled Areas	Open Ground
1727 ha	373 ha	158 ha	271 ha

Source: ARC Woodlands Ltd

Ancient Semi Natural Woodland

13.3.11 Ancient Semi Natural Woodland (ASNW) is defined by having been in existence since at least 1600 AD. Within the Ancient Woodland Inventory[8] managed by NRW there are four types of Ancient Woodland sites:

- ASNW;
- Plantation on Ancient Woodland Site;
- Restored Ancient Woodland Site; and
- Ancient Woodlands site of Unknown Category.

The database shows that all four categories are present within the study area. The proposed infrastructure and associated tree felling is not located on any of the designated Ancient Woodland areas. Figure 13.3 identifies the areas that appear in the latest Ancient Woodland Inventory in relation to proposed infrastructure positions.

Table 13.4: ASNW within the study area (Hectares (ha))

ASNW	Plantation on Ancient Woodland Site	Restored Ancient Woodland	Ancient Woodland Site of Unknown category
29 ha	142 ha	8 ha	20 ha

Source: ARC Woodlands Ltd.

Tree Species

13.3.12 The majority of the study area has conifer tree cover which is found in various stages of growth from new felled areas and recently replanted areas to mature forest. The main tree species planted is Sitka spruce (*Picea sitchensis*) but other tree species are present in significant numbers including Scots pine (*Pinus sylvestris*), Norway

[8] DataMapWales, (2022). *Ancient Woodland Inventory 2021.* Available from - https://datamap.gov.wales/layers/inspire-nrw:NRW_ANCIENT_WOODLAND_INVENTORY_2021 [Accessed 29/03/2023]

spruce (*Picea abies)* and Oaks of various species. Areas of pure broadleaved trees are generally confined to the lower slopes and stream sides but small quantities of naturally occurring broadleaves are present throughout the forestry study area. Areas of less than 0.5 ha are not mapped by NRW and are allocated as 'components' within the NRW forest database. Figure 13.4 shows tree species distribution derived from NRW forest data.

Table 13.5: Study area tree species (Hectares (ha))

Species	Area (ha)	Percentage of study area (%)
Sitka spruce	1114	45
Scots pine	214	8.9
Mixed broadleaves	195	7.9
Norway spruce	126	5.1
Oak	117	4.6
Douglas fir	117	4.6
Omorika spruce	33	1.3
Beech	32	1.2
Japanese larch	25	1.0
Fir (Grand & Noble)	21	0.85
Mixed conifer	17	0.69
Common Alder	7	0.28
Small leaved lime	6	0.24

Source: ARC Woodlands Ltd.

13.3.13 The remainder of the study area would be either felled areas or other land use.

Windthrow

13.3.14 Windthrow is the term used to describe trees which have toppled over or been snapped by wind. It can be caused by unusual weather events or by trees becoming unstable due to ground/soil conditions or tree height. Windthrow also occurs after management operations when trees are exposed to new or altered wind forces resulting from the removal of nearby trees. It is not possible to mitigate entirely against windthrow, but planning felling or thinning with tree age, and taking into account exposure and the type of adjacent crop, can reduce or minimise windthrow. Windthrow can lead to increased harvesting costs and degraded timber.

NRW Felling Plan and Long Term Strategy

13.3.15 The FRP and the NRW SCDB provide a proposed felling and restocking plan for the next 30 years and identifies both clear felling and thinning works. The FRP includes an approval (felling licence) for the 10-year period of felling and thinning. The currently approved felling years for the FRP areas are from 2014 to 2024 for Afan (north section) and from 2019 to 2029 for Margam (south section). Table 13.6 shows the currently approved areas for clear felling within the forestry study area and Figure 13.5 shows the location of the felling planned until 2051 and areas managed under other systems.

Table 13.6: NRW currently approved clear felling

Location	Area (ha)
North section	40.8
South section	124.2

Source: ARC Woodlands Ltd

Certification

13.3.16 Through the FRP and through independent audit by FSC the Welsh Government can demonstrate that the woodland estate is managed in a way that adheres to the principles of the UK Forest Standard. The audits cover topics such as forest operations, environmental impact, conservation and biodiversity, recreation and local community, and health and safety. Once certification has been awarded it lasts for five years with audits taking place regularly. Certification can be lost if audits find failures that amount to serious breaches of the guidance.

13.4 ASSESSMENT OF POTENTIAL EFFECTS

13.4.1 The following considers construction and operational impacts on forestry assets. The assessment has taken into consideration the micrositing allowance of 50 m for infrastructure and the conclusions reflect this allowance.

Embedded Mitigation

13.4.1 As detailed in Chapter 4: Site Selection and Design Evolution, a key design criterion for the location of turbines and other infrastructure has been seeking to minimise the need for felling trees. This has included moves to individual turbines, reorientation of hardstandings/crane erection areas and access tracks, consideration of necessary construction and operational clear area buffers. The following section is therefore a consideration of residual effects following such embedded design mitigation.

Identified Effects

13.4.2 Identified effects from the proposed development on forestry are led by the effect of felling trees to make room for infrastructure, including the required distances to allow construction and operation, and the effect this will have on the existing FRP and certification. The pre-construction felling required is a total of 119.24 ha with 14.48 ha available post construction for restoration through replanting or habitat management. The felling area is illustrated in Figure 13.6.

Table 13.7: Felling Area required for the proposed development (ha)

Total Felling Area	Area available for replanting	Area required by the proposed development
119.24 ha	14.48 ha	104.76 ha

Source: ARC Woodlands Ltd

Tree Felling

13.4.3 As a general principle and approach to minimising the forest impact, a management technique of 'keyholing' within the forest has been adopted. This involves felling only the minimum of trees necessary to allow the construction to take place. Larger felling areas were considered during the design evolution to try and reduce the impact of windthrow around the keyholing where it created new forest edges. Consultation with the NRW Operational Land & Assets Team (OLAT) provided information to redesign back to simple keyholes to minimise the felling required. The OLAT's combined local knowledge and history of dealing with windthrow in the forest provided the evidence for changing the felling strategy.

13.4.4 The forest SCDB was provided to the design team so that the layout minimised forest impact where possible, considering other design constraints.

13.4.5 Felling is required for the upgrades of existing tracks, creation of new tracks and cable routes, turbine foundation and laydown areas, crane hard standings, an on-site substation, permanent wind monitoring equipment, control buildings, construction and storage compounds, and borrow pits. At some proposed infrastructure locations, the tree felling required will have previously been approved as part of normal forest management under the FRP but not yet been undertaken. At other proposed locations, felling will have already been carried out and the clearance

required for construction will be minimal. Table 13.8 illustrates the felling areas by tree age group and summarises the ages and estimated volumes of timber in each age group.

13.4.6 One area of tree felling will be required outside of the NRW land area. This area is required for construction traffic to access the proposed development. The felling is located on the proposed south-western access from the M4 motorway and involves felling trees planted during the construction or upgrading of this motorway section. The woodland removal will consist of approximately 0.5 ha of primarily broadleaved trees which are mainly Oak, Beech and Cherry trees with a number of pine also.

13.4.7 The access route from the M4 motorway passes near a designated Ancient Woodland as it rises up Mynydd Brombil. Prior to construction, a tree protection plan will be put in place to ensure that construction traffic do not enter the designated area.

13.4.8 Table 13.8 present the approximate age, area and volume of timber estimated to require felling for the proposed wind farm. The total area (ha) of trees of all ages does not match the total felling area as bare ground has not been included in Table 13.8.

Table 13.8: Age, area and volume of timber recovered

Age group (years)	Area (ha)	Volume of timber estimated (cubic metres)
0-10	6.2	80
10-20	15.9	789
20-30	38.6	10074
30-40	21.4	8607
40 and older	22.5	9369

Source: ARC Woodlands Ltd

Felling Operations

13.4.9 Crops that contain timber which is conventionally recoverable and merchantable will be mechanically harvested and extracted. All merchantable timber will be sold and taken off site. Brash[9] may be harvested subsequently but this will be subject to an assessment of each area and its appropriate post harvesting management.[10] During harvesting brash will be used as a mat for the machinery to drive over which will reduce ground/soil damage. Very wet areas or trees that are adjacent to watercourses may be manually felled to limit ground disturbance and protect watercourses. Appropriately sized machinery will be critical in reducing the impact of harvesting.

Ancient Semi Natural Woodland

13.4.10 Mitigation of any impact on woodland that appears in the ASNW database was embedded in the design process. Infrastructure design was not considered in these areas of woodland.

Continuous Cover Forestry Systems

13.4.11 Within the FRP area, NRW identify areas of trees which they manage under continuous cover systems. NRW call these areas LISS areas, and in both FRP's future management aims to expand the area under LISS. LISS areas provide long term tree canopy cover which can provide contrasting recreation facilities and also more stable wildlife habitat. The design process sought to avoid LISS areas where possible. The parameters required for the proposed development have meant built infrastructure will require the felling of 10.8 ha of LISS designated forest to provide the optimal overall environmental outcomes, including and in respect of landscape and visual and renewable energy generation. Over 2.5 ha of the designated LISS area is recently felled or open. The felling will result in a 3.5% reduction in LISS within the study area which currently covers over 300 ha. The majority of the LISS impacted is shown as Sitka spruce in the NRW database with a small section appearing as Scots pine and beech.

Windthrow

13.4.12 One of the priorities during design evolution was seeking to minimise felling and limit the risk of windthrow. This will be achieved by ensuring that tree felling is kept to a minimum and by designing felling areas that try to account for the vulnerability of crops to windthrow.

13.4.13 Tree stability is influenced by several factors including soils, elevation, and exposure. Tree stability also tends to decrease with increasing tree height.

13.4.14 The age and yield class[11] of crop trees also gives some indication of how vulnerable they will be to windthrow. In this exercise it was initially advised by OLAT that trees over the age of 20 years would require felling to windfirm edges, whereas trees under that age would be able to adapt to new exposure created by felling and could be keyholed. Further input from local OLAT staff with extensive site knowledge across crops and ages ranges enabled modification of the original advice to allow all of the areas at whatever tree age to be keyholed. Although some slight increase windthrow risk may be incurred, the reduction in the felling area by 64 ha represents an advantage over the original proposal.

The FRP and Certification

13.4.15 When producing the FRP, NRW must ensure compliance with the UK Forestry Standard and the UK Woodland Assurance Standard. The summarised UK Forestry Standard guidance is listed in Section 13.2 and the requirements help forest managers ensure that management practices minimise impacts on landscape, water quality, ecology, and recreation.

13.4.16 The UK Forestry Standard suggests that forests should have varied structures in terms of ages, species and open space which will help provide resilience for future threats and allow flexibility in management options.

13.4.17 The UKWAS Interpretation Note 8[12] gives guidance to forest managers about wind farm developments and the certification status of forest areas felled for development. Areas felled on which infrastructure is built and the timber which arises cannot retain certified status. Where areas are cleared but will be restocked or retained as other forest land, the certification can remain on the forest land and on the timber from it.

13.4.18 Of the total felling area of 119.24 ha, approximately 14.48 ha will be returned to NRW management after construction of the proposed wind farm development and will therefore, be available for replanting with forest trees or returned to alternative open space habitat. This is illustrated on Figure 13.7. These areas, once returned to NRW management will continue as a normal component of the forest and FRP. Forest design principles, habitat gains and landscaping may require modification of the replanting plan from that in the approved FRP. Any change necessary will be led by NRW requirements.

13.4.19 Replanting around infrastructure will be defined after the proposed development is constructed and is expected to leave a minimum 86 m radius around the turbine base without trees to minimise impact on wind resource from an operational perspective and to allow for future maintenance. Forest areas cleared for the purpose of the proposed development which are not required to be kept clear for the operation of the wind farm will be replanted. The resulting net loss of forest land for the proposed development is 104.76 ha. This represents approximately 4.1%

[9] Brash is the branch wood removed from tree stems during tree harvesting.

[10] Forest Research, (2009). *Guidance on site selection for brash removal.* Available from - https://cdn.forestresearch.gov.uk/2009/05/brash_residue_protocol.pdf [Accessed 29/03/2023]

[11] Yield Class is a measure of the potential productivity of stands of even aged trees.

[12] UKWAS, (2017). *UKWAS Interpretation Note 8 – Wind farm development on certified forest land.* Available from - https://ukwas.org.uk/wp-content/uploads/2017/11/UKWAS-IN-8-Wind-farm-development-on-certified-forest-land-March-2013.pdf [Accessed 29/03/2023]

of the forest study area, and, if appropriate, this area can be returned to forest land at the end of the operational life of the proposed development (however, see the following section regarding compensatory planting).

13.4.20 Within the study area there are areas of soils which have a peat layer. NRW have recognised the significance of the peat resource on the WGWE and have stated their aims to restore areas of afforested peat through the National Peatland Action Programme.[13] One of the work areas of this programme is to identify areas of deep peat suitable for restoration. There are some smaller areas of peat within the study area and infrastructure placement has minimised impact on peat and any peat restoration opportunities. Some parts of the NRW estate where tree removal takes place may be unsuitable for peat restoration. Each area will be examined by OLAT and the most appropriate land use for that particular area will be examined. This could range in scope from peat restoration to, natural regeneration of broadleaf species or planted trees or allowing an area to colonise with scrub and grasses.

13.4.21 The scale of the proposed felling for the proposed development can be considered to be within the parameters of the UK Forest Standard and of a similar extent and design to existing felling plans that are approved. A comparison of the felling areas under existing approved NRW felling plans and those required for the proposed development is shown in Table 13.8.

Table 13.8: NRW and proposed development felling areas (ha)

Study Area	Study Area size (ha)	NRW approved felling and % of study area (ha)	Felling required for proposed development and % of study area (ha)
North	830	40.8 (4.9%)	30.8 (3.7%)
South	1699	124.2 (7.3%)	88.9 (5.2%)

Source: ARC Woodlands Ltd

13.4.22 Timber felled on forest land where windfarm infrastructure and wind turbines have their foundations cannot be certified as meeting the requirements of the Certification Standard as directed by the UKWAS and information note 8[14]. The note shows that timber from areas that will be replanted, used as alternative open space or habitat, will meet the requirements for certified timber.

Felling Management Plan

13.4.23 A felling management plan would be expected to be secured by a planning condition. The plan would be reviewed by NRW (as statutory consultee) and it would be anticipated to include the following indicative measures which would be subject to the roles described by the Forest Industry Safety Accord guidance.[15]

- Risk assessment and method statements;
- Re-fuelling plans and locations;
- Pollution plans;
- Public access assessment;
- Watercourse mapping;
- Mitigation equipment for pollution incidents;
- Welfare facilities for contractors and visitors;
- Signage and banksmen requirements;
- Biosecurity measures and protocols;
- Adverse weather working protocols and plans in the event of ground damage;
- A description of the area to be worked with a map and details of the produce to be cut and locations for stacking produce;
- Details of constraints such as watercourses, archaeological sites etc. and how they will be protected;
- A description of appropriate work method- e.g. the felling of the trees will be primarily done using a mechanised timber harvester, but chainsaws will be used for felling/brashing of oversize and/or coarse trees and trees in inaccessible areas such as wet ground. Felling or winching to the harvester if required;
- Machine specifications including traction aids permitted and where they are permitted;
- Trees felled away from watercourses and watercourses left free of brash or debris; and
- A specification of the felling site post harvesting- stump heights, how brash is to be left, deadwood specification, timber zone and brash mat specification.

Compensatory Planting Fund

13.4.24 The developer is legally obliged under their land agreements with Welsh Government to contribute to a fund for compensatory tree planting across the wider national estate wherever such planting cannot be immediately provided for in terms in quantitative or qualitative means within the proposed development. The details of the planting to take place have yet to be finalised with NRW. However as a result of Welsh Government implementing planting under the compensatory fund, there would be no net loss of trees owing to the proposed development.

Operation and Decommissioning

13.4.25 The operational phase will not require any tree felling works unless either maintenance, wind resource, environmental, or health and safety requires the areas immediately around the turbine bases (already cleared of trees) to be cleared of any natural re-growth. Vegetation in this area will likely be low and of no significance to the FRP or certification, however, may present greater opportunities with regards to habitat management (see Appendix 6.3). Decommissioning may also require the immediate areas around the turbines to be clear of vegetation.

Micrositing

13.4.26 A micrositing allowance of 50 m is being applied for as part of the application for all infrastructure, although in some cases environmental constraints will be factored in the final design and mean that restrictions are placed on micrositing ability. Until the site investigation works are completed the extent of micrositing required will not be apparent and it is possible that micrositing will not be needed in all locations where ground conditions are appropriate.

13.4.27 Micrositing constraints in respect of forestry impacts on neighbouring coupes are to be agreed with NRW. The assessment has taken into consideration the micrositing allowance of 50 m for infrastructure and the conclusions reflect this allowance.

[13] Natural Resources Wales, (2022). *The National Peatland Action Programme*. Available from - https://naturalresources.wales/evidence-and-data/maps/the-national-peatland-action-programme/?lang=en [Accessed 29/03/2023]

[14] UKWAS, (2017). *UKWAS Interpretation Note 8 – Wind farm development on certified forest land.* Available from - https://ukwas.org.uk/wp-content/uploads/2017/11/UKWAS-IN-8-Wind-farm-development-on-certified-forest-land-March-2013.pdf [Accessed 29/03/2023]

[15] Forestry Industry Safety Accord, (2023). *Safety Guides*. Available from - https://ukfisa.com/Safety/Safety-Guides [Accessed 29/03/2023]

13.5 CONCLUSION

13.5.1 The impact on forestry has been a key issue for the applicant and NRW, and both have worked closely together to reduce the immediate impact of the proposed development to 119.24 ha; which represents 4.7% of the Forestry study area.

13.5.2 Of the 119.24 ha to be felled 82% of the area is dominated by spruce crops and it is these areas that are producing the major part of the volume of timber to be harvested as shown in Table 13.8. The remaining parts of the felling area consist of another 6% of mixed conifer species and 2% of mixed broadleaved species (approximately 3 ha). The remaining 10% consists of areas that appear in the SCDB as either 'quarries', 'felled areas' or 'open'. These areas are included within the felling area totals as small amounts of tree cover will be present in some of them. Of the 28,919 cubic metres of timber to be felled 97% is Sitka spruce or Larch over 20 years old and 62% of the total volume is from trees over the age of 30.

13.5.3 The impact is further reduced by the return of 14.48 ha of land to NRW management after construction which will be available for replanting or other habitat use.

13.5.4 The design of the infrastructure and its location within the forest area has corresponded with the principles originally suggested in the tender process as follows:

- Using the NRW SCDB the developer has placed all infrastructure (excepting two areas of access road outside NRW land) on to areas of conifer species forest;
- The proposed development does not give rise to the loss of any Ancient Woodland and no infrastructure is placed within woodland designated as a Plantation on Ancient Woodland Site;
- Impact on LISS managed forest areas has been kept to a minimum with only two turbines being located within LISS area and an additional two turbines having a felling area that's partly contained within LISS. A further area which is required for a borrow pit is within LISS designated forest however this area was largely clear felled in 2016; and
- The use of keyholing felling to place infrastructure throughout Y Bryn site boundary to minimise felling areas.

13.5.5 The proposed felling for the proposed development is shown to be of a smaller geographic scale than existing approved felling across the approved period in the NRW felling plan. The felling areas are relatively small compared with existing felling coupe design although they are concentrated into the elevated parts of the study area. It is considered therefore that the impact on the forest from the felling will be of minor significance.

13.5.6 There will be a small loss of forest area (4.7%) from infrastructure footprint leading to a loss of certificated forest land but it is considered to be insignificant across the study area. Timber produced from the areas lost permanently to the proposed development will also be uncertified but in the volumes predicted this is also considered to be insignificant.

13.5.7 The proposed development will mean that NRW as land manager will need to consider changes to the NRW FRP, however, the felling required for the proposed development is less than existing approved felling within the FRP and it is considered that the changes can be accommodated without significant disruption to the long term goals of the FRP.

13.5.8 As a result of Welsh Government implementing planting under the compensatory fund, there will be no net loss of trees owing to the proposed development.