Chapter 9: Non-Avian Ecology
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9. Non-Avian Ecology

9.1. Project Overview

9.1.1. This Chapter describes and evaluates the nature conservation interest of the Application Site and immediate surrounding area, both in terms of habitats and species, and assesses the potential impacts of the Project on these habitats and species. Birds are excluded from this Chapter and are covered separately in Chapter 10 (Avian Ecology). Similarly potential impacts on water quality, fish and peat are not included here and are covered separately in Chapter 8 (Hydrology and Geology). Chapter 15 (Grid Connection), gives an initial desk based study assessment of the species and habitats which are present within the two currently proposed route corridors and so is not discussed within this Chapter. An initial assessment of the impacts of works to the proposed Abnormal Indivisible Load (AIL) routes (see Chapter 12 (Traffic and Transport)) on habitats and species is provided in this Chapter.

9.1.2. In respect of ecology (excluding birds), the key issues for any assessment of potential impacts relating to wind farms are as follows:

- the direct loss of habitats due to land take by wind turbine bases, access tracks and infrastructure;
- habitat fragmentation due to land take by wind turbine bases, access tracks and infrastructure;
- the indirect loss of habitats through disturbance to habitats or species, eg as a consequence of construction work;
- indirect changes to habitats as a result of modifications to processes affecting them, e.g. hydrological changes during construction;
- the possible effects of collision with rotating turbine blades leading to the killing or injuring of bats. This is of particular relevance for sites located in areas known to support important populations of bats; and
- the positive benefits to terrestrial ecology from habitat creation and management secured as part of a Habitat Management Plan.

9.1.3. The following site-specific issues are also considered:

- the direct loss of habitats due to pre-development tree clearance to accommodate wind farm infrastructure;
- the fragmentation of habitats due to pre-development tree clearance to accommodate wind farm infrastructure; and
- positive impacts on key habitats and species resulting from habitat management proposals, which are embedded into the Project.

9.1.4. A phased approach has been taken in assessing the ecological interest of the site. This involved a desk-based study, detailed baseline surveys and assessments over the period 2008-2012. Consultation (as detailed in the Consultation Report which accompanies the application) with Forestry Commission Wales (FCW) and Countryside Council for Wales (CCW) has been undertaken throughout this process. The county ecologists for Denbighshire and Conwy have also been consulted during the Environmental Impact Assessment (EIA) process. In addition consultation has been undertaken with Environment Agency Wales (EAW) and also the North Wales Wildlife Trust (NWWT) and
relevant comments from other non-statutory consultees have been incorporated where appropriate. The results of these surveys, assessments and consultations form the basis of the detailed assessment presented in this Chapter.

9.1.5. The results of the various surveys and assessments undertaken are summarised briefly in this Chapter with more detail provided in the following technical annexes:

- Annex 9.1 – Ecology Planning Policy Context;
- Annex 9.3 – Update Vegetation Survey Report (2012);
- Annex 9.4 – Great Crested Newt Survey Report (2008);
- Annex 9.5 – Mammal Survey Report (2009);
- Annex 9.6– Dormouse Survey Report (2011);
- Annex 9.7 – Red Squirrel Habitat Suitability Mapping report (2009);
- Annex 9.8 – Bat Survey Report (2009);
- Annex 9.9 – Offsite Infrastructure and Potential Access Routes A-D – Extended Phase 1 Habitat Survey (2010);
- Annex 9.10 – Outline Habitat Management Plan (OHMP) (2013);
- Annex 9.11 – Ecological Assessment of Route A (2011);
- Annex 9.12 – National Vegetation Classification Survey Report (2011);
- Annex 9.13 – Dormouse Habitat Suitability Assessment (2012) ; and

9.2. Relevant Legislation

9.2.1. This assessment has been undertaken with reference to the following legislation:

- The Wildlife and Countryside Act 1981 (as amended);
- The EC Habitats Directive 1992;
- The Protection of Badgers Act 1992;
- The Conservation of Habitats and Species (Amendment) Regulations 2012;
- The Countryside and Rights of Way (CRoW) Act 2000; and
- The Natural Environment and Rural Communities (NERC) Act 2006
- The Hedgerow Regulations 1997.

9.2.1. Sites of Special Scientific Interest (SSSI)

9.2.1.1. These are sites of biodiversity or geological interest which have been designated under Section 28 of the Wildlife and Countryside Act 1981, as amended by the CROW Act 2000. There are 1,019 SSSIs in Wales. Planning authorities have specific duties and

1Additional data has been received following the completion of the initial desk study and has been reviewed and referenced as appropriate within this chapter
responsibilities in respect of SSSIs; these are summarised in Part II of ODPM Circular 06/2005.

9.2.2. Great Crested Newt

9.2.2.1. The great crested newt is fully protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and in Schedule 2 of The Conservation of Habitats and Species (Amendment) Regulations 2012 as a European protected species. Under the legislation, it is an offence to intentionally kill, injure or take a great crested newt as well as intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a great crested newt or disturb an animal while it is occupying a structure or place which it uses for that purpose. The legislation applies to great crested newts in both aquatic and terrestrial habitats and to all life stages.

9.2.3. Reptiles

9.2.3.1. All common reptiles in the UK, i.e. slow-worm, common lizard, adder and grass snake, are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) in respect of Sections 9(1) and 9(5) only, which makes it an offence to intentionally kill, injure or sell the animals.

9.2.4. Water Vole

9.2.4.1. Water vole is fully protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to intentionally kill, injure or take a water vole as well as to intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a water vole or to disturb an animal while it is occupying a structure or place that it uses for that purpose.

9.2.5. Otter

9.2.5.1. The otter is fully protected through its inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and in Schedule 2 of The Conservation of Habitats and Species (Amendment) Regulations 2012 as a European protected species. Under the legislation, it is an offence to intentionally kill, injure or take an otter as well as intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by an otter or disturb an animal while it is occupying a structure or place which it uses for that purpose.

9.2.6. Badger

9.2.6.1. The badger receives strict protection under the Protection of Badgers Act 1992 which makes it an offence to wilfully kill, injure, take or attempt to kill, injure or take a badger or interfere with a badger sett by damaging a sett or any part thereof. It is also an offence to wilfully destroy a sett, obstruct access to a sett or disturb a badger while occupying a sett. The 1992 Act defines a badger sett as “any structure or place, which displays signs indicating current use by a badger”.

9.2.7. Dormouse

9.2.7.1. The dormouse is protected under the Wildlife and Countryside Act under Schedule 5 and in Schedule 2 of The Conservation of Habitats and Species (Amendment) Regulations 2012 as a European protected species. Taken together, both levels of protection make it an offence to kill, capture, injure, possess or sell an individual. Furthermore, it is also an offence to deliberately disturb or destroy any site used for breeding by dormice.

9.2.8. Red Squirrel

9.2.8.1. Red squirrel is protected under the Wildlife and Countryside Act, 1981 (as amended) under Schedule 5 and 6. Under the legislation it is an offence to intentionally kill or injure a red squirrel as well as intentionally damage, destroy or obstruct their place of shelter or protection (drey); and intentionally or recklessly disturb red squirrel whilst occupying their place of shelter or protection.

9.2.9. Bats

9.2.9.1. All British bat species are fully protected through their inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and in Schedule 2 of The Conservation of Habitats and Species (Amendment) Regulations 2012 as European protected species. Under the legislation, it is an offence to intentionally kill, injure or take a bat as well as intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a bat or disturb an animal while it is occupying a structure or place which it uses for that purpose.

9.2.10. The Natural Environment and Rural Communities Act (NERC)

9.2.10.1. In accordance with Section 40 of the 2006 NERC Act, every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.

9.2.10.2. Under Section 42 of the 2006 NERC Act, the Welsh Assembly Government has published a list of the living organisms and types of habitat which are of principal importance for the purpose of conserving biodiversity in Wales. The list includes a number of fauna and floral species.

9.3. Policy Context

9.3.1. A review of the planning policy relevant to the scheme is provided in Chapter 4 (Planning and Energy Policy Context) with a brief summary of relevant national planning policy pertinent to ecology included in Section 9.3.1 below. Development Plan and Local Plan policies pertinent to ecology and nature conservation are summarised in Annex 9.1 Ecology Planning Context.

9.3.1. National Planning Policy

9.3.1.1. The Overarching National Policy Statement for Energy (EN-1) states that “Prior to granting a development consent order, the IPC must, under the Habitats and Species Regulations... consider whether the project may have a significant effect on a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects.”
9.3.1.2. EN-1 also states that “Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.” It also notes that “The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.”

9.3.1.3. In addition to the items highlighted in EN-1, EN-3 states that ecological “assessments should include any effects on biodiversity resulting from the disturbance of important habitats such as peat.”

9.3.1.4. Planning Policy Wales (PPW)\(^3\) provides the strategic policy framework for the effective preparation of local planning authorities’ development plans. This is supplemented by 21 topic-based Technical Advice Notes (Wales) (TANs). Relevant to this Chapter are the following:

9.3.1.5. Technical Advice Note (Wales) 5: Nature Conservation and Planning (TAN 5) provides detailed guidance to ensure that planning policies and proposals are prepared and undertaken in a manner that does not result in adverse impacts occurring on acknowledged areas of nature conservation importance. This guidance has been incorporated within the relevant planning policies at a local level.

9.3.1.6. Technical Advice Note 8: Renewable Energy (Annex C, Para 2.22 to Para 2.23 Ecology and Ornithology) (TAN 8) notes that the advice contained with TAN 5 should cover all aspects of wind farm development other than the impact of the moving blades upon birds and bats. It goes on to note, however, that in most cases this will not lead to significant numbers of deaths or injuries and that turbine strike is most likely to occur if a wind turbine is erected directly in a migration path or where there are high concentrations of a particular species for feeding. Early consultations with the Countryside Council for Wales and the Royal Society for the Protection of Birds (RSPB) are strongly recommended.

9.4. Consultation

9.4.1. A summary of scoping responses from the various statutory consultees is provided in the Consultation Report, which includes those responses relevant to, and now addressed in, this Chapter, i.e. those received from CCW, EAW, Denbighshire County Council and Conwy County Borough Council.

9.4.2. Within the final ES account has been taken of the Section 42 consultation responses received with regard to non-avian ecology, as summarised in Table 9.1. The Section 47 consultation responses were also considered in the drafting of the current Chapter, as set out in the consultation report.

\(^3\) Information taken from [http://www.planningportal.gov.uk/planning/planningpolicyandlegislation/currentwelshpolicy/ppwtan/](http://www.planningportal.gov.uk/planning/planningpolicyandlegislation/currentwelshpolicy/ppwtan/) accessed 10/05/12
### Table 9.1 Summary of issues identified during S42 consultation

<table>
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<tr>
<th>Consultee</th>
<th>Issue</th>
<th>Response</th>
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<tr>
<td>Countryside Council for Wales</td>
<td>Requirements for an assessment of likely significant effects under the Conservation of Habitats and Species Regulations 2010 (as amended) of European Sites.</td>
<td>An assessment of impacts on the River Dee and Lake Bala SAC is detailed in Section 9.8 for the associated otter population. Chapter 8 (Geology and Hydrology) for water quality impacts. In addition a report to inform a Habitat Regulations Assessment is provided in Annex 9.15.</td>
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<td></td>
<td>Concerns regarding the level of survey effort to assess roosts within proximity to the site.</td>
<td>Section 9.6.3.98 details no suitable structures for roosts are located within 200m of turbine positions. The buffer is in line with BCT 2012 guidance.</td>
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<td></td>
<td>Concerns that proposed buffers from turbine tips to forest edge and restock areas do not comply with Natural England Guidance Note TN051.</td>
<td>Section 9.7.1 details the design mitigation including details on specific bat buffers to turbines (Table 9.3) to maintain the 50m buffer in line with Natural England Guidance Note TN051.</td>
</tr>
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<td></td>
<td>Requirement for further information on dormice distribution and information to safeguard the conservation status of dormice.</td>
<td>Detailed information on dormice distribution is provided in section 9.6.3.76-87 and Annex 9.6 and 9.13.</td>
</tr>
<tr>
<td></td>
<td>Further information required for areas of suitable dormouse habitats to allow impacts to be assessed.</td>
<td>A Habitat Suitability Assessment is provided in Annex 9.13 with assessment of impacts in section 9.8.</td>
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<td></td>
<td>Concerns over impacts of Access Route options and level of detail of assessment.</td>
<td>Detailed baseline information supplied in Annex 9.9 and 9.11 with high level assessment provided in section 9.8.2.3.1-6.</td>
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<tr>
<td></td>
<td>Concerns over the assessment of impacts on peat habitats and level of detail within baseline surveys and proposed mitigation.</td>
<td>Detailed baseline information provided in Annex 9.3, 9.12 and Appendix A of Annex 8.2. Detail on mitigation provided in Annex 9.10.</td>
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<td></td>
<td>Noise impacts on wildlife, specifically Red Squirrel.</td>
<td>Discussed further in section 9.8.3.24</td>
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<td></td>
<td>Requirement for further information to ensure reptiles are protected throughout project.</td>
<td>Further details on mitigation are provided in section 9.9</td>
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<tr>
<td></td>
<td>Requirement for Habitat Management Plan to detail how conflicting species management will be integrated.</td>
<td>Annex 9.10 provides information on proposed mitigation and details of implementation and responsibilities. A detailed HMP will be agreed post consent.</td>
</tr>
<tr>
<td></td>
<td>Habitat Management Plan to be updated with further detail on implementation, funding and levels of mitigation.</td>
<td>Annex 9.10 provides information on proposed mitigation and details of implementation and responsibilities. A detailed HMP will be agreed post consent.</td>
</tr>
</tbody>
</table>
Consultee | Issue | Response |
--- | --- | --- |
Further information required to assess grid connection impacts. | Further details are provided in Chapter 15 (Grid Connection). |
Further details required for structure of Environmental Management Plan and implementation. | Further details are provided in Chapter 3 (Project Description) section 3.13. |
Denbeighshire County Council | Further details required for structure of Environmental Management Plan and implementation. | See above |
Concerns over level of survey effort for dormice | Detailed information on dormice distribution is provided in section 9.6.3.76-87 and Annex 9.6 and 9.13. |
Concerns over impacts of Access Route options and level of detail of assessment. | Detailed baseline information supplied in Annex 9.9 and 9.11 with high level assessment provided in section 9.8.2.3.1-6. |
Welsh Government | Concerns over level of survey effort. | The survey methodology and scope have been agreed with the Countryside Council for Wales through on-going consultation. |
Environment Agency Wales | Suggested bat monitoring is essential to inform knowledge of impacts of turbines on bats | Details on bat monitoring provided in Annex 9.10 and section 9.9.5 |

9.4.3. Consultation (both formal and informal) with relevant nature conservation organisations has taken place throughout the EIA process. For example: CCW provided a formal response containing comments based on a draft issue of the ES (see the Consultation Report), in September 2011. As a result the non-avian ecology related comments have been addressed within this Chapter. In addition to this, informal consultation has taken place with statutory consultees including: NWWT via telephone (23rd Jan 2012) so that Adrian Lloyd Jones could talk through NWWT’s concerns.

9.4.4. In addition to written and telephone correspondence, seven meetings have been held with CCW; between 2008 and 2012. A site meeting with the NWWT Dormouse Conservation Officer was held in January 2009 to discuss potential issues relating to dormice. Email correspondence has also taken place with the county ecologists for Denbighshire and Conwy County Councils. In February 2010 a consultee meeting was held with all statutory and non-statutory consultees related to ecology invited. Attendees included representatives from CCW, Royal Society for the Protection of Birds (RSPB), Conwy County Borough Council, EAW and NWWT, with written comments from Denbighshire County Council, whose ecologist was unable to attend.

9.4.5. Rhian Hughes, the Dormouse Project Officer for the North Wales Wildlife Trust, was consulted on the scope of dormouse surveys within the Application Site. In addition Jonathon Gilpin, CCW Windfarm Casework Officer and Liz Halliwell, CCW Mammal Ecologist were consulted to agree the scope of the further 2010 dormouse surveys and methodology for the 2012 habitat suitability assessment. Further site visits have been...
carried out in 2011 and 2012 to discuss the range of mitigation strategies included with the ES.

9.5. **Assessment Methodology and Significance Criteria**

9.5.1. The impact assessment for terrestrial ecology and habitats has been carried out based on the Institute of Ecology and Environmental Management (IEEM) Guidelines for Ecological Impact Assessment in the UK, hereafter referred to as the IEEM guidelines (2006). These guidelines are endorsed by a number of organisations including; CCW, Natural England, Scottish Natural Heritage (SNH), Environment Agency, Scottish Environment Protection Agency (SEPA), Environment and Heritage Service, Association of Local Government Ecologists (ALGAE), Institute of Environmental Management and Assessment (IEMA) and the Wildlife Trusts.

9.5.2. The starting point for any assessment of impacts is to determine which receptors should be subject to detailed assessment. Ecological receptors to be subject to more detailed assessment should be a) of sufficient value that impacts upon them may be significant (in terms of legislation or policy) and b) potentially vulnerable to significant impacts arising from the development (IEEM, 2006). This approach is consistent with the EIA Regulations, which only require investigation of likely significant impacts.

9.5.1. **Determining Value**

9.5.1.1. The IEEM guidelines recommend that the value of ecological receptors is determined based on a geographic frame of reference that includes the following levels; International; UK; National; Regional; County; District; Local/Parish; and within zone of influence

9.5.1.2. For this assessment, a regional level of value is considered irrelevant given both the lack of clarity over regional boundaries (i.e. North Wales) and the likelihood of considerable overlap with the county boundaries (i.e. Denbighshire and Conwy). Where the Local value has been referenced to Strategic Search Area A, this area has been taken from TAN 8 and represents one of the seven areas identified as being suitable for large onshore wind farm developments. Hence for the purposes of this assessment, the following geographic frame of reference is used to describe the value of ecological features:

- International;
- UK;
- National (Wales);
- County (Denbighshire & Conwy);
- Local (Strategic Search Area A); and
- Less than local (within zone of influence only).

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4 The zone of influence is the area or resources that may be affected by the biophysical changes caused by activities associated with a Project (IEEM, 2006). The zone of influence will be different for different ecological receptors. For example, most terrestrial habitats outside the potential development area boundary will be largely unaffected by the development of the wind farm whilst on the other hand riparian species such as otter could be affected even at considerable distance downstream of the site, e.g. due to impacts on water quality in streams within the potential development area during construction.
9.5.1.1. Valuing Habitats

In accordance with the IEEM guidelines, the value of habitats is measured against published selection criteria, where available. Reference is also made to UK and local Habitat Action Plans (HAPs), although as the guidelines note, the presence of a HAP reflects the fact that the habitat concerned is in a sub-optimal state (and hence that action is required) and does not necessarily imply any specific level of importance for the habitat. In accordance with the guidance, features may be assigned greater value if there is a reasonable chance that they can be restored to higher value in the future.

9.5.1.2. Valuing Species

In accordance with the IEEM guidelines, in assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Rarity is an important consideration because of its relationship with threat and vulnerability although since some species are inherently rare, it is necessary to look at rarity in the context of status. A species that is rare and declining should be assigned a higher level of importance than one that is rare but known to be stable.

Reference is also made to UK and local Species Action Plans (SAPs) and to the List of Species and Habitats of Principal Importance for Conservation of Biological Diversity in Wales (i.e. Section 425 species), although as with HAPs, their presence reflects the fact that the population is in a sub-optimal state and does not necessarily imply any specific level of importance.

9.5.2. Ecological Impacts

9.5.2.1. Predicting and Characterising Ecological Impacts

In accordance with the IEEM guidelines, when describing impacts, reference is made to various impact characteristics including the following:

- Confidence in predictions (levels of certainty that an impact will occur as predicted) - this is based on a three point scale; certain/near certain; probable and uncertain;
- Magnitude – i.e. the size of an impact in quantitative terms where possible;
- Extent – i.e. the area over which an impact occurs;
- Duration – i.e. the time for which an impact is expected to last;
- Reversibility – i.e. a permanent impact is one that is irreversible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it, a temporary impact is one from which a spontaneous recovery is possible; and
- Timing and frequency – i.e. whether impacts occur during critical life-stages or seasons.

5 Section 42 of the Natural Environment and Rural Communities (NERC) Act 2006
9.5.2.3. Both direct and indirect impacts are considered:

- Direct impacts are changes directly attributable to a defined action such as the physical loss of a habitat or the immediate mortality of an individual of a particular species; and
- Indirect impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or receptor. An example of this would be an impact on an aquatic species located downstream of the site due to polluted runoff from construction entering the river catchment.

9.5.3. Approaches for Determining Significant Impacts

9.5.3.1. In accordance with the IEEM guidelines a significant impact, in ecological terms, is defined as an impact (adverse or positive) on the integrity of a defined site or ecosystem(s) and/or the conservation status of habitats or species within a given geographical area. The assessment of whether an impact is ecologically significant is not dependent on the value of the receptor in question. The value of any receptor that will be significantly affected is simply used to determine the geographical scale at which the impact is significant, for example an ecologically significant impact on a receptor of value at county level is regarded as a significant impact at a county level.

9.5.3.2. As noted above impacts are only assessed in detail for receptors of sufficient value that impacts upon them may be significant (in terms of legislation or policy). In this assessment, impacts are assessed in detail only for receptors of county (Denbighshire and Conwy) value or subject to some form of legal protection.

9.5.3.3. Any significant impacts remaining after mitigation (the residual effects), together with an assessment of the likelihood of success in the mitigation, are the factors to be considered against legislation, policy and development control in determining the application.

9.5.4. Mitigation, Compensation and Enhancement

9.5.4.1. It is important as part of any EIA, wherever possible, to clearly differentiate between mitigation, compensation and enhancement and these terms are defined here as follows:

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6 Based on the ODPM (2005) integrity is defined as follows: “The integrity of a site is the coherence of its ecological structure and function, across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of population

7 Based on the EC Habitats Directive, conservation status is defined as follows: “for habitats, conservation status is determined by the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area; and for species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its population within a given geographical area” NB One of the main aims of the EC Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance. The assessment of favourable conservation status applies to the subpopulation/population level.

8 It should be noted that in some cases it is possible for a feature to be of relatively low value in nature conservation terms, yet subject to legal protection. An example, in many parts of the UK, is badger which is of relatively low conservation importance.
Mitigation is used to refer to measures to avoid, reduce or remedy a specific negative impact in situ. Mitigation is only required for negative impacts assessed as being significant or where required to ensure compliance with legislation;

Compensation is used to refer to measures proposed in relation to specific negative impacts but where it is not possible to fully mitigate for negative impacts in situ. Compensation is only required for negative impacts assessed as being significant or where required to ensure compliance with legislation; and

Enhancement is used to refer to measures that will result in positive ecological impacts but which don’t relate to specific significant negative impacts or where measures are required to ensure legal compliance.

9.6. Baseline Data Collection Methodologies and Consultation

9.6.1. Pre-existing Information

9.6.1.1. The following statutory and non-statutory consultees were contacted variously between 2008 and 2012 (see Consultation Report for further details) with respect to the identification of existing ecological information in the vicinity, i.e. within 5 km of OS SJ 014 537 the approximate centre of the Application Site:

- Cofnod Biological Records Centre;
- Countryside Council for Wales (CCW);
- North Wales Wildlife Trust (NWWT);
- Denbighshire County Ecologist; and
- Conwy County Ecologist.

9.6.1.2. The Vincent Wildlife Trust (VWT) was also contacted for information on pine marten in the area but did not respond.

9.6.1.3. FCW has also provided various ecological data for the Application Site throughout the EIA process.

9.6.1.4. In addition to the data received through consultation with the relevant organisations, further information was obtained from other sources such as Environmental Statements produced for other potential wind farm Projects in the surrounding area including; Derwydd Bach, Brenig, Gorsedd Bran, Nantbach and Wern Ddu.

9.6.2. Field Surveys

9.6.2.1. The scope of the field survey work required to inform the EIA was determined following a site visit by RWE NRL and WYG in March 2008 and was subsequently refined in response to emerging data and following consultation with CCW and the two county ecologists. The field surveys were carried out over the period 2008-2012. As a result of the likely resulting time gap, between these surveys and the future commencement of works, pre-construction surveys will be carried out for all protected species which may be present on the site to inform detailed mitigation requirements. In addition, annual surveys for dormice will continue during the pre-construction and planning determination period, to inform detailed mitigation requirements.
9.6.2.2. It is acknowledged that most survey data are now at least three years old, however, the habitats present at the site have not altered significantly during the intervening period (see Annex 9.3 Vegetation Survey Report (2009)), and the abundance and distribution of species is, therefore, also considered unlikely to have changed significantly.

- Phase 1 habitat survey;
- National Vegetation Classification (NVC) level survey of habitats considered to be of potential nature conservation value;
- NVC survey of accessible turbine foundations and associated infrastructure;
- Great crested newt (GCN) survey;
- Otter, water vole and badger surveys;
- Dormouse survey and dormouse habitat mapping survey; and
- Bat survey and a day time bat box survey.

9.6.2.3. Survey methodologies utilised for the various field surveys are summarised proceeding sections. Further details can be found within the relevant technical annexes (Annexes 9.2 Initial Ecological Desk Study (2008) (1) to 9.14 Draft Dormouse License Method Statement (2012)).

9.6.2.4. Surveys were not undertaken for reptiles. Common lizard and adder are both considered to be present within Clocaenog Forest in open habitats however it was considered that further survey would add little relevant data given the scale of the Application Site. Incidental sightings of common lizard were made during the ornithological surveys across the study area. The Vincent Wildlife Trust (VWT) carried out a survey in April 2009 in the area for pine marten which found no signs of this species (Liz Halliwell, CCW, pers. comm.); therefore, further pine marten surveys were not considered necessary.

9.6.2.5. Study Area

9.6.2.6. During the course of the survey work there have been several minor changes to the Project boundaries. Initial surveys were based on (and all baseline reports refer to) the site, which was the current site at the time of that survey. In some cases, areas were surveyed which no longer form part of the Project (e.g. the area immediately surrounding the reservoir at the head of the Afon Clywedog).

9.6.2.7. In other cases, where infrastructure was later proposed outside this area, additional Phase 1 habitat surveys were conducted to fully include these areas. For example, the initial Extended Phase 1 Habitat Survey covered the 2008 site over the course of four days in August 2008. Additional Phase 1 surveys were then undertaken on September 30th and October 1st 2009 covering the locations of proposed infrastructure (access tracks, substations, borrow pits) which now lie within the Application Site. These additional surveys also included surveying four potential access route options from the A5 trunk road. The 2012 update Phase 1 survey covered the submitted application area in its entirety.

9.6.2.8. As a result the individual surveys (and the geographic area that they covered) are considered sufficient to allow a full ecological assessment of the current Application Site to be undertaken.
9.6.2.9. In addition to the above and in accordance with current best practice guidance (English Nature 2001\textsuperscript{9}), surveys for great crested newt were extended to suitable habitat up to 500m beyond the Application Site. Checks were also made outside of the Application Site for signs of otter at road bridges and other accessible locations within catchment areas shared with the Application Site. Data were also collected on bat activity outside of the Application Site to obtain contextual information on bat populations within the general area.

9.6.2.10. Vegetation

9.6.2.11. Extended Phase 1 Habitat Survey - Habitats within the Application Site were mapped in accordance with the standard Phase 1 habitat survey classification (JNCC, 2010\textsuperscript{10}) in 2008. The survey covered all open habitats and included all rides within the forest where these were greater than 5 m wide. An updated Phase 1 survey was carried out in 2012 to record any significant changes to the previous assessment and provide an up to date record of habitats present from which to assess impacts (Figure 9.2 and 9.3 is based upon the 2012 survey).

9.6.2.12. National Vegetation Classification (NVC) Survey - Habitats of particular nature conservation value and accessible infrastructure locations were also surveyed with regard to the NVC (Rodwell 1991\textsuperscript{11}; 1992\textsuperscript{11}).

9.6.2.13. The following Phase 1 habitat types were subject to NVC survey:

- Upland heathland;
- Mosaic of heathland-woodland;
- Mire;
- Marsh/Marshy grassland; and
- Unimproved acid grassland.

9.6.2.14. The surveys were undertaken in August, September and early October 2008, some areas were then re-surveyed in late September and early October 2010 with one further area being surveyed in July 2011. In February 2012, during the peat probing survey (see Annex 8.2), all turbine base locations, existing and proposed access tracks and additional infrastructure (including substations, met masts and temporary construction compounds) which were peat probed, were also assessed to NVC level survey; subject to access.

9.6.2.15. Great Crested Newt (GCN)

9.6.2.16. During April and early May 2008, site visits were undertaken to locate and assess, using a Habitat Suitability Index (HSI) (Oldham et al. 2000\textsuperscript{12}), waterbodies within the Application Site and a 500m buffer zone, for their potential to support GCN. Surveys to determine the presence/absence of GCN were undertaken in accordance with the statutory guidance (English Nature, 2001\textsuperscript{9}) which is also applicable to Wales. According to the guidance four surveys are to be undertaken per pond within the recommended period. If


\textsuperscript{10} JNCC (2010) Handbook for Phase 1 Habitat Survey: a technique for environmental audit.


GCN are observed an additional two visit are required to those in which they were observed.

9.6.2.17. Given the large number of ponds, and in many cases their relatively low potential to support GCN, the 12 most highly ranked of the 44 water bodies following the initial assessment were surveyed for GCN presence/absence on the proviso that if GCN were found to be present, then a more comprehensive survey, including all other potentially suitable waterbodies would be undertaken. Those ponds selected for presence/absence surveys were surveyed in accordance with standard guidance (English Nature 2001) between mid May and mid June 2008.

9.6.2.18. Water Vole and Otter

9.6.2.19. Surveys for water vole and otter were undertaken between September and October 2008. In accordance with the standard survey guidelines (Strachan & Moorhouse13, 2006; Chanin, 200314), the survey comprised walking the banks of all watercourses within the Application Site to search for and record any signs of water vole and/or otter presence, including but not limited to holts/burrows, latrines/spraints, footprints, feeding remains and sightings of animals.

9.6.2.20. Watercourses outside the Application Site but within the same catchments were checked for signs of otter at road bridges and other locations where the watercourse was accessible or clearly visible from the road.

9.6.2.21. Survey effort was frequently hampered by steep sided, narrow stream channels with dense, overhanging vegetation which obscured visibility of the banks; however, steep sided and heavily shaded water courses are considered to be generally unsuitable for water vole and as such this is not considered to impact on the validity of the survey.

9.6.2.22. Badger

9.6.2.23. Surveys to determine the presence/absence of badger were undertaken in December 2008 and January 2009 following the recognised survey methodology (Harris et al 198915). The survey was necessarily restricted to tracks and open areas due to difficulties in accessing dense plantation blocks; however paths and push throughs as evidence of badger presence could still be searched for. Since only the more accessible open areas could be searched for badger signs, it is possible that some badger setts within the dense forestry blocks may have been missed; the Cofnod desk search results found one result for badger based in the south east corner of the site.

9.6.2.24. Dormouse

9.6.2.25. Guidance on dormouse survey is provided in the Dormouse Conservation Handbook (Bright et al 200616). It is recommended that at least 50 nest tubes should be used spaced at approximately 20m intervals across the study area. Due to the large size of the

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Application Site and the perceived low value of much of the plantation forest for dormice\textsuperscript{17}, a targeted survey methodology was at first devised to survey a sample of suitable areas of habitat within the Application Site, rather than providing comprehensive coverage. A total of 125 nest tubes and 125 nest boxes were installed in eight locations considered to represent the best quality habitat for dormice within the Application Site in April 2009. Each nest box and nest tube was searched for any evidence of use by dormice on three occasions; once in June, once in September and once in October 2009.

9.6.2.26. Following discussion of the survey results with CCW in April 2010 it was agreed that the existing boxes and tubes be left in situ and checked on three further occasions over the following 2010 survey season. In addition, a further 90 nest boxes and 90 nest tubes were placed in six further potentially suitable locations on the site, with targeting of areas adjacent to proposed pre-development tree clearance for the wind farm if possible. These were subsequently checked along with the existing boxes and tubes in June, August and September 2010. A further check was made in November 2011 of all in situ nest boxes and tubes.

9.6.2.27. In February 2012 a habitat suitability assessment was carried out of the entire Clocaenog Forest area, which includes the Application Site, based upon the Forestry Commission’s (2010)\textsuperscript{18} dormouse guidance with changes agreed with Liz Halliwell, CCW and FCW to reflect the unique nature of the Clocaenog Forest habitats. The assessment included analysis of FCW GIS data, aerial photos and ground truthing to identify high, moderate and low quality habitat for dormice.

9.6.2.28. Bats

9.6.2.29. Bat surveys were undertaken in accordance with guidelines in place at the time, i.e. the Bat Conservation Trust (BCT), Bat Surveys – Good Practice Guidelines (2007)\textsuperscript{19} and the then current Natural England interim guidance on bats and onshore wind turbines (Natural England, 2008\textsuperscript{20}). This involved undertaking a range of surveys (see below) with surveys undertaken across the bat active period.

- **Bat Roost Potential Survey** - Potential bat roost sites were explored by driving the forest tracks within the Application Site during a daytime visit in April 2008. Locations which had the greatest potential to support bat roosts, such as man-made structures, mature deciduous trees and cliffs were targeted. If any potential roosting sites were found, they were subject to point count and/or Anabat surveys (see below).

- **Transect Surveys** - Transect surveys were undertaken over the course of six visits, carried out at approximately monthly intervals between April and September 2008, to provide data on species and numbers of bats in the Application Site. To enable

\textsuperscript{17} The best conditions for dormice are considered to be found in extensive ancient semi-natural woodland, where there has been time for shrub species diversity to develop, and where coppicing of hazel is carried out on a long rotation. This appears to constitute the species’ core habitat. Despite the importance of shrub diversity and abundant sunlight, dormice are sometimes discovered in the relatively uniform conditions of plantations and some sites appear to support dormice in the virtual absence of deciduous trees and shrubs. Certain softwood species may contain sufficient insects (e.g. aphids and caterpillars) to sustain a small dormouse population in the absence of more conventional food and it is possible that dormice can make use of sap as a food source in such habitats (Bright et al, 2006).

\textsuperscript{18} Forestry Commission (2010) Woodland Management in the presence of the dormouse: Guidance for compliance with the Habitats Regulations.


maximum site coverage, the survey utilised a four-wheel-drive vehicle driven along a pre-determined 28km route on forest tracks (see Figure 2, Annex 9.8 Bat Survey Report (2010)). This method of survey is consistent with standard survey guidelines (BCT, 2007) and enabled the entire Application Site to be adequately surveyed once in each month.

- **Point Counts/Remote Recording** – Point counts using hand-held Bat Box Duet detectors were carried out at a number of locations (this varied between six and 12 locations during each survey session) in conjunction with the transect surveys. Point counts were focussed on locations where bats were considered most likely to be found, such as near watercourses, woodland edges and adjacent areas of scrub. In addition, Anabat remote recorders were used to record data for an entire night at a total of nine locations, five within the Application Site and four at control sites located outside the Application Site. Control sites were used to allow direct comparisons between on and off site data. Six full nights of survey data were recorded using at least six remote detectors on each night. The Anabat results were analysed for all species and with specific reference to bats considered to have a high risk of collision with onshore wind turbines (Natural England, 2009).

9.6.2.30. In addition to the surveys completed in 2008, a bat box survey was undertaken on all known bat box locations within the Application Site and also within 1km of the boundary (September 2008 and June 2010). All known bat box locations were surveyed by a licensed bat worker in order to assess the need for further surveys. The survey found that generally the bat boxes were uninhabitable due to being in a poor state of repair; therefore further surveys were not considered necessary.

9.6.2.31. **Red Squirrel Habitat Suitability Mapping**

9.6.2.32. Field surveys were not conducted for red squirrel. A number of studies have previously been carried out on red squirrel at Clocaenog (e.g. Cartmel, 2008) from which squirrel records were available (provided by COFNOD and FCW) and from which information on the suitability of habitats for red squirrel was also available. New data would simply provide a snapshot of the current population and it was considered that existing squirrel records, combined with information on the habitats present in the forest now and in the future would allow the assessment of future habitat suitability for red squirrel, both with and without the Project.

9.6.2.33. Geographical Information Systems (GIS) data provided by FCW regarding the current forest land use at Clocaenog Forest was used to assess the suitability of existing habitat for red squirrels. Blocks of forestry were appointed levels of value according to tree species and age as per Gurnell et al. (2002). Habitats of value 1 are considered not suitable for feeding or nesting. Habitats valued as 2 (low suitability) are considered suitable for nesting or provide food for a short period of time. Habitats of value 3 & 4 (moderate and high suitability) refer to habitats that will support resident squirrels and consist of tree species of an age and structure that will hold moderate and high densities of squirrels respectively.

9.6.2.34. Using published data on the carrying capacity of different habitats for red squirrels (Gurnell et al. 2002), an estimate of the potential red squirrel population within the

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Clocaenog Forest as a whole was made based on the then current Forest Design Plan (FDP).

9.7. Baseline

9.7.1. A summary of baseline data relevant to this assessment is presented below. For ease of reading, scientific names are not used in the text. Further details and scientific names for all species referred to in the text below are provided in Annex 9.2 Initial Ecological Desk Study (2008) (1) to 9.8 Bat Survey Report (2010).

9.7.1. Designated Sites

9.7.1.1. Statutory Designated Sites

9.7.1.2. There are no internationally or nationally designated sites within the Application Site itself.

9.7.1.3. There is one internationally designated site within 10 km of the Application Site, the River Dee and Bala Lake Special Area of Conservation (SAC), which lies 8 km to the south of the Application Site. The River Dee and Bala Lake has been selected as a SAC as it is a watercourse of plain to montane level with Ranunculion fluitantis and Callitricho-Batrachion vegetation. The annex II species which are a primary reason for selection of this site are Atlantic salmon and floating water-plantain. Additional species which are a qualifying feature though not a primary reason for site selection are sea, brook and river lamprey, bullhead and otter. Further detail is provided in Annex 9.15 Report to Inform Habitat Regulations Assessment.

9.7.1.4. There are two nationally designated sites, Mynydd Hiraethog Site of Special Scientific Interest (SSSI) and Cefn Rofft SSSI, within a 5 km radius of the Application Site (see Figure 9.1). Citations for both are provided in Annex 9.2 Initial Ecological Desk Study (2008) (1).

9.7.1.5. Mynydd Hiraethog SSSI lies immediately adjacent to the west side of the Application Site. The SSSI covers approximately 6321ha and is designated for habitats (some of which are Annex 1 Habitats), including acidic blanket bog, natural oligotrophic lakes, soligenous mires and sub-montane heathland. Furthermore, the SSSI is known to support large numbers of breeding waders as well as raptors including peregrine, hen harrier and merlin (see Chapter 10 (Avian Ecology)).

9.7.1.6. Cefn Rofft SSSI lies approximately 620 m to the south of the Application Site. The SSSI is approximately 4ha in size and is designated for its unimproved neutral grassland which occurs in association with small areas of wet acidic grassland, woodland, scrub and bracken.

23 Full citation can be viewed at: http://www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0030252 – accessed 30/03/2010
9.7.1.7. *Non-statutory Designated Sites*

9.7.1.8. There are 19 Local Wildlife Sites (LWSs) and a further 20 candidate LWSs within a 5 km radius of the Application Site (see Figure 9.1). Of the 19 LWSs, three are within the Application Site:

- Brynhyfryd (0.8 ha);
- Clocaenog Forest (1,430 ha); and
- Craig Bron-banog (22 ha).

9.7.1.9. One further LWS lies adjacent to the Application Site Nilig LWS (12.8 ha).

9.7.1.10. Of the 20 candidate LWSs, Burma Road (2) (3.3 ha) and Nant Y Derwydd (0.7 ha) lie within the Application Site.

9.7.1.11. All those sites which carry the prefix of being a candidate wildlife site are Conwy LWSs. These sites have not had boundaries confirmed or citations produced and function as a ‘first alert’ (pers. comm. Barbara Owsianka, County Ecologist).

9.7.1.12. Brief citations are available for the Denbighshire Wildlife Sites. These are detailed below for the relevant sites and their location is also shown in Figure 9.1.

- **Brynhyfryd**
  - Upland fields within Clocaenog Forest. Most of the grassland is neutral with crested dog’s-tail, sweet vernal-grass, field wood-rush, bird’s-foot-trefoil, common knapweed, bulbous buttercup and cat’s-ear. Cuckooflower and soft-rush occurs in perennially wet hollows.

- **Clocaenog Forest**
  - Coniferous plantation and associated patches of heathland and mire. The largest and possibly only viable population of red squirrel in North East Wales occurs in the forest.

- **Craig Bron-banog**
  - Upland heathland on a hill top within Clocaenog Forest. Heather of a range of ages occurs and herbs present include common milkwort, tormentil and heath wood-rush.

- **Nilig**
  - Acid grassland fields on a south-east slope, with some wet flushes, typical of upland rffdd. Grassland is mat-grass-heath bedstraw dominated and in drier area it is sheep’s fescue-common bent-heath bedstaw community. Acid flushes support soft rush, common sedge, carnation sedge, and *Polytrichum* and *Sphagnum* mosses.

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**9.7.2. Pre-existing Survey Data**

9.7.2.1. A brief summary of relevant information is presented below for all species including those which were subsequently surveyed for. Further details can be found in Annex 9.1. Based on this pre-existing survey data, evaluations of ecological receptors have been made for those species which were not subsequently surveyed for, such as reptiles and brown hare.

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24 The size (ha) of these Wildlife Sites according to the original citation differs in some cases from that provided in GIS format by Cofnod (see Figure 9.1). As the GIS information is the only detailed information available with regards boundaries this data has been used for determining the size of Wildlife Site in this chapter.

25 This citation would appear to be out of date as WYG surveys of this area indicate it is now a small area of acid heath and conifer plantation (Annex G2).

9.7.2.2. Cofnod provided data on species of conservation concern within 5 km of the Application Site. FCW provided ecological records from the Application Site and from the wider Clocaenog Forest area. These data are summarised below in Table 9.2.

### Table 9.2 Summary of Data Provided by Cofnod and FCW

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Data Provider</th>
<th>Records</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vascular Plants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cofnod</td>
<td>Bluebell</td>
<td>1.5 km south-south east Application Site</td>
</tr>
<tr>
<td></td>
<td>FCW</td>
<td>Water forget-me-not – 27 records from ponds and bog/mire habitat</td>
<td>In central and southern areas of the Application Site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lesser twayblade</td>
<td>In north east of Application Site at Gors y Wern</td>
</tr>
<tr>
<td><strong>Non-Vascular Plants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cofnod</td>
<td>Feathery bog-moss, spiky bog-moss, twisted bog moss, slender cow horn bog-moss</td>
<td>Records from Llyn Brenig 1.5-3 km west of Application Site</td>
</tr>
<tr>
<td></td>
<td>FCW</td>
<td>Fir club moss – 1 record</td>
<td>In north west of Application Site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stag’s-horn clubmoss – 1 record</td>
<td>On Llech Daniel water course within wet flush</td>
</tr>
<tr>
<td><strong>Invertebrates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cofnod</td>
<td>Small pearl-bordered fritillary - 25 records, 5 from within Application Site.</td>
<td>Majority of records from the southern half of the Application Site</td>
</tr>
<tr>
<td></td>
<td>FCW</td>
<td>Small pearl-bordered fritillary – 26 records, 9 from within Application Site (in 2012 a further 17 records were received, 4 records from within the Application Site).</td>
<td>Majority in central and southern areas associated with riparian corridors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Common blue – 1 record</td>
<td>Not within Application Site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dark green fritillary – 2 records</td>
<td>In north east of Application Site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Small copper – 1 record</td>
<td>In central north area of Application Site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Small heath – 3 records</td>
<td>2 records from north of Application Site one in south</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hairy woodant – 3 records</td>
<td>In central southern area of Application Site</td>
</tr>
<tr>
<td><strong>Amphibians</strong></td>
<td>Cofnod</td>
<td>12 palmate newt; 9 common frog.</td>
<td>No records of great crested newt</td>
</tr>
<tr>
<td><strong>Reptiles</strong></td>
<td>Cofnod</td>
<td>4 common lizard; 2 adder</td>
<td>No records from within adder</td>
</tr>
<tr>
<td><strong>Otter</strong></td>
<td>Cofnod</td>
<td>13 records only 1 from within the Application Site</td>
<td>Most records associated with the River Clwyd</td>
</tr>
<tr>
<td><strong>Water vole</strong></td>
<td>Cofnod</td>
<td>20 records, 8 of which are from within the Application Site</td>
<td>Records within the Application Site are distributed across the site with 3 in the north and 5 in the south.</td>
</tr>
<tr>
<td></td>
<td>FCW</td>
<td>2 records</td>
<td>1 in central northern area of Application Site and one just outside boundary immediately south</td>
</tr>
<tr>
<td><strong>Badger</strong></td>
<td>Cofnod</td>
<td>16 records, only 1 from the Application Site located in the south east corner</td>
<td></td>
</tr>
</tbody>
</table>
### Taxa Data Provider | Records | Notes
--- | --- | ---
| | | |
| FCW | 44 records | None in Application Site |
| Brown hare | Cofnod | 12 records, 10 within Application Site |
| FCW | 13 records | One within Application Site |
| Polecat | Cofnod | 9 records, 1 within Application Site |
| | | Located in north of Application Site |
| Dormouse | Cofnod | 1 record |
| | | Record 2 km north east of Application Site |
| FCW | 2 records | Records from Coed y Pennant c.5.5 km west of Application Site |
| Red squirrel | Cofnod | 140 records |
| | | Red squirrel distributed across Application Site and wider Clocaenog Forest |
| Bats | Cofnod | Common pipistrelle, brown long-eared bat and Daubenton’s bat. |
| | | No records from within the Application Site |
| FCW | Common pipistrelle – 6 records, 2 within Application Site. One potential bat roost record for a beech tree. | The potential bat roost in the beech tree lies c. 100 m outside the potential development boundary to the south. |

9.7.2.3. Further information for a number of taxa was obtained from sources additional to Cofnod and FCW and these are summarised below:

9.7.2.4. Small Pearl-Bordered Fritillary

9.7.2.5. Research undertaken over an eight year period in the Clocaenog Forest and Alwens (Williams & Hobson, 2009) has found the small pearl bordered fritillary to be present in open riparian areas and clear fell sites. Most continuous populations occur on open riparian areas whereas transient populations mainly occur on clear fell sites which are often left to scrub up. A further report (Williams 2012) on the status of the small pearl-bordered fritillary comes to the same conclusions.

9.7.2.6. The small pearl-bordered fritillary is a UK BAP Species. The species is generally widespread and locally abundant in Wales but has suffered a decline in recorded distribution of 36 percent in Wales and 34 percent at UK level between 1970-82 and 1995-2004 (Fox et al, 2006).

9.7.2.7. Management of sites to keep habitat open has now taken place at a number of locations at Clocaenog. The management has resulted in scrub clearance along 5 km of watercourse, equating to 6 hectares (NB some of which lies out site of the Application Site). Where management has been undertaken, it appears to have had a beneficial impact on the small pearl bordered fritillary population enabling persistence at those sites.

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However, the current long-term population trend for Clocaenog Forest and the Alwens indicates a moderate decline (Williams 2012).

9.7.2.8. Given the decline in this species nationally the Application Site is considered to be of at least county (Denbighshire & Conwy) value for the small pearl-bordered fritillary.

9.7.2.9. In the absence of the Project, the only reason to expect any significant changes in the small pearl-bordered fritillary populations within the Application Site as a whole would be due to the management work currently being undertaken for this species. Although in the short term, their population is likely to continue to decline in line with projections made by Williams (2012).

9.7.2.10. \textit{Common Lizard and Adder}

9.7.2.11. Common lizard and to a lesser extent adder, are considered likely to be present in widely scattered locations across the Application Site where suitable habitat is present (i.e. areas of heath and to a lesser extent unimproved acid grassland). Although no dedicated surveys for reptiles were conducted, incidental observations were made of common lizard at several locations within the Application Site (pers. comm Ross Phillips WYG & Dan Brown bird surveyor) during other ecological surveys.

9.7.2.12. Suitable habitat for reptiles is present within the Application Site, but is limited to forest rides and open areas, which are present in limited areas across the whole Application Site. Common lizard is generally common and widespread in Wales, whilst adder is generally common in south and north Wales. It is considered that the Application Site is of value for these two reptile species at a local level.

9.7.2.13. In the absence of the Project, there is no reason to expect any significant changes in common lizard and adder populations within the Application Site as a whole, although their distribution may change with forest rotation.

9.7.2.14. \textit{Otter and Water Vole}

9.7.2.15. FCW provided a water vole survey report (Walsh, 2001\textsuperscript{29}) from 2001 for Clocaenog Forest. Water vole activity was recorded on 10 of the 35 watercourses surveyed. In addition, evidence of otter was recorded at four sites in the study area, two sites on the river Clwyd and one record each on a stream and pond. Maps and location data were not provided with this report, therefore, it is not possible to establish which records come from within the Application Site.

9.7.2.16. \textit{Pine Marten}

9.7.2.17. The VWT undertook a survey for pine marten in April 2008. The results of this survey have not been made available, however it is understood that no evidence of pine marten was found (Liz Halliwell, CCW, pers. comm.). Therefore, the Application Site, as a whole, is considered to be of less than local level value to pine marten. In the absence of the Project there is no reason to expect a significant change in current population status, although (if present) distribution could change with forest rotation.

\textsuperscript{29} Walsh, J. (2001) Clocaenog Forest: water vole survey
9.7.2.18. **Polecat**

9.7.2.19. Only one record for polecat was received for within the Application Site. Polecats are nocturnal animals and although they occur in a wide range of habitats, polecats prefer lowland areas. When they were confined to Wales, valleys and farms were favoured.\(^\text{30}\)

9.7.2.20. Polecat dens are commonly in rabbit burrows, especially in summer, but they frequently move into farmlands in winter, when they may den in hay bales, under sheds and in rubbish tips. Therefore, the habitat within the Application Site is not considered to be highly optimal for this species; as a result, if polecat is present, numbers are likely to be small. Therefore, the Application Site, as a whole, is considered to be of less than local level value to polecat. In the absence of the Project there is no reason to expect a significant change in current population status, although (if present) distribution could change with forest rotation.

9.7.2.21. **Dormouse**

9.7.2.22. Dormice have been recorded from several sites to the east of Clocaenog Forest, most notably Bontuchel Wood, which is located approximately 5 km from the Application Site.

9.7.2.23. The NWWT run a dormouse monitoring Project involving eight different sites to the west and south west of Bontuchel; currently three of these, Coed Tre'r-parc, Coed Cooper and Coed Pennant on the north east of Clocaenog Forest, are known to support dormice. Of the woodlands in the Clocaenog area, Coed Pennant is the nearest known population to the Application Site (approximately 5 km at its closest).

9.7.2.24. There is also a historical record of dormouse within the Coed Pen Y Bedw/Ffridd Y Fedw LWS to the east of the Application Site; however, it is understood that the ownership of this site has changed since this site was designated and that the woodland has been felled reducing the chance of continued dormouse presence. No recent survey data for dormouse are available for the site.

9.7.2.25. Despite the occurrence of dormice at these sites, there are currently significant gaps in the distributional pattern west of Bontuchel. NWWT also has boxes at Coed Y Fron, Coed Nant y Parc and Coed Felin y Moch, Coed y Pentre and Clocaenog north, none of which have recorded dormice (all of these locations are within c. 5 km of the Application Site and generally located to the east of the Application Site).

9.7.2.26. **Red Squirrel**

9.7.2.27. Red squirrels have declined in England and Wales throughout the 20\(^{\text{th}}\) century. In Wales, the red squirrel has declined considerably in the last 30 years and is now confined to conifer plantations. Clocaenog Forest supports the largest remaining population of red squirrels in Wales (Cartmel, 2008\(^{\text{21}}\)) and has been identified by the Welsh Government as one of three key areas or “focal sites” for red squirrel populations.

9.7.2.28. Red squirrel is of high national conservation concern and, as such, is a priority species in the UK BAP and relevant LBAPs (Denbighshire and Conwy). Red squirrel is listed in Section 42 of the Natural Environment and Rural Communities Act 2006 (NERC Act), therefore, the Wales Squirrel Forum, CCW and FCW have proposed a strategy to help

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secure improved protection for the red squirrel. As such conservation programmes have been initiated within Clocaenog Forest as a whole, aimed at conserving the population of red squirrels there.

9.7.2.29. The desk-based assessment conducted by WYG adds to previous population and distribution studies undertaken by Gurnell et al (2002) and Cartmel (2008) to provide a baseline from which to predict future habitat suitability for red squirrel, with and without the Project. The three studies are consistent in estimating the area of currently most suitable habitat for red squirrel within Clocaenog Forest as a whole (of which the current Application Site forms a part) at around 600ha. The majority of “good” red squirrel habitat is located outside the Application Site as are the majority of red squirrel records. The three studies provide differing estimates of likely squirrel population at or around 2008, varying from 143 up to a maximum carrying capacity of 704. The true carrying capacity of Clocaenog Forest is likely to lie between these two figures.

9.7.2.30. The work undertaken in the three studies, along with analysis of previous records of red and grey squirrels in the forest, suggests a declining population of red squirrels, despite the various conservation programmes employed in the area. The minimum viable population of red squirrel at Clocaenog Forest is considered to be 200. However, CCW state that since no survey of sufficient effort has been undertaken to give a confident assessment of current population size; there is no evidence to suggest that the red squirrel population at Clocaenog is likely to fall below the minimum viable population value. It is also possible that red squirrel populations will increase and decrease in response to cone crop cycles.

9.7.2.31. WYG ecologists conducted approximately 126 individual person days of ecological surveys within the Application Site in 2008-9. However, WYG ecologists reported just one unconfirmed sighting of red squirrel and no confirmed sightings of either red or grey squirrel at the time of writing. This could be due to the more dense crops within the Application Site that limit the effectiveness of visual sightings and are less used by the species compared with other parts of Clocaenog Forest, which support larger areas of suitable habitat and from where the majority of records provided by Cofnod originate (see Annex 9.7 Red Squirrel Habitat Mapping Suitability Report (2010)).

9.7.2.32. The current population of red squirrel within the Application Site is considered to be relatively low. However, population size is difficult to estimate accurately and it may increase in future years in response to changes in forest management, e.g. restocking with species of greater value for red squirrels. On this basis and given the presence of suitable habitat here and the historic importance of this area for this species, the Application Site is considered to be of National (i.e. Wales) value for red squirrel.

31 Figure taken from Gurnell et al. (2002); however it should be noted that since this figure was derived (in 1998), the Forestry Development Plan has changed – pers comm. CCW (2011).
32 704 as derived by WYG (2009) is likely to be an overestimate and represent the maximum carrying capacity for the Clocaenog Forest as the presence of grey squirrels, minimum viable patch size and connectivity were not considered in these calculations (see Annex 9.7)
34 Formal consultation response, dated 28th September 2011.
9.7.2.33. Bats

9.7.2.34. A preliminary ecological assessment undertaken by WYG (2008) and data received from CCW, indicate that the area within 5km of the centre of Application Site includes a number of known bat roost sites. Further data supplied for the preliminary assessment by Clwyd Bat Group confirmed records for lesser horseshoe bats from within the general area. However, no information was supplied as to the specific location and/or size of any roosts and no further records were obtained as part of the EIA.

9.7.2.35. Environmental Statements for nearby wind farm Projects at Derwydd Bach, Gorsedd Bran and Brenig also refer to bat records in this area. These make mention of the following species: common and soprano pipistrelle, noctule and Myotis species.

9.7.2.36. Brown Hare

9.7.2.37. The desk search results from Cofnod show that brown hare is present within the Application Site. Although brown hare was not surveyed for specifically, incidental sightings of brown hares were noted during site visits; thus confirming that brown hare is present within the Application Site. This species is listed on the 2006 NERC Act (section 42) and also is a LBAP species.

9.7.2.38. Brown hare are most likely to be associated with a mix of arable and grassland fields (and some woodland) with a mixture of vegetation height, and some large uniform fields; habitats which are not prevalent in the Application Site. Therefore, given the likely scattered distribution of this species, the Application Site, as a whole, is considered to be of less than local level value to brown hare.

9.7.2.39. In the absence of the Project there is no reason to expect any significant changes in brown hare populations within the Application Site.

9.7.3. Survey Results

9.7.3.1. A summary of the results of the various surveys is provided in this section. Information is also provided, where relevant, on predicted trends in habitats and species populations in the absence of the Project. The nature conservation value of the various habitats and species recorded is also evaluated. More detailed baseline survey information can be found within Annex 9.2 to 9.9 and 9.11 and 9.12.

9.7.3.2. Habitats and Vegetation

9.7.3.3. The Phase 1 habitat map for the Application Site is shown in Figure 9.2 and 9.3. The following Phase 1 habitat types were identified within the Application Site (the approximate area of each habitat type is given in parentheses).

- Semi-natural broadleaved woodland (<1 ha);
- Coniferous plantation (c. 1177 ha);
- Recently felled conifer woodland (c. 42 ha);
- Semi- natural mixed woodland (c. 2 ha);
- Scrub (both dense/continuous and scattered) (58 ha);

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9.7.3.4. The areas for each habitat quoted above are based on the habitats present during the 2012 update survey. However, it should be noted that as Clocaenog Forest is a working productive forest, the various tree crops within it are in continual cycles of growth, felling and restocking, therefore, the survey results should be considered a “snapshot” of the habitats present at the time of survey only. The 2012 survey highlighted no significant changes to the 2008 Phase 1 survey, with any changes generally associated with ongoing felling and restocking and changes in growth of existing vegetation (e.g. extent of scrub in open heath land areas). As the 2012 update survey highlighted no significant habitat changes since the 2008 survey, it is considered all baseline surveys are valid and are suitable to assess impacts of the Project.

9.7.3.5. Brief descriptions of each of the broad habitat types present are provided below. For those habitats surveyed with regard to the NVC, the various NVC communities identified are outlined within the habitat descriptions. As the habitats which were surveyed to NVC level were small and fragmented across the Application Site, they have not been mapped on one representative figure. For a large scale plan of each NVC habitat location; please refer to the individual NVC reports located in Annex 9.3 Vegetation Survey Report (2009), Annex 9.12 National Vegetation Survey Classification Report (2011) and Appendix A of the Annex 8.2 Peat Depth Survey Report.

9.7.3.6. The Phase 1 Habitat survey generally did not identify extensive areas of active peat forming mire habitat on site, but the surveys did identify a number of areas of bog habitat or wetter heath habitat with associated bog mosses. The majority of the peat based habitat which was identified across the site has been described as heath habitat as part of the Phase 1 (as it is present on less than 0.5m of peat – under the Phase 1 classification habitats should only be mapped as bog where peat depth is greater than 0.5m) and mapped as such. The two main exceptions to this are: a small area of blanket bog (c.1.7 ha) located at Gors Y Wern in the north of the site and also an area of mire and modified bog between Turbines 22 and 26 (Figure 9.3). Additional small mire areas have been identified in forest clearings as detailed in sections below.

9.7.3.7. It is acknowledged that there are further peat deposits beneath the coniferous plantation; though these areas are assessed to be non-active due to lack of peat-forming vegetation. Further information on peat deposits is provided in Chapter 8 (Hydrology and Geology), and Annex 8.2 Peat Depth Survey Report which contains the results of peat probing and associated NVC surveys at proposed infrastructure locations.
9.7.3.8. *Coniferous Plantation*

9.7.3.9. The majority of the Application Site is characterised by coniferous plantation. Most stands are dominated by Sitka spruce, although additional species such as larch, Norway spruce, lodgepole pine and Scots pine are also present.

9.7.3.10. Areas of recently planted Sitka are more diverse flora wise than established coniferous plantation blocks and more difficult to define as either heath or plantation as heather and other typical heathland species (bilberry and haircap mosses) are common. In line with the JNCC (2010) methodology, all areas where tree species account for greater than 30 percent of the cover, irrespective of shrub species present, have been classified as plantation woodland, whilst those with less than 30 percent tree cover and greater than 25 percent ericoid species in the shrub layer have been recorded as heath (see below). As a result of this the Phase 1 Habitat mapping should be regarded as a “snapshot” of the habitats present at the time of the most recent survey (2012).

9.7.3.11. Even though the forest area is predominantly dominated by non-native species and habitats, this large area of coniferous plantation provides a range of diverse habitats considered to be of value at a local level and supports locally and nationally important species (inc bird species, foraging bats, red squirrel, etc.).

9.7.3.12. In the absence of the Project, it is anticipated that trees would be felled on rotation and new trees planted; with Low Impact Silvicultural Systems (LISS) and clear-felling creating a multi-structured forest with a range of habitats. The Forest Design Plan also shows some areas will be left open or planted with broadleaves. The above notwithstanding, in the long term it is assumed that the vast majority of the Application Site would remain as coniferous plantation.

9.7.3.13. *Woodlands (excluding coniferous plantation)*

9.7.3.14. The Application Site contains areas of both broadleaved and mixed woodland, largely restricted to linear areas adjacent to roads and tracks and riparian areas where FCW have deliberately not re-stocked with conifers within close proximity of watercourses.

9.7.3.15. The broadleaved semi-natural woodland contains a range of species including; beech, rowan, willow and occasional birch and the ground flora is generally species poor with tall ruderal and rank acid grassland species present.

9.7.3.16. Semi-natural broadleaved woodland is listed in the Conwy LBAP however the habitat here is often very scrubby with willow, birch and rowan abundant. The areas where additional species such as beech, oak and alder exist tend to be small. Taking into consideration the limited areas of semi-natural broadleaved woodland and their species composition; they do provide small areas of natural habitat within the coniferous forest area. As a result this habitat is considered to be of value at a local level.

9.7.3.17. A significant area of mixed woodland is situated approximately 100m west of the telecommunications mast on Craig Bron-banog. This habitat is situated in a small valley with some coniferous species (self-seeded or remnant individuals from previous plantations) as well as occasional rowan, birch and willow. As with the surrounding habitats, the ground flora is dominated by heather and bilberry. This habitat also occurs adjacent to roads and tracks, although here the species differ slightly and ‘typical’ broadleaved species such as beech, oak and alder were recorded.
9.7.3.18. Mixed woodland is not listed on either the Denbighshire or Conwy LBAPs. This habitat is dominated by coniferous species and is considered to be of value at a less than local level.

9.7.3.19. In the absence of the Project, the extent of non-coniferous woodland within the Application Site is expected to increase as the Forest Design Plan shows small areas of broadleaves are to be included in future re-stocking, although the forest is likely to remain predominantly coniferous plantation, albeit its biodiversity value may increase through the adoption of continuous cover management and LISS, as described above.

9.7.3.20. **Scrub**

9.7.3.21. Scrub habitats, where the vegetation is dominated by locally native species generally less than 5m tall, are frequent throughout the Application Site. Little used forest tracks, road verges, recently felled areas and river valleys are all typical locations for this habitat. Dominant species tend to be willow and birch although Sitka spruce, beech and oak were also present in different areas.

9.7.3.22. This habitat type is common and widespread, both locally and nationally and the ground and shrub species recorded were typical, including bramble, rosebay willowherb, Yorkshire fog, soft rush, tormentil, creeping buttercup and colt’s foot. Scrub is listed on both the Denbighshire and Conwy LBAPs however, for Denbighshire, LBAP scrub habitats should be dominated by fruit bearing trees and floristically rich grassland, neither of which criteria is true here. The Conwy LBAP gives no description for its scrubland category. Despite this, the scrub is considered to be of value at a local level in part due to the fact that it does cover 58 ha of the site, but also because it provides suitable habitat for fauna such as common lizard and dormice.

9.7.3.23. In the absence of the Project, areas of scrub within the plantation are likely to expand; albeit their expansion will be restricted to open, unmanaged areas and track edges.

9.7.3.24. **Acid Heath**

9.7.3.25. All areas where ericoid species constituted greater than 25 percent of the shrub layer (and there was less than 30 percent tree cover and peat depth was less than 0.5m) were mapped as heath. This includes some areas which have been recently re-stocked with conifers, where heath habitat will be temporary until the canopy starts to close, and areas of open habitat present within the coniferous forest i.e. due to wind fall and/or crop failure. It is considered that the best ‘fit’ to an NVC community (though at a low level of confidence due to the influence that the past forestry has had i.e. stumps, brash and wetter ditches and dry ditch tops) is H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath. However, the heath here is representative of a very species-poor example. An alternative potential NVC match is the H9 *Calluna vulgaris* – *Deschampsia flexuosa* habitat. This habitat is typically more species poor and matched the quadrats more closely, however the frequency and abundance of bilberry suggests the H12 community may be more appropriate.

9.7.3.26. Clearance of previous coniferous plantations has created micro-mosaics of habitats within the heathland with the undulating micro topography resulting in the colonisation of depressions by species such as: Sphagnum mosses, hare’s tail cotton-grass, sedges and rushes (i.e. species thriving in the wet); and on the raised areas by heather, bilberry, heath bedstraw and wavy hair-grass. Although some of these species indicate the presence of underlying peat in certain areas, the NVC survey results suggest that the
wider habitat should still be considered as a heath habitat (with small areas dominated by more aquatic species).

9.7.3.27. H12 heath is the most common type of heather-dominated vegetation occurring at medium altitudes on acidic soils, and according to Rodwell et al. (1991) this community makes a locally important contribution to moorland vegetation throughout Wales. Heathlands on the study site are particularly species-poor compared with typical semi-natural heathlands, however, this is still one of the most valuable habitats within the site, as it is a Habitats Directive Annex 1 habitat. Dry, upland heath is also a UK BAP priority habitat and Conwy LBAP habitat and although no notable plant species are present here, the quantity of this habitat here and its relative rarity in the wider district are considered to make this habitat of at least county (Denbighshire and Conwy) importance.

9.7.3.28. Within the forest, in the absence of the Project, the extent of heathland habitats might be expected to decline over time due to canopy closure and scrub invasion as was highlighted within the 2012 update phase 1 survey, which highlighted extensive areas of scrub within a number of heathland areas.

9.7.3.29. The current management of the forest creates a continuous cycle of habitats which allows transient heathland to develop until the forestry crop shades out the heather, these habitats provide important areas for a range of species.

9.7.3.30. The 219 ha of open heathland, mapped during the 2012 Phase 1 Habitat Survey is likely to remain where management regimes are being implemented, such as the current grazing at Craig Bron Banog and Tir Mostyn plus small-scale flailing of heather within the black grouse management area. However areas of the heathland with limited management have been identified, during the 2012 update phase 1, and these are being increasingly covered by scrub (compared to the 2008 survey), including self-sown broadleaves and conifers, which could reduce the habitat quality with subsequent succession to scrub habitats.

9.7.3.31. Blanket bog

9.7.3.32. The blanket bog located at Gors y Wern comprises blanket mire type vegetation, composed of a dwarf shrub upper-storey of abundant crowberry, cross-leaved-heath heather, ling heather and bilberry with abundant hare's-tail cottongrass. The understorey comprises abundant bog-mosses such as fine bog-moss, red bog-moss and papillose bog-moss, which often form mats and hummocks where round-leaved sundew, common cottongrass and common sedge push through or grow over. Wetter pools occur scattered across the vegetation stand, and here bog asphodel can be found forming dense stands. This area of blanket bog shows strongest affinities with M19 Calluna vulgaris – Eriophorum vaginatum (heather – hare’s-tail cotton-grass) Blanket Mire, and in turn is probably best associated with the M19a Erica tetralix (cross-leaved heath) sub-community. See Annex 9.12 National Vegetation Classification Survey Report (2011) for more detail.

9.7.3.33. A second area of M19 blanket mire was also recorded in an area between turbines 22 and 26 (see Annex 9.12). The blanket mire was being encroached upon by scrub and self-sown Sitka; but did show closest affinity with a mosaic of both cross-leaved heath and crowberry sub-communities. To the north of this is a larger area that, although previously forested, has not been restocked. The area is dissected by a number of drainage ditches and remains of the old ridges and furrows (from previous afforestation), within this area is a mosaic of bog vegetation in the wetter furrows and heathland on the
ridges which are notably drier. The area has been mapped as modified bog and is unlikely to fit to any NVC type across its area.

9.7.3.34. In addition a pioneer community comprising a mosaic area of U2 Deschampsia flexuosa (wavy hair-grass) grassland community and M6 Carex echinata / Sphagnum recurvum / auriculatum mire (star sedge / fine bog-moss / cow-horn bog-moss mire) was recorded south of Turbine 4 (see Annex 9.12 National Vegetation Classification Survey Report (2011)). This area had recently been cleared of coniferous woodland and replanted with a young crop and therefore could not be considered to be blanket bog habitat based on recognised vegetation classification.

9.7.3.35. Vegetation surveys carried out as part of the updated peat depth survey (see Appendix A of Annex 8.2) identified a number of additional mire communities that were relatively small and largely located within clearings in the coniferous forest. Due to the limited scale of the areas they were not mapped on Figure 9.2. A small area of mire habitat was identified to the west of Turbine 11. This has been mapped as M19a Calluna vulgaris – Eriophorum vaginatum blanket mire, Erica tetralix sub community. These habitats were also located on an area which was recorded, during the peat probing survey as having a peat depth of 0.5-1 m. To the north west of Turbine 14, in a clearing (~5 x 35m) a poor fit to M25a Molinia caerulea – Potentilla erecta (purple moor-grass – tormentil) mire, Erica tetralix sub community was recorded corresponding to a recorded peat depth at this location of up to 1m. A band of M20 Eriophorum vaginatum blanket and raised mire was recorded to the south east of Turbine 16. In addition near the western end of the spur road to turbine 27, a small mire community was recorded and mapped as M6 Carex echinata – Sphagnum recurvum/ auriculatum mire (star sedge - fine bog-moss / cow-horn bog-moss mire).

9.7.3.36. Blanket bog is a Habitats Directive Annex 1 habitat and is also UK BAP priority habitat and Conwy LBAP habitat. The quantity of this habitat on site is small compared with a wider distribution within Denbighshire of c. 1,200ha with a number of areas modified due to the planting and/or removal of conifers which has led to a reduced habitat quality in some areas; however, this habitat is assessed to be of county (Denbighshire and Conwy) importance.

9.7.3.37. Acid Grasslands

9.7.3.38. Small patches of unimproved, semi-improved and poor semi-improved acid grassland are common throughout the Application Site, especially on roadside verges and adjacent to the southern boundary. Most areas of this vegetation are best assigned to the U4 Festuca Ovina-Agrostis capillaris community, though several areas could be assigned to the U2 Deschampsia flexuosa vegetation community, especially where wavy hair-grass is dominant. Some areas appear to be more consistent with semi-improved and improved areas of grassland with a thicker sward of grasses, and considerably reduced species diversity.

9.7.3.39. Unimproved acid grassland, U2 Deschampsia flexuosa grassland, is listed on both the UK BAP and Conwy LBAP, although this relates to lowland areas. Only small areas of this habitat are present in the Application Site and these appear entirely typical of this habitat. This unimproved grassland is considered to be of value at a less than local level.

9.7.3.40. Improved and poor-semi improved grassland is not listed on either the Conwy or Denbighshire LBAP. These areas of grassland are poor in vascular plant species richness and are considered to be valued at a less than local level.
9.7.3.41. In the absence of the Project, those areas of grassland within the forest are likely to decline in extent over time as unmanaged track side verges are colonised by scrub.

9.7.3.42. Marshy Grassland

9.7.3.43. There are several areas of marsh/marshy grassland throughout the Application Site. All of these areas are in shallow sided stream valleys.

9.7.3.44. The confluence of the Aber Waen-lydan and the Nant Llech-waered has produced an area of wet grassland either side of the river channel. The channel is narrow (approximately 25 cm) but relatively deep (approximately 1m) and appears to overtop the banks regularly. As a result, the area surrounding the channel is dominated by moisture-loving species such as rushes (soft, jointed and bulbous), sedges (common and star) and grasses (Yorkshire fog, common and creeping bent) with occasional other species including marsh bedstraw, lesser spearwort, marsh cinquefoil and marsh thistle.

9.7.3.45. There are two further areas of this habitat recorded within the Application Site, both adjacent to an unnamed stream that flows in a south westerly direction to the Afon Alwen. The first area is a shallow valley with numerous small streams, dominated by soft and jointed rush. As the valley sides steepen in the south, the habitat grades into small areas of unimproved acid grassland and heath. As the habitat continues to the west it remains very wet but has an increasingly mosaic appearance with a number of tree species (grey willow, birch) overlaying wet heath and patches of marshy grassland.

9.7.3.46. The second area of this habitat type follows the unnamed stream as it flows in a southerly direction through heath habitat. This is a complex mosaic of micro habitats, with micro habitats probably reflecting the underlying ground conditions. There are areas where soft and jointed rush dominate and others where marsh bedstraw and hare's tail cotton-grass dominate. In areas where the valley sides are steeper, typical dry heath species such as heather begin to encroach. Additional areas of marshy grassland were identified adjacent to Nant Llyfarddu and an unnamed stream that flows into the Oernant during the 2012 update survey.

9.7.3.47. Marshy grassland is part of a UK BAP Habitat (although the habitats in the Application Site do not fit the habitat descriptions as detailed by the UK BAP). Examples of this habitat in the Application Site are unexceptional in their species composition, are not considered species rich and are considered to be of value at a less than local level.

9.7.3.48. In the absence of the Project wet scrub/woodland may develop in these areas if open ground is left unmanaged.

9.7.3.49. Ponds and Streams

9.7.3.50. There are a number of ponds and streams within the Application Site. Surveys were undertaken on all ponds during the great crested newt survey (see Annex 9.4 Great Crested Newt Survey Report (2008)), and all streams were surveyed during the water vole survey (see Annex 9.5 Mammal Survey Report (2009)). Both of these surveys were completed in 2008.
9.7.3.51. There was no evidence from the surveys conducted that the ponds within the Application Site support any notable plant species or fit the definition of ponds in accordance with the UK BAP (2009). Although ponds are a Denbighshire and Conwy LBAP habitat, ponds are not uncommon in the wider area and as such, the ponds within the Application Site are considered to be of value at a less than local level.

9.7.3.52. Surveys of the smaller streams in the Application Site suggest that they have little botanical interest and have a low structural diversity. As such, they are considered to be of value at a less than local level.

9.7.3.53. Surveying the Afon Clywedog, downstream of the reservoir, was not possible due to this part of the river being physically inaccessible. The Afon Clywedog is a major tributary of the River Clwyd and is an important salmon and sea trout fishery and impacts on the site are assessed as part of Chapter 8 (Hydrology and Geology).

9.7.3.54. Other Habitats

9.7.3.55. Other habitats present in small areas include bracken, tall ruderal and ephemeral/short perennial vegetation. None of these habitats are considered to be of value at a level greater than less than local and assuming current management practices continue, none are considered likely to change significantly in the absence of the Project.

9.7.3.56. Protected and Notable Plant Species

9.7.3.57. Eyebrights were recorded from several places within the Application Site, typically in ephemeral / short perennial habitats on the edges of tracks. Eleven eyebright species are listed on the 2007 UK BAP, but it is very difficult to identify individual species in the field.

9.7.3.58. The National Biodiversity Network (NBN) lists two records of eyebright species within the 10km grid squares encompassing the site, though neither is listed on the UK BAP. It is not thought that any of the recorded examples correspond to UK BAP species, as the majority of these are found in habitats such as damp lowland heaths, maritime heaths and grasslands, and salt marshes, none of which exist within the Application Site. The Application Site is therefore considered to be of value for eyebrights at a less than local level.

9.7.3.59. Amphibians

9.7.3.60. No great crested newts were recorded within any of the ponds surveyed (see Annex 9.4 Great Crested Newt Survey Report (2008)); however palmate newt was recorded in all the ponds surveyed, with the largest count of adult palmate newts in any individual pond being 16. Smooth newts were also recorded in two of the ponds surveyed. Efts (juvenile newts) were found in five ponds and newt eggs were recorded in four ponds. Palmate and smooth newts are common in Wales (Beebee & Griffiths, 2000) and the newt populations within the Application Site are considered to be of value at a less than local level.

9.7.3.61. Common frog was recorded in four ponds and common toad in a single pond. Common frog is a very widespread species and the populations in the Application Site are considered to be of value at a less than local level. Although common toad has recently been afforded the status of UK BAP Priority, it remains relatively common and
widespread and the small populations within the Application Site are considered to be of value at a less than local level.

9.7.3.62. In the absence of the Project, amphibian populations are likely to remain unchanged assuming that the current forestry management regime remains the same.

9.7.3.63. Water Vole

9.7.3.64. According to the Denbighshire LBAP, compared with the rest of Britain, water vole distribution in Wales seems to have remained relatively stable over the last ten years, although in their consultation response to the draft ES, CCW state that this is not the case and water vole populations have significantly declined in Wales. Water voles are known to be present at a number of sites within the Denbighshire LBAP area but the full extent and status of populations remains largely unknown. Water vole colonies are known to be present in a handful of sites within the Conwy LBAP area including within the Mynydd Hiraethog SSSI.

9.7.3.65. Water voles were recorded in very low densities at two widely spaced locations across the Application Site, on Nant Llech-waered and Nant y Derwydd (see Annex 9.5 Mammal Survey Report (2009) and Figure 9.4). The results suggest that the other parts of the Application Site could be occupied by a very low density of water vole population, where suitable habitat is present which is in line with the results of the water vole survey provided by FCW (Walsh, 2001) see section 9.6.2.

9.7.3.66. Given that there are known to be a number of local colonies within the wider Clocaenog Forest area, the small water vole population within the Application Site is considered to be of value at a local level. Water vole is also a UK BAP and Denbighshire and Conwy LBAP priority species.

9.7.3.67. In the absence of the Project, there is no reason to expect any significant changes in water vole populations in the Application Site; although if more riparian areas are left unstocked following pre-development tree clearance this may create more suitable habitat for water vole.

9.7.3.68. Otter

9.7.3.69. No evidence of otter was recorded on any watercourse within the Application Site, although isolated patches of suitable habitat were identified in rockier areas. Checks of bridges and other accessible sites outside the Application Site provided evidence of otter on the Afon Alwen (see Annex 9.5 Mammal Survey Report (2009) and Figure 9.4).

9.7.3.70. The results of the survey suggest that the Application Site is not regularly used by otters, although as otters are known to be present on surrounding watercourses, it is possible that they use the Application Site occasionally. Otters are known to be present on many of the rivers in the Conwy LBAP area and are listed as a Conway LBAP species. The Application Site is therefore considered to be of value for otters at a less than local level

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36 Information taken from: http://www.denbighshire.gov.uk/CE/Councillors.nsf/0/0d54a449283bc6a580256e16005e88bd/$FILE/DenbWaterVoleSAP.pdf accessed 10/05/12

9.7.3.71. In the absence of the Project, there is no reason to expect any significant changes in otter activity within the Application Site.

9.7.3.72. **Badger**

9.7.3.73. Badgers are a priority species on both the Denbighshire and Conwy LBAPs.

9.7.3.74. Evidence of badger was found in the north west of the Application Site. This evidence included badger hairs in fencing around the Tir Mostyn and Foel Goch Wind Farm, a badger footprint, and a sett which appeared to be unused at the time of the survey. Given the access constraints placed upon the survey across much of the Application Site, with large areas inaccessible due to the dense coniferous plantations, it is considered possible that further setts may be present but have gone unrecorded. The survey results, together with the information provided by Cofnod and FCW (see Table 9.1 and Figure 9.5) suggest that any badger population present is relatively small and the Application Site is therefore considered to be of value for badgers at a less than local level.

9.7.3.75. In the absence of the Project there is no reason to expect any significant changes in badger populations within the Application Site.

9.7.3.76. **Dormouse**

9.7.3.77. Dormouse is a priority species in the UK BAP and both Denbighshire and Conwy have local species action plans for dormouse.

9.7.3.78. Surveys in the 1980s and 1990s revealed that the dormouse has disappeared from a number of counties and is declining southwards in its range. The dormouse is widely distributed in Wales but individual populations are often scattered and isolated from each other. Dormice occur at low population densities, and even in optimal habitat do not usually exceed 10 adults per hectare. They have been found in coniferous woodland, but it is not known what they feed on in this habitat and it is likely that they occur at very low densities (Denbighshire LBAP, 2009).

9.7.3.79. During the monitoring visit in September 2009, a dormouse nest was discovered in a single box close to the south eastern boundary of the Application Site and an adult dormouse was seen on a tree branch adjacent to the nest box. During the monitoring visit in early October, an adult female dormouse with a litter of five juveniles was discovered in this same nest box. Adult male dormice were also discovered in two additional boxes during the October visit, both of which are located within the extreme south eastern part of the Application Site.

9.7.3.80. During the monitoring visit in June 2010, a dormouse nest with an adult dormouse and a degraded dormouse nest were discovered in the south eastern part of the Application Site (in the same area in which dormice were recorded in 2009). During the monitoring visit in August 2010 seven dormice nests and three individual adult male dormice were discovered in this area.

9.7.3.81. During the monitoring visit in September 2010 eight dormice nests and three individual adult female dormice and an adult dormouse were again discovered in the south eastern part of the Application Site. In addition, further dormouse records were recorded in four new areas of the Application Site: in the north east near Cefn Trefor; near the north west boundary close to Marial Gwyn; in the central part of the Application Site close to Nant Uchaf; and to the north east of Craig Bron-banog. A single dormouse nest and adult
dormouse were discovered in a nest tube near Cefn Trefor. Five dormice nests and five adult dormice were discovered in boxes in the north west of the Application Site near Marial Gwyn. A single dormouse nest and adult dormouse were discovered in a nest tube close to Nant Uchaf. A single dormouse nest and two adult dormice were discovered in boxes to the north east of Craig Bron-banog.

9.7.3.82. In addition to the areas highlighted during the 2009 and 2010 surveys dormice were recorded in two new areas of the Application Site in November 2011: to the south west of Craig Bron-banog and to the west of Craig Bron-banog near the old quarry. A single dormouse nest was recorded in a nest box to the south west of Craig Bron-banog. A single dormouse nest was recorded in a nest box to the west of Craig Bron-banog near the old quarry.

9.7.3.83. The areas of habitat surveyed for dormice were those considered to provide the most suitable habitat across the Application Site. The results of these surveys suggest that dormice may be present across the majority of the Application Site in low numbers (see Annex 9.6 Dormouse Survey Report (2010) and Figure 9.6).

9.7.3.84. Dormice are known to be present in Bontuchel Wood approximately 5km to the north east of where they were discovered during this survey as well as 3 woodland sites to the south and south west of Bontuchel Wood which are currently being monitored by the NWWT, the closest of which is approximately 4.5 km away. As Clocaenog Forest is not a Planted Ancient Woodland Site (PAWS) and was mainly heather moorland and hill farms prior to conifers being introduced, it is considered unlikely that a relict population of dormice persists due to a lack of suitable original habitats. The survey results and suitable habitat connectivity in the area indicates the Clocaenog dormouse records are likely to be a result of colonisation from existing populations, including that at Bontuchel but possibly from other sites currently unknown. The studies to date have shown that there are significant gaps in information of dormouse distribution within the wider area.

9.7.3.85. Given the scattered distribution of this species and a downward population trend nationally, any population of dormice is considered to be of conservation value and despite the restricted habitats available to dormouse here, the Application Site is considered to be of county (Denbighshire & Conwy) level value to dormice.

9.7.3.86. The dormouse habitat suitability assessment (see Annex 9.13) indicated the majority of the site can be classed as offering habitat of low suitability to dormice as it is largely dominated by upland mature coniferous forest that is densely shaded with limited understorey and/or not linked to suitable habitat areas. However, 121 ha of habitat of moderate suitability (see Figure 9.6) for dormice was recorded, which included all woodland habitat within 150 m of current dormice records and species rich broadleaved edge strips (such as those associated with riparian corridors) and/ or shrub dominated ride sides of similar structure and composition to those where dormice have been recorded on site. No habitat of high suitability for dormice was recorded.

9.7.3.87. In the absence of the Project there is no reason to expect any significant changes in dormice populations within the Application Site, although animals are likely to move within the site in response to ‘normal’ forestry operations, e.g. felling and re-stocking.

9.7.3.88. Bats

9.7.3.89. All species of bat are listed as a European species under the Habitats Directive. The aim of the Habitats Directive is to maintain or restore the favourable conservation status of
European species and Habitats. Mechanisms under the Habitats Directive to maintain or restore the favourable conservation status of bats includes species protection, Article 16 derogation; prevention of incidental capture or killing; provision and management of stepping stone and linear habitats; and in the case of greater horseshoe, lesser horseshoe, Bechstein’s and barbastelle bats, the designation and management of Special Areas of Conservation. The UK BAP includes seven bat species as priority species; barbastelle, Bechstein’s, noctule, Soprano pipistrelle, brown long-eared bat, greater horseshoe and lesser horseshoe. The Denbighshire LBAP includes common pipistrelle and both the Denbighshire and Conwy LBAPs include lesser horseshoe bat. Natural England Guidance (2009\textsuperscript{19}) considers noctule, Leisler’s bat and nathusius pipistrelle as those bat species at highest risk from wind turbines.

9.7.3.90. Bat Species Recorded

9.7.3.91. During the six survey occasions, six species of bat were recorded (see Annex 9.8 Bat Survey Report (2010)). Within the Application Site, the following four species were identified:

- Common pipistrelle;
- Soprano pipistrelle;
- Noctule; and
- Natterer’s.

9.7.3.92. A small number of Myotis species (whiskered or Brandt’s bats) were also recorded on the Anabat recorders, but these records could not be identified to species level. At the control sites, six species in total were recorded; these were the same four species found within the Application Site with the addition of the following species:

- Daubenton’s; and
- Brown long-eared

9.7.3.93. Areas of Greatest Bat Activity

9.7.3.94. From the combined results of transects and point counts, the pattern of bat activity across the Application Site is generally found to be slightly higher in the southern half of the site (see Figures 2 and 3, Annex 9.8 Bat Survey Report (2010)); although, the Anabat results do not show a south-north bias. From the transect survey results, bat counts seem to be highest around Craig Bron-banog, especially during the June survey.

9.7.3.95. However, when compared with the bat activity at the offsite control locations, bat activity within the Application Site is regarded as being low (average registrations on-site per night of 12 versus 62 off-site).

9.7.3.96. Bat Roost Potential

9.7.3.97. The results of the bat roost potential survey indicate that there are unlikely to be any large bat roosts present within the Application Site. This assessment is based on the fact that the Application Site is predominantly composed of coniferous woodland, with small pockets of immature broadleaf woodland present, generally associated with streams and waterbodies. Neither type of woodland is considered to provide particularly suitable bat roosting opportunities. Additionally the Forestry Commission Wales advice leaflet on
Woodland Management\textsuperscript{38} for Bats, states that: trees under the age of 80 years are least likely to contain roosts. No trees over the age of 80 years are proposed to be cleared as part of the wind farm Project.

9.7.3.98. No man-made structures with bat roost potential were identified within the Application Site and no caves or cliff crevices/fissures with bat roost potential were found. If bats are roosting within the local area, it is most likely that they are utilizing farm buildings and houses located within the surrounding area. The majority of the buildings in the area have stone or slate pitched roofs and stone walls; as such they are likely to offer ample bat roosting opportunities. No suitable buildings were located within 200m of the turbine locations.

9.7.3.99. Tree mounted bat box locations were supplied by FCW for the southern part of the Application Site and surrounding land; however when the bat box locations were examined all 8 boxes located within the Application Site were found to be in a state of disrepair and not suitable for roosting bats. Three boxes outside, but within 1km of the Application Site were found also to be uninhabitable and only one box, c. 750 m east of the Application Site was found to be intact, though no signs of use were noted.

9.7.3.100. Noctules

9.7.3.101. Analysis of the Anabat results conducted with specific reference to noctules (individuals are considered to be at a high risk of collision with onshore wind turbines due to their habitat preference and flight behaviour (Natural England 2009) showed no obvious patterns in use of the Application Site by noctules. Due to the lack of suitable roosting habitat within the Application Site (noctule is a tree dwelling species which uses woodpecker and rot holes), noctules are considered most likely to be roosting outside the Application Site and only foraging/transiting across the Application Site on an infrequent basis (see Annex 9.8 Bat Survey Report (2010)).

9.7.3.102. Importance of the Application Site for Bats

9.7.3.103. Given the relatively low usage of the Application Site by bats particularly in comparison to the control sites, the lack of roosts, limited evidence of foraging, and the species recorded, the Application Site is considered to be of value for bats at a less than local level. In the absence of the Project, whilst usage may vary within the Application Site in response to felling rotations, there is no reason to suspect any significant changes to levels of bat activity compared with the current situation.

9.8. Design Mitigation

9.8.1. Design Mitigation

9.8.1.1. A summary of all mitigation measures for the Project is provided in Chapter 16 (Project Mitigation and Enhancement).

9.8.1.2. The turbine and infrastructure layout has been developed to avoid as many of the areas of habitat considered of moderate to high value to red squirrel as possible (areas as defined by Gurnell et al. (2002) i.e. Corsican, Scots & lodgepole pine >20 years,}

\textsuperscript{38} http://www.forestry.gov.uk/pdf/woodland-management-for-bats.pdf/$FILE/woodland-management-for-bats.pdf - accessed 03/02/2010
European/hybrid larch >40 years, Japanese larch >20 years, Norway spruce >30 years) (see Figure 9.7 and 9.8). In addition Wildlife Sites, peat deposits and heath habitat were also avoided where possible (see Chapter 2 (Project Design), Section 2.4 for site design), however given the extent of these ecological receptors it was not possible to avoid the siting of infrastructure in all these areas completely. Additional changes to the site layout were not considered necessary in relation to other non-avian faunal species present.

9.8.1.3. Design mitigation to minimise hydrological impacts, which could in turn reduce impacts on aquatic ecological receptors, is presented in Chapter 8 (Hydrology and Geology). This has included micrositing of turbine and infrastructure to avoid impacts to deep peat where possible (as detailed in Annex 8.2 Peat Depth Survey Report and summarised within Table 3-6 of this report).

9.8.1.4. Buffer zones of 50 m around surface watercourses were included where feasible in the turbine layout design to ensure construction activities do not occur in these areas. Wherever practicable, buffers in line with the UK Forestry Standard Guidelines Forests and Water (2011) will be applied. This is primarily for hydrological reasons, but will benefit otter and water vole and potentially small pearl-bordered fritillary in riparian habitats.

9.8.1.5. With regards to bat species, pre-development tree clearance for the wind farm will create forest edge habitat through the use of key hole felling with a 100m radius area to the turbine cleared for the majority of turbine locations, however a number of turbines have retained existing mature forestry coupes within this area. To ensure a 50m buffer to turbine tip, as prescribed by Natural England TIN051 (2012), is maintained the turbine locations have been micro-sited in line with buffers as described below.

9.8.1.6. All restocking will be located to provide a 50m buffer from the forest edge to the blade tip for the entire operation period of the project, the distance will depend on year of planting of restocked areas and the yield class planted and will be calculated on a turbine by turbine basis (however it should be noted no restocking will occur in the demised area located 47m from the turbine base). Based on a worst case scenario a maximum of a 52m buffer will be required, this assumes a maximum tree height of 20m for restocked areas which is a worst case maximum height based on use of growth rates of the fastest growing yield class plus 10% that is planted in year one of operation through the operational lifespan of the wind farm (heights are as provided by forestry specialists, UPM Tilhill). All calculations are based on a hub height of 100m and a blade length of 45m.

9.8.1.7. In addition turbine specific buffers have been calculated for a number of turbines (see Table 9.3) to ensure a minimum of a 50m buffer from turbine blade tip to adjacent retained conifer coupes which will exceed the worst case 20m maximum height of the restocked areas during the lifespan of the project. Again all calculations have taken into account the worst case maximum height based on use of growth rates of the planted yield class plus 10% for the mature conifer stands throughout the lifespan of the project (heights are as provided by forestry specialists, UPM Tilhill).
### Table 9.3 Specific bat buffers to turbines

<table>
<thead>
<tr>
<th>Turbine</th>
<th>Max height of adjacent coupe</th>
<th>Bat buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>34.3 (2024)</td>
<td>68.6m</td>
</tr>
<tr>
<td>T3</td>
<td>30.4 (2022)</td>
<td>64.6m</td>
</tr>
<tr>
<td>T7</td>
<td>34 (2024)</td>
<td>68.3m</td>
</tr>
<tr>
<td>T10</td>
<td>29.5 (2029)</td>
<td>63.7m</td>
</tr>
<tr>
<td>T11</td>
<td>31.1 (2034)</td>
<td>65.4m</td>
</tr>
<tr>
<td>T19</td>
<td>26.3 (2032)</td>
<td>59.9m</td>
</tr>
<tr>
<td>T20</td>
<td>31.2 (2034)</td>
<td>65.5m</td>
</tr>
<tr>
<td>T21</td>
<td>24.9 (2042)</td>
<td>58.1m</td>
</tr>
<tr>
<td>T24</td>
<td>23 (2027)</td>
<td>55.6m</td>
</tr>
<tr>
<td>T25</td>
<td>38.6 (2042)</td>
<td>72.5m</td>
</tr>
<tr>
<td>T26</td>
<td>37.9 (LISS)</td>
<td>71.9m</td>
</tr>
<tr>
<td>T28</td>
<td>21.6 (2032)</td>
<td>53.6m</td>
</tr>
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<td>T29</td>
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<td>41.9 (LISS)</td>
<td>75.2m</td>
</tr>
<tr>
<td>T31</td>
<td>44.9 (LISS)</td>
<td>77.4m</td>
</tr>
<tr>
<td>T32</td>
<td>30.1 (2042)</td>
<td>64.3m</td>
</tr>
</tbody>
</table>

9.8.1.8. All buffers between turbine blades and the highest point of existing and new forest edge comply with the currently adopted Natural England Guidance note TN051 (2012) advisory distance of 50 m.

9.8.2. Embedded Mitigation and Ecological Enhancements

9.8.2.1. In addition to the design mitigation described above, embedded mitigation and ecological enhancement measures are contained within an OHMP (Annex 9.10). These measures are considered to be embedded mitigation, as the ecological measures represent an integral part of the Project and therefore have been assessed as such in Section 9.8.

9.8.2.2. The OHMP is intended as a precursor to a more detailed Habitat Management Plan (HMP), which would be produced following planning consent. The aim of the OHMP is to establish the key objectives and principles by which the site will be managed to the benefit of biodiversity, which will then form the basis for the more detailed HMP.

9.8.2.3. The receptors which form the priorities for the OHMP have been determined through consideration of the relative importance of each receptor and the extent to which they may be affected by the wind farm. As such, the aims and objectives of the OHMP relative specifically to receptors judged to be of national importance (whether affected by the wind farm or not) or of county level importance and subject to potentially significant impacts resulting from the wind farm. The OHMP therefore relates to the following features (not in order of priority): heathland habitats, bog habitats, black grouse, nightjar, red squirrel and dormouse.

9.8.2.4. For other receptors assessed to be of county level importance e.g. small pearl bordered fritillary; these have been assessed unlikely to be significantly affected by the wind farm.
(subject to the implementation of ‘standard’ mitigation measures during pre-development tree clearance and construction) and therefore these receptors are not considered priorities for management action in the OHMP. However it should be noted that a wide range of other species such as the small pearl-bordered fritillary should also benefit from the management proposed for the key features listed above.

9.8.2.5. The detailed HMP will be subject to agreement with Forestry Commission Wales (on behalf of Welsh Government), Denbighshire County Council and Conwy County Borough Council, in consultation with CCW, following planning consent.

9.8.2.6. The embedded mitigation and enhancements contained within the OHMP, which are relevant to non-avian ecology, are outlined below.

9.8.2.7. **Wildlife Ranger / Site Manager**

9.8.2.8. Funding will be provided by RWE NRL for a suitably qualified Wildlife Ranger / Site Manager to be employed by the land manager (currently FCW) for the duration of wind farm operation (25 years). The Wildlife Ranger / Site Manager will be responsible for the implementation of the various management prescriptions and proposed monitoring set out in the detailed HMP. At this stage it is envisaged that the Wildlife Ranger / Site Manager’s role will include the following tasks: Predator (fox) control (see Chapter 10 (Avian Ecology)); Grey squirrel monitoring/control; Removal of self-sown conifer and broad-leaved trees, as required; Management of grazing animals; and Habitat and species monitoring (excluding bats) and reporting to the HMP steering group. Note that in practice, the level of the Wildlife Ranger / Site Manager input will vary over the lifetime of the wind farm with, in general, a much higher level of input required during the first few years. To reflect this, funding equivalent to the employment of a full time Wildlife Ranger / Site Manager throughout wind farm operation will be provided as a series of lump sum payments, the first to be made following agreement of the detailed HMP with further payments made in years five and ten of wind farm operation. This will allow additional funding to be drawn down at the start of the period when management and monitoring requirements are more extensive. It will also allow the use of suitably qualified contractors/consultants to carry out specific tasks, where these are not able to be undertaken by the Wildlife Ranger / Site Manager (see Annex 9.10 for further detail).

9.8.2.9. **Heathland habitats**

- Three areas of existing coniferous forest will be cleared or thinned (leaving 10% tree cover) as part of the pre-construction tree clearance totaling c.22.6 ha. These areas will not subsequently be restocked allowing heathland habitat to develop around the retained trees. The tree clearance will take account of the need to maintain canopy connectivity for red squirrels across Foel Frech in accordance with current best practice.

- Grazing – the current grazing at Craig Bron Banog (c.34 ha) will be taken over as part of the scheme and extended to cover a total area of c.189 ha within the Application Site. The primary objectives would be to maintain open land (notably heathland) and maintain structural diversity. It is intended that grazing animals would be able to

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39 It is anticipated that FCW, CCW and EAW will be replaced by a Single Body in 2013.
wander relatively freely within this area, to mimic natural grazing as closely as possible. However, to provide more flexibility for management it is considered likely that the area would need to include 2-3 fenced compartments. The type of fencing to be used will be of a size and type appropriate for all likely grazing animals (e.g. cattle and ponies) to maintain animals within the grazing areas.

- Clearance of self-sown trees - within the proposed grazing area there are currently a number of areas dominated by self-sown trees, mostly birch, willow and conifers, which could not be managed by grazing alone. If/when cover of self-sown trees reaches 10%, clearance of trees will be undertaken, either by hand or by mechanical means until cover is reduced so it is no more than 10%. Following clearance, it is envisaged that these areas will be maintained as open habitat by grazing, as described above. Precise areas to be cleared will be identified within the detailed HMP, based on up to date survey information and avoiding areas considered to provide favourable habitat for dormice.

9.8.2.10. The proposals outlined above should also benefit other species and habitats, e.g. the pre-development tree clearance and grazing should benefit heathland habitat and species that favour more open habitats such as common lizard, adder and small pearl-bordered fritillary butterfly.

9.8.2.11. Peatland – bog habitat restoration

9.8.2.12. The aim of the bog habitat restoration is to compensate for peat loss and damage during wind farm construction through the restoration of vegetation that protects underlying peat. The restoration proposals are outlined more fully in the OHMP, however, in brief the primary objectives are:

- The restoration of four areas considered suitable for peatland restoration where feasible totalling up to 25.4 ha of peatland habitat through clearance of self-sown trees, the blocking of ditches and forestry plough furrows and subsequent management of vegetation as appropriate.

9.8.2.13. Although the ideal aim would be to restore modified bog or heathland communities so that they become capable of on-going peat growth, it is acknowledged that in practice this may not be possible. More realistic aims are, therefore, to restore vegetation that protects the underlying peat deposits, and to maximise the chances of active bog formation in the future by providing suitable hydrological conditions.

9.8.2.14. Dormouse

9.8.2.15. To benefit dormice and to compensate for any losses of habitat due to pre-development tree clearance 16.7ha of conifer and small-seeded broad-leaved trees and shrubs will be established in a number of specified areas within the south of the Application Site to provide a network of linked habitat suitable for dormice. Species to be planted will include black thorn, dog rose, bramble, hawthorn, willow and ash. These will be managed and created during the pre-development tree clearance phase of the project.

9.8.2.16. In addition to the above, opportunities to allow the establishment of small-seeded broad-leaved trees and shrubs around the fringes of the proposed grazing areas will be identified and built into the detailed design of the grazing areas as part of the detailed HMP.
9.8.2.17. Funds will be provided for a PhD (Doctor of Philosophy) studentship to undertake research into specific aspects of dormouse ecology within upland forests in Wales, using Clocaenog as a case study, which is an unusual site for dormice due its altitude and the predominantly coniferous nature of the woodland habitats present. The precise nature of the research will be determined by the HMP stakeholder group.

9.8.2.18. Red squirrel

9.8.2.19. Measures to control grey squirrel (which would augment existing squirrel control measures) will be undertaken to reduce competition between grey and red squirrels. The extent of this additional resource will be agreed by the HMP Stakeholder Group on an annual basis, taking into consideration other HMP objectives and may vary in response to changes in the level of grey squirrel incursion over time.

9.8.2.20. As part of the habitat management for dormouse, small-seeded broadleaved species will be allowed to establish in a number of areas currently dominated by Sitka spruce in the south of the site which will also provide suitable habitat for red squirrel. In addition, any large seeded species (which favour grey squirrel) which colonise these areas will be removed.

9.9. Assessment of Potential impacts

9.9.1. This section characterises and evaluates the significance of potential impacts of the Project on ecological receptors, in the absence of mitigation measures but taking into account embedded mitigation (see Section 9.7.2), during pre-development tree clearance and the construction, operational and decommissioning phases. The assessment of potential impacts assumes the current FDP is implemented and as such cumulative impacts as a result of this are detailed within the following relevant sections. However it is acknowledged the FDP is reviewed every ten years, and will be reviewed following construction when final micro-sited turbines and infrastructure locations are fixed.

9.9.2. As noted in Section 9.4, ecological receptors to be subject to more detailed assessment should be both a) of sufficient value that impacts upon them may be significant (in terms of legislation or policy) and b) potentially vulnerable to significant impacts arising from the Project (IEEM, 2006\textsuperscript{42}). The exception to this is land take, which has been assessed even though the majority of the habitats to be ‘taken’ are all of local value or less, as accumulatively the loss of these habitats may have an impact on the biodiversity of the zone of influence and therefore is important to assess. An assessment of impacts relating to access routes A, B, C and other off site infrastructure (see Chapter 12 (Traffic and Transport) and Annex 9.9 Off-site Infrastructure and Potential Access Routes A-D – Extended Phase 1 Habitat Survey and 9.11 Ecological Assessment Route A (2011)) has also been included for the construction phase (no impacts are predicted during pre-development tree clearance or operation and decommissioning phases).

9.9.3. Impacts are not assessed for the statutorily designated site Cefn Rofft SSSI as this is located 620m south of the Application Site and 685m from the nearest turbine, and therefore is not considered likely to be impacted upon by the Project.

9.9.4. The River Dee and Bala Lake SAC, in respect of otters has been assessed in this section. With regards to an assessment of the potential impact of the development on

the water quality of the River Dee and Bala Lake SAC please refer to Chapter 8 (Hydrology and Geology). The impacts of the development on the River Dee and Bala Lake SAC have been assessed in relation to all qualifying features with Annex 9.15 Report to Inform Habitat Regulations Assessment. In addition impacts on Afon Clwedog and other surface water features are assessed in Chapter 8 (Hydrology and Geology).

9.9.5. Mynydd Hiraethog SSSI is located immediately to the west of the Application Site. This SSSI is designated for habitats including acid blanket bog, soligenous mires and oligotrophic lakes, all of which are dependent on the quantity and quality of surface water runoff which drains to the area. A small section of the Application Site is located within the catchment area draining towards the SSSI and as such potential impacts on Mynydd Hiraethog SSSI are assessed in detail here.

9.9.6. Impacts on non-statutorily designated sites are considered for the following sites which lie within or directly adjacent to the Application Site:

- Brynhyfryd Local Wildlife Site;
- Clocaenog Forest Local Wildlife Site;
- Craig Bron-banog Local Wildlife Site;
- Nilig Local Wildlife Site;
- Burma Road (2) candidate Local Wildlife Site; and
- Nant Y Derwydd candidate Local Wildlife Site.

9.9.7. Potential impacts are considered in detail for the following habitats or species receptors considered to be of at least county (Denbighshire & Conwy) level importance or subject to some form of legal protection:

- Acid heath;
- Blanket Bog;
- Common lizard & adder;
- Otter;
- Water vole;
- Badger;
- Pine marten;
- Polecat;
- Dormouse;
- Red squirrel;
- Bats; and
- Small pearl-bordered fritillary.

9.9.1. Pre-development Tree Clearance Impacts

9.9.1.1. This section characterises and evaluates the significance of potential impacts on important non-avian ecological receptors during pre-development tree clearance. This will include the clearance of 222 ha however it should be noted that 116 ha of the

\[43\] It should be noted that 24.5 ha of the felling total is classified as open ground.

\[44\] It should be noted that this includes 9ha of open ground.
area cleared is available to be restocked or allowed to re-establish following construction subject to the revised FDP.

9.9.1.2. It should be appreciated that the potential Project is situated on land used for forestry plantation and substantial areas of trees are felled as part of on-going FCW management. In the absence of the wind farm application the FDP for the Project area details that c. 391 ha would be cleared within the Application Area in the next 20 years, which includes c. 72 ha included in pre-development tree clearance areas.

9.9.1.3. Pre-development tree clearance is expected to take up to 12 months. Part of the embedded mitigation strategy, including tree clearance/thinning, will begin during this activity and will continue through the lifespan of the Project.

9.9.1.1. Designated sites

9.9.1.1.1. River Dee and Bala Lake SAC

9.9.1.1.2. The River Dee and Bala Lake is located 8 km linearly, from the Application Site in a straight line, and hydrologically this distance is 14.2 km. Chapter 8 (Hydrology and Geology) and Annex 9.15 deals with the River Dee and Bala Lake SAC in more detail.

9.9.1.1.3. No evidence of otter was recorded on any watercourse within the Application Site, with the closest confirmed evidence of otter on the Afon Alwen approximately 1.8 km to the south west. The SAC is located c. 14 km from the Application Site, and although otters can have a range up to 20 km it is considered unlikely, due to distance and limited habitat suitability, that significant otter numbers that form part of the SAC utilise the Application Site. In addition limited pre-development tree clearance will take place within 50 m of the watercourses onsite (see section on otter impact). Therefore, it is considered certain/near certain there will be no significant impacts on the SAC otter population due to pre-development tree clearance.

9.9.1.1.4. Mynydd Hiraethog SSSI

9.9.1.1.5. Limited pre-development tree clearance will take place within the Afon Alwen 1 catchment area, and risks associated with increased sediment mobilisation as a result of pre-development tree clearance are considered unlikely as all pre-development tree clearance will follow the UK Forestry Standard Forests and Water (2011) guidelines. Combined with the limited scale and distributed nature of pre-development tree clearance required, the risk of significant sediment mobilisation is considered to be low. Therefore, this is considered that no significant impacts on the integrity of the SSSI will result from pre-development tree clearance (for further information please refer to Chapter 8 (Hydrology and Geology)). Confidence in this prediction is certain/near certain.

9.9.1.2. Wildlife Sites and Candidate Wildlife Sites

9.9.1.2.1. T23, T25, T27 and T32 will require pre-development tree clearance to take place within the Clocaenog Forest Wildlife Site. Whilst these turbines are located within the Wildlife Site Boundary, they have been sited away from areas of forest identified as being of moderate-high value for red squirrel. Additionally, given the size of this Wildlife Site (1,430 ha), pre-development tree clearance around the four turbines and related

infrastructure totals c. 27.73 ha. However in addition Clocaenog Forest Wildlife Site is also subject to felling as part of the FDP (totalling 91.34 ha) of which the majority is outside pre-development tree clearance; therefore it is considered probable that pre-development tree clearance is unlikely to represent a significant negative impact on the integrity of the LWS. It should also be noted that it is over part of the LWS area that some of the embedded mitigation – grazing and dormouse mitigation areas— will take place, enhancing the areas value for wildlife.

9.9.1.2.2. No pre-development tree clearance is proposed within the Brynhyfryd and Craig Bronbanog LWSs or within the Burma Road (2) candidate LWS and as such no impacts are anticipated on these sites during the pre-development tree clearance. Confidence in this prediction is considered certain/ near certain.

9.9.1.2.3. Nant Y Derwydd candidate LWS is located adjacent to the southern boundary of the Application Site along existing tracks that will be used for access. As no citation information is available with regards this candidate LWS it is not possible to ascertain what impacts any pre-development tree clearance along this track will have on the receptor of value for which the site was identified. Given the limited size (0.7 ha) of this site and its linear nature it is considered that in the absence of mitigation any pre-development tree clearance adjacent to the track could have a significant negative impact, on the integrity of this candidate LWS, a feature of county value. Confidence in prediction is considered uncertain given the absence of any information regarding the features for which this site was identified.

9.9.1.2.4. Nilig LWS lies immediately adjacent to the Application Site with no pre-development tree clearance proposed within the LWS boundary and as such no impacts are anticipated on this site during the pre-development tree clearance. Confidence in this prediction is considered certain/ near certain.

9.9.1.3. Habitats and Species

9.9.1.3.1. General Habitats

9.9.1.3.2. Pre-development tree clearance areas identified within the Tree Clearance Plan totals an area of 222 ha, of which 116 ha will be available to be restocked or allowed to re-establish following construction. Therefore, the majority of pre-development tree clearance only represents a temporary loss of forested habitat. Table 9.4 shows the amount of each habitat present on the site and the amount that is included within the Tree Clearance Plan. Figure 9.2 and 9.3 shows the Phase 1 habitat categories overlain with the wind farm specific tree clearance plan. Please note that the figure 222 ha for pre-development tree clearance, has been derived from the Tree Clearance Plan; therefore areas, mapped as heathland, but also are early stage conifer plantation are still included in the tree clearance area calculation of 222ha; but have been mapped on the Phase 1 habitat plan as a different habitat e.g. heathland. Therefore the Phase 1 coniferous plantation area to cleared is in reality less at: c. 174 ha. However for all assessments the figure of 222 ha of pre-development tree clearance will be used for consistency within the ES.

9.9.1.3.3. Acid heath and blanket bog have been included within this general habitat assessment; but are also treated separately below. With regards to the other habitats identified on site, the dominant habitat is conifer plantation with Sitka spruce as the dominant species. Other habitats are present (as listed in Section 9.7.3), but in the absence of three habitat types these comprise less than 11 % of the total Application Site.
Table 9.4 Comparison of habitat present and that included in tree clearance plan.

<table>
<thead>
<tr>
<th>Phase 1 Habitat Category</th>
<th>Total Area Ha</th>
<th>Ha included in tree clearance plan</th>
<th>% of habitat type impacted by tree clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi natural broad-leaved woodland</td>
<td>0.53</td>
<td>0.24</td>
<td>45.1</td>
</tr>
<tr>
<td>Coniferous plantation</td>
<td>1177.3</td>
<td>172.16</td>
<td>14.6</td>
</tr>
<tr>
<td>Semi-natural mixed woodland</td>
<td>1.94</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dense continuous scrub</td>
<td>20.07</td>
<td>0.15</td>
<td>0.7</td>
</tr>
<tr>
<td>Scattered scrub</td>
<td>37.47</td>
<td>1.06</td>
<td>2.8</td>
</tr>
<tr>
<td>Recently felled conifer woodland</td>
<td>42.34</td>
<td>5.55</td>
<td>13.1</td>
</tr>
<tr>
<td>Acid grassland unimproved</td>
<td>9.77</td>
<td>1.85</td>
<td>18.9</td>
</tr>
<tr>
<td>Acid grassland Semi-improved</td>
<td>8.18</td>
<td>0.51</td>
<td>6.3</td>
</tr>
<tr>
<td>Marshy grassland</td>
<td>4.75</td>
<td>0.04</td>
<td>0.94</td>
</tr>
<tr>
<td>Poor semi-improved grassland</td>
<td>0.86</td>
<td>0.21</td>
<td>24.6</td>
</tr>
<tr>
<td>Bracken continuous</td>
<td>2.16</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tall ruderal</td>
<td>1.78</td>
<td>0.52</td>
<td>29</td>
</tr>
<tr>
<td>Dry dwarf shrub heath acid</td>
<td>218.91</td>
<td>24.27</td>
<td>11.1</td>
</tr>
<tr>
<td>Blanket bog (incl. modified bog &amp; fen)</td>
<td>16.86</td>
<td>0.15</td>
<td>90.3</td>
</tr>
<tr>
<td>Quarry</td>
<td>0.55</td>
<td>0.55</td>
<td>100</td>
</tr>
<tr>
<td>Ephemeral short perennial</td>
<td>0.11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tracks hardstanding etc.</td>
<td>57.10</td>
<td>13.84</td>
<td>24.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1600.68</strong></td>
<td><strong>222</strong></td>
<td></td>
</tr>
</tbody>
</table>

9.9.1.3.4 Pre-development tree clearance will result in the loss of 222 ha, largely comprising coniferous plantation but also including small areas of semi natural broad-leaved woodland, scattered and dense scrub and scattered broadleaved trees. Of this 116 ha will be restocked or allowed to re-establish following construction. The Tree Clearance Plan has been designed to avoid as far as possible areas of high habitat value with restocking of a significant area, in addition the pre-development tree clearance will mainly impact areas of woodland (with heathland and blanket bog assessed separately below), and, therefore, it is envisaged pre-development tree clearance will have a non-significant impact on habitats. The confidence of this prediction is probable.

9.9.1.3.5 Acid Heath

9.9.1.3.6 The Tree Clearance Plan includes a number of areas mapped as permanent heath habitat totalling 24.96 ha (located at northern construction compound/substation, T2, T6, T9, T11, T20, T21, T22, T25, T26 and T28), however, impacts from pre-development tree clearance will be limited to the clearance of early stage conifer plantation where present to allow the construction of the wind farm. Therefore, impacts will be temporary and not significant, the confidence in this prediction is probable.

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46 The discrepancy in the total habitat area compared to the total site area of c. 1580 ha, is due to inclusion of the habitat figures for areas that are mapped as two vegetation types (i.e. dry dwarf shrub heath and scattered scrub); and therefore these effectively double up the areas mapped.
9.9.1.3.7. Positive impacts will occur as a result of the embedded mitigation which includes the thinning and clearance of c. 22.6 ha of forest within the Application Site (see Annex 9.10 Outline Habitat Management Plan) and should result in the establishment of additional heathland habitat. In addition regeneration in areas cleared during pre-development tree clearance, will occur in the demised areas within the turbine over sail and widened track corridors edges as they will not be restocked during the wind farm operational period (totalling 76ha\(^47\)). Although the precise nature of habitats that will regenerate is not known it is likely that heathland will form a significant area. Therefore, a significant positive impact is anticipated as a result of pre-development tree clearance. The confidence in this prediction is near certain.

9.9.1.3.8. Blanket Bog

9.9.1.3.9. Peat has been discussed and assessed in depth in Chapter 8 (Hydrology and Geology) and this section focuses on the assessment of impacts on areas of blanket bog habitat. The blanket bog area as located at Gors y Wern and between Turbine 22 and 26 are not likely to be impacted with no pre-development tree clearance for wind farm infrastructure located close to these habitats, with pre-development tree clearance limited to removal of scattered self-sown trees as part of the HMP management. However, small areas of blanket bog habitat are included within the Tree Clearance Plan and could potentially be impacted at Turbine 11, 14, 16 and the spur road to Turbine 27, as identified in Appendix A of Annex 8.2. The blanket bog habitats located in these areas are relatively isolated, limited in extent, modified through previous forestry operations and largely located within open areas within the forest. Pre-development tree clearance will potentially temporarily impact these habitats during the clearance operation however, the clearance of trees has the potential to enhance these habitats in the longer term. Therefore, impacts will be temporary and not significant, the confidence in this prediction is probable.

9.9.1.3.10. Common Lizard and Adder

9.9.1.3.11. Common lizard is known to be present, and it is considered likely that adder (though in smaller numbers) is also present within the Application Site (Cofnod provided records of adder within 2 km of the Application Site); therefore, as a precautionary approach it is assumed that both of these reptile species could utilise the rides, track sides and other heather-dominated areas throughout the Application Site. The majority of pre-development tree clearance will take place in habitat unsuitable for reptiles i.e. coniferous plantation. However, small numbers of common lizards and adder could potentially be inadvertently injured or killed by forestry machinery working within open habitats. Impacts are most likely during early mornings or late evenings in spring or autumn, when the body temperature of animals is low and they are unable to move quickly to avoid forestry machinery, or during winter if hibernation sites are affected. At other times it is anticipated that animals would simply move out of the way of the slow-moving forestry machinery to avoid harm.

9.9.1.3.12. The possible loss of small numbers of animals in this way is considered to be not significant in terms of the conservation status of common lizard and adder in the area. However, in the absence of mitigation measures, the killing or injuring of individual lizards or snakes could represent an offence under the Wildlife and Countryside Act 1981 and mitigation may be required (see Section 9.9). Confidence in this prediction is considered near certain.

\(^{47}\) It should be noted that this includes 13ha of open ground
9.9.1.3.13. Long term, the habitat change on site as a result of pre-development tree clearance is anticipated to have a positive impact on common lizard and adder populations, as pre-development tree clearance will create cleared areas for each turbine that may provide suitable basking sites for these reptiles. Additionally, the verges of the widened roads will potentially provide suitable habitat for reptiles. The establishment and maintenance of heathland habitats as part of the HMP will also create additional reptile habitat. Therefore, it is considered long term that a significant positive impact is anticipated in respect of common lizard and adder populations. Confidence in this prediction is near certain.

9.9.1.3.14. Otter

9.9.1.3.15. The majority of the watercourses within the Application Site have been avoided during the design mitigation.

9.9.1.3.16. In general none of the watercourses within the site are likely to be permanently impacted by the proposed pre-development tree clearance operations, given the extent of pre-development tree clearance proposed for the Project within 50 m of a watercourse (10.6 ha). Otters are known to travel across upland areas away from riparian corridors to move between water course catchments, and it is possible the Application Site is used by commuting otters in this way. However, the pre-development tree clearance will only impact relatively dispersed small areas of the overall site (222 ha) over a one year period. As usage of the Application Site by otter is likely to be limited, no significant impacts are anticipated on otter populations within the Application Site during pre-development tree clearance. This prediction is considered certain/near certain.

9.9.1.3.17. Although it is considered very unlikely that the site supports any otter holts or other resting places; it was not possible to survey all of the Application Site due to physical barriers such as dense forestry stands; therefore, the possible presence of otter resting places along watercourses passing through the Application Site cannot be entirely ruled out. Pre-development tree clearance related disturbance to such resting places, if present, is not likely to be significant in terms of the conservation status of otter in the area. However, in the absence of mitigation measures, such disturbance could represent an offence under the Wildlife and Countryside Act 1981 and The Conservation of Habitats and Species (Amendment) Regulations 2012 and mitigation may be required (see Section 9.9). This prediction is considered near certain.

9.9.1.3.18. There could be an indirect, temporary negative impact on otters using watercourses during pre-development tree clearance. Increased discharges of sediment laden, acidic and nutrient-enriched runoff from recently cleared areas may flow into surrounding watercourses, which may impact upon fish which serve as prey for otter (see Chapter 8 (Hydrology and Geology)). In the absence of mitigation measures, impacts on water quality and on fisheries in surrounding watercourses are considered to potentially be minor (see Chapter 8 (Hydrology and Geology)) and, therefore, could have potentially significant negative impacts on otter at a less than local level, outside the Application Site. The confidence in this prediction is probable.
9.9.1.3.19. *Water Vole*

9.9.1.3.20. Water voles are less likely to be negatively impacted than otters by temporary negative impacts on water quality due to runoff from recently cleared areas. This is because water voles are herbivorous and, therefore, their food supply is less likely to be affected by a temporary increase in suspended sediment / acidity or nutrient enrichment. Impacts on water voles through changes in water quality, if present, are therefore considered likely to be not significant. The confidence in this prediction is probable.

9.9.1.3.21. As noted above in relation to otters, direct impacts on watercourses during pre-development tree clearance are limited as pre-development tree clearance proposed for the Project within 50 m of a watercourse is limited (10.6 ha) and areas where clearance is required directly adjacent to watercourses do not provide suitable habitat for water vole. In addition, no areas of recorded water vole presence are located within the pre-development tree clearance areas. The clearance of trees within proximity to water courses also has the potential to increase the suitability of areas for water vole through the increase in light levels and subsequent vegetation, although this is not considered likely to be significant. Due to the design mitigation and limited impact on stream corridors; it is considered that there will be no significant impact on the conservation status of water vole populations within the Application Site during pre-development tree clearance. Confidence in this prediction is near certain.

9.9.1.3.22. *Badger*

9.9.1.3.23. Although no badger setts were recorded within the Application Site, evidence of badger activity was found within the Application Site and given the difficulties of surveying dense blocks of coniferous woodland, the possible presence of badger setts within the plantation cannot be ruled out. In the absence of mitigation measures, any such setts located in areas to be cleared, would be very likely to be subject to damage or disturbance during pre-development tree clearance operations.

9.9.1.3.24. Although disturbance or damage to any setts, if present, is not likely to be significant in terms of the conservation status of badger in the area, such disturbance could represent an offence under the Protection of Badgers Act 1992 and mitigation may be required (see Section 9.9). Due to unavoidable limitations in the coverage of the survey data, confidence in this prediction is considered probable.

9.9.1.3.25. During the pre-development tree clearance 222 ha of forest will be cleared, of this 116 ha will be restocked and much of the rest will develop into open habitats which may also provide suitable habitat for badger. As a result it is considered that long term habitat loss within the Application Site, which has a total area of c. 1,581 ha represents a non significant impact on the conservation status of badger. Confidence in this prediction is near certain.

9.9.1.3.26. *Pine Marten*

9.9.1.3.27. Although no evidence of pine marten was recorded, given the difficulties of surveying for this elusive species, the possible presence of pine marten within the Application Site cannot be ruled out. In the absence of mitigation measures, any dens located in areas to be cleared, would be very likely to be subject to damage or disturbance during pre-development tree clearance operations and there could be a risk of injury or killing of pine marten.
9.9.1.3.28. Although disturbance or damage to any dens or injury/killing of an individual is unlikely, as it is doubtful that they are present within the Application Site; death or injury if it did occur is assessed to be significant in terms of the conservation status of pine marten in the area. Also in the absence of mitigation measures, these could represent an offence under the Wildlife and Countryside Act 1981 and mitigation may be required (see Section 9.9). Confidence in this prediction is considered probable.

9.9.1.3.29. During the pre-development tree clearance, 222 ha of forest will be cleared, of this 116 ha will be restocked and much of the rest will develop into open habitats which may also provide suitable habitat for pine marten. As a result of this it is considered that long term habitat loss within the Application Site, which has a total area of c.1,581 ha represents a non significant impact on the conservation status of pine marten. Confidence in this prediction is near certain.

9.9.1.3.30. *Polecat*

9.9.1.3.31. One record for polecat exists for within the Application Site and given the difficulties of surveying for this elusive species, the possible presence of a small population of polecat within the Application Site cannot be ruled out. Polecat dens are commonly in rabbit burrows, especially in summer, but they frequently move into farmyards in winter, when they may den in hay bales, under sheds and in rubbish tips. Therefore, in the absence of mitigation measures, any dens located in areas to be cleared, would be very likely to be subject to damage or disturbance during pre-development tree clearance operations and there could be a risk of injury or killing of polecat.

9.9.1.3.32. Although disturbance or damage to any dens or injury/killing of an individual is highly unlikely, as it is doubtful that they are present within the Application Site; death or injury if it did occur is assessed to be significant in terms of the conservation status of polecat in the area. Also in the absence of mitigation measures, these could represent an offence under the Wildlife and Countryside Act 1981 and mitigation may be required (see Section 9.9). Confidence in this prediction is considered probable.

9.9.1.3.33. *Dormouse*

9.9.1.3.34. Dormice are unable to move around a forest quickly (for instance to flee from threat), their breeding sites and resting places are hard to find and their terrestrial resting places are likely to be widely distributed. In the absence of mitigation measures pre-development tree clearance could potentially result in the loss of dormouse habitat, impacts on connectivity of habitat and disturbance and injury or killing of dormouse if breeding/hibernation sites or resting places are present.

9.9.1.3.35. As scrub and ruderal vegetation along the edges of the plantation areas are considered likely to provide the best quality habitat for dormice, pre-development tree clearance operations along forest edges, particularly along access tracks are likely to pose the biggest threat to dormice; although they could also be occupying adjacent conifer plantations as well. In the absence of mitigation measures small numbers of dormice could potentially be inadvertently injured or killed by forestry machinery during pre-development tree clearance. Given the results of the 2009 - 2011 dormouse survey, this could potentially occur across the Application Site in favourable habitat. Impacts
are most likely during the breeding season (June-August inclusive) and in late October/early November before the animals go into hibernation.

9.9.1.3.36. In the absence of mitigation, the possible loss of small numbers of dormice during pre-development tree clearance operations is considered to represent a significant negative impact on a feature of value at county (Denbighshire and Conwy) level. As the surveys are only considered to be targeted surveys this prediction is considered to be probable. In addition, in the absence of mitigation measures (see Section 9.9) the disturbance, killing or injuring of individual dormice would represent an offence under the Wildlife and Countryside Act 1981 and The Conservation of Habitats and Species (Amendment) Regulations 2012.

9.9.1.3.37. Figure 9.6 shows the Application Site, dormouse records and habitat suitability assessment for dormice (see Annexes 9.6 Dormouse Survey Report (2010) and 9.13 Dormouse Habitat Suitability Assessment (2012) respectively) overlain with the proposed wind farm pre-development tree clearance plan as well as an overlay showing the trees which will be commercially felled during the next 20 years. As can be seen from Table 9.5 and Figure 9.6 the ongoing rotation of FCW forestry harvesting will remove suitable dormice habitat over the next 20 years in the absence of the wind farm. Overlap of areas is limited (0.02 ha), and, therefore, additional loss of moderate value habitat as a result of the wind farm can be assumed to be c.13.2 ha or 10.9% across the Application Site.

### Table 9.5 Dormouse Habitat Loss to pre-development tree clearance in Application Site

<table>
<thead>
<tr>
<th>Habitat ranking</th>
<th>Total area (ha)</th>
<th>Wind Farm Area loss (ha)</th>
<th>Loss as % of total</th>
<th>FCW Felling Area loss (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate suitability</td>
<td>121</td>
<td>13.2</td>
<td>10.9</td>
<td>11</td>
</tr>
</tbody>
</table>

9.9.1.3.38. The dormouse habitat suitability assessment indicates c. 13.2 ha of moderately suitable habitat will be cleared due to the wind farm. However, outline proposals for dormice are provided in Annex 9.10 Outline Habitat Management Plan and Section 9.7.2 which includes the creation of c. 16.7 ha of conifer and small-seeded broad-leaved trees and shrubs suitable for dormice in a number of specified areas within the south of the site to provide a network of linked managed habitat. Positive impacts will occur as a result of the embedded mitigation. Therefore, a significant positive impact is anticipated during pre-development tree clearance of the wind farm. The confidence in this prediction is probable.

9.9.1.3.39. Pre-development tree clearance and the loss of vegetation though track widening could also result in a reduction in the connectivity of suitable habitat for dormice. The habitat structure of dense conifer plantation provides excellent arboreal connectivity allowing dormice to disperse without the need to cross more open habitats where they would be vulnerable to predators such as owls. The risk of dormice habitat fragmentation will be posed across the site where areas of mature forestry are required to be cleared, particularly pre-development tree clearance for T12, T13, T14, T15, T16, T25, T27, T28 and T30 due to the proximity to dormouse records from the surveys. The clearance of track side trees could also fragment habitat connectivity.

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9.9.1.3.40. However, the possible impact on dormice populations through a reduction in habitat connectivity is considered unlikely to be significant due to the limited amount of pre-development tree clearance proposed in relation to the Project, and the fact that existing access tracks will be used where possible. In addition dormice onsite are considered to currently cross access tracks due to the limited arboreal connectivity across current tracks. Furthermore, dormice do not normally travel far from their nest (usually less than 70 m)\(^\text{16}\) and the limited amount of pre-development tree clearance in relation to the site size is unlikely to significantly impact connectivity. Given the targeted nature of the surveys this prediction is only considered to be probable.

9.9.1.3.41. **Red squirrel**

9.9.1.3.42. The majority of areas of the forest considered to be of greatest value to red squirrel (calculations based on Gurnell et al. (2002)\(^\text{22}\), tree species and age) have been avoided in the design of the Project (see section 9.7 and Figure 9.3); however, a small area of moderate to high value habitat (habitat ranking 3 and 4) c.6.9 ha will be lost by pre-development tree clearance (see Table 9.6). This represents a small proportion (5.6 \%) of suitable habitat (ranked as 3 and 4) across the Application Site.

<table>
<thead>
<tr>
<th>Habitat ranking</th>
<th>Total area (ha)</th>
<th>Wind Farm Area loss (ha)</th>
<th>Loss as % of total</th>
<th>FCW Felling Area loss over 20 years(ha)</th>
<th>Additional habitat loss as a result of the wind farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – No trees</td>
<td>283</td>
<td>28.8</td>
<td>10.2</td>
<td>11.2</td>
<td>26.1</td>
</tr>
<tr>
<td>1 – No Feeding/nesting habitat</td>
<td>139</td>
<td>26.7</td>
<td>19.1</td>
<td>10.1</td>
<td>22.3</td>
</tr>
<tr>
<td>2 – low suitability</td>
<td>1035</td>
<td>160.9</td>
<td>15.5</td>
<td>318.2</td>
<td>100.2</td>
</tr>
<tr>
<td>3 – Moderate suitability</td>
<td>50</td>
<td>4.4</td>
<td>8.9</td>
<td>19.9</td>
<td>0.7</td>
</tr>
<tr>
<td>4 – High Suitability</td>
<td>73</td>
<td>1.4</td>
<td>1.4</td>
<td>32.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Area</td>
<td>1580</td>
<td>222.2</td>
<td></td>
<td>393.5</td>
<td></td>
</tr>
</tbody>
</table>

9.9.1.3.43. Figure 9.7 and 9.8 shows the Application Site colour coded by habitat suitability for red squirrels (tree age and species) overlain with the proposed wind farm tree clearance plan as well as an overlay showing the trees which will be commercially felled during the next 20 years, based on FDP data. As can be seen from Table 9.6 and Figures 9.7 and 9.8 the on-going rotation of FCW forestry harvesting will remove suitable red squirrel habitat over the next 20 years in the absence of wind farm. Additional loss of moderate or high value habitat as a result of the wind farm is c.1.2 ha or <1 % across the Application Site. However restocking as part of the FDP has the potential to provide higher value species for red squirrel.

9.9.1.3.44. In addition, pre-development tree clearance operations pose the risk of injuring or killing individuals and of reducing the connectivity between areas of preferred habitat. These issues are explored further below.

9.9.1.3.45. The majority of the Application Site is considered to provide low value habitat for red squirrels (see Annex 9.6 Dormouse Survey Report 2010, Table 9.6 and Figure 9.7
and 9.8) and the design mitigation has safeguarded the majority of areas of moderate to high value for red squirrels. As such any direct impacts from pre-development tree clearance (i.e. death or injury to an individual) are likely to be limited to red squirrels which are transiently ranging through low value habitat. Although the occurrence of injury or death is very unlikely, if it were to occur it is considered that this would be significant in terms of the declining red squirrel population at a national level. Also the killing or injuring of individual red squirrels would represent an offence under the Wildlife and Countryside Act 1981 and mitigation will be required. Confidence in this prediction is considered probable.

9.9.1.3.46. Pre-development tree clearance could also result in a reduction in the connectivity of habitat for red squirrels. Red squirrels prefer to remain in the canopy for the majority of the time usually only coming down to the ground to move to another feeding area when there is no alternative. The turbine and infrastructure of the Project has been specifically designed to minimise the impact of pre-development tree clearance, through the use of keyhole felling and also avoiding areas of high value to red squirrel (based on Gurnell et al. (2002) scoring system). There will be no areas within the site where the Application Site is effectively severed, as pre-development tree clearance will occur in patches across the site, in a similar way that the forestry harvesting operations are currently undertaken and will leave, where possible, movement corridors in place. In addition to this, replanting of trees will occur soon after construction, which will with time restock c. 116 ha.

9.9.1.3.47. For the whole Application Site, it is considered that there is unlikely to be a significant effect on the red squirrel population due to habitat fragmentation as there will be only a limited amount of pre-development tree clearance in relation to the wind farm, and the areas to be cleared have been selected so as to minimise high value habitat loss and to maintain habitat connectivity. This prediction is considered to be probable.

9.9.1.3.48. Bats

9.9.1.3.49. Across most of the conifer plantation, including forest edge, levels of bat activity were found to be relatively low compared with the better foraging habitat within the valleys surrounding the Application Site.

9.9.1.3.50. Prior to harvestable age, tree species such as Sitka spruce which is present throughout most of the commercially harvested areas of the Application Site and other species of trees which are present: Scots pine and Norway spruce, lodgepole pine, hybrid larch and Japanese larch; do not generally provide crevices, woodpecker holes or rough loose bark suitable for use by roosting bats. Commercially harvested trees are unlikely to remain in situ past the age of 80 years, therefore, according to The Forestry Commission for England and Wales (2005) are ‘least likely to contain roosts’. Within the proposed pre-development tree clearance area of 222 ha, no trees over the age of 80 years will be cleared. Therefore, the proposed pre-development tree clearance operations should have no impact on roosting bats.

9.9.1.3.51. Similarly, given the relatively low levels of current usage of the plantation by bats, the relatively small areas that will be cleared at any one time and overall, and the fact that pre-development tree clearance will only take place during daylight hours during the season when bats are active (April to October 0700 to 1900 hours), any disturbance to foraging bats, which are very unlikely to use the site in significant numbers, during pre-
development tree clearance is not likely to be significant. The confidence in these predictions is near certain.

9.9.1.3.52. During the pre-development tree clearance, 222 ha of forest will be cleared of this c. 116 ha will be restocked. As a result of this it is considered that long term habitat loss within the Application Site, which has a total area of c.1,581 ha represents a non-significant impact on the conservation status of bats. Confidence in this prediction is near certain.

9.9.1.3.53. **Small Pearl-Bordered Fritillary**

9.9.1.3.54. Small pearl-bordered fritillary is only likely to be present in open areas and, therefore, direct impacts though pre-development tree clearance are unlikely. However, pre-development tree clearance of 222 ha, 76 ha of which will not be restocked for the operation of the wind farm, including c. 22.6 ha cleared as part of embedded mitigation for heathland combined with additional areas along access tracks and around turbines, is likely to have a positive impact on small pearl bordered fritillary, although as the majority of continuous populations occur on open riparian areas, this is most likely to benefit transient populations. Therefore, impacts are not considered ultimately to be significant. Confidence in this prediction is considered probable.

9.9.2. **Construction Impacts**

9.9.2.1. This section characterises and evaluates the significance of potential impacts on important non-avian ecological receptors during the construction phase of the Project. The construction phase will include the installation of wind turbines and other infrastructure.

9.9.2.1. **Designated sites**

9.9.2.1.1. **River Dee and Bala Lake SAC**

9.9.2.1.2. Chapter 8 (Hydrology and Geology) and Annex 9.15 report to inform Habitat Regulations Assessment provides more detail on water quality impacts and impacts to qualifying features respectively with respect the River Dee and Bala Lake SAC.

9.9.2.1.3. As stated previously no evidence of otter was recorded on any watercourse within the Application Site, and, therefore, it is considered unlikely, due to distance and limited habitat suitability, that significant otter numbers that form part of the SAC utilise the Application Site. In addition, limited construction impacts will take place within 50 m of watercourses onsite (see section on otter impact), and where this occurs this will largely take place within previously cleared areas. Therefore, it is considered certain/near certain there will be no significant impacts on the SAC otter population as a result of construction.

9.9.2.1.4. **Mynydd Hiraethog SSSI**

9.9.2.1.5. A small section of the Project (including 125 m of existing access track to be upgraded, 105 m of new access track and the northerly permanent met mast) is located within the catchment area draining towards the SSSI (Afon Alwen 1), upstream and close to the catchment watershed of Afon Llech Daniel. The location of Turbine T9 has been micro-sited, since an earlier layout, to remove the turbine excavations out of this catchment. All proposed development is situated over 100 m from the boundary of the SSSI, and
based on the small scale of work, it is considered there will be no significant impacts on the integrity of the SSSI due to construction activities (for further information please refer to Chapter 8 (Hydrology and Geology)). Confidence in this prediction is near certain.

9.9.2.2. Wildlife Sites and Candidate Wildlife Sites

9.9.2.2.1. T23, T25, T27 and T32 and associated infrastructure are located within the Clocaenog Forest Wildlife Site. Given the size of this Wildlife Site (1,430ha) the construction of infrastructure (totalling 2.5 ha within the LWS is considered unlikely to represent a significant negative impact on the integrity of the LWS as the areas will all have been cleared as part of the pre-development tree clearance. Confidence in this prediction is considered near certain.

9.9.2.2.2. No infrastructure is proposed within the Brynhyfryd (closest turbine approximately 180 m) and Craig Bron-banog (closest turbine approximately 160 m) LWSs or within the Burma Road (2) (closest turbine approximately 125 m) candidate LWS, and as such no impacts are anticipated on these sites. Confidence in this prediction is considered near certain.

9.9.2.2.3. Nant Y Derwydd candidate LWS is located adjacent to the southern boundary of the Application Site along existing tracks that will be used for access. Given the main impacts on the site will have taken place during pre-development tree clearance it is considered that any widening of the track will result in negligible permanent habitat loss and therefore no significant impacts on the integrity of this candidate LWS are likely during construction, a feature of county value. Confidence in prediction is considered uncertain given the absence of any information regarding the features for which this site was identified.

9.9.2.2.4. Nilig LWS lies immediately adjacent to the Application Site. The nearest infrastructure lies approximately 200 m from the LWS boundary and as such no impacts are anticipated on this site. Confidence in this prediction is considered near certain.

9.9.2.3. Habitat and Species

9.9.2.3.1. Access Route A, B and C and off site infrastructure

9.9.2.3.2. The section below is a high level assessment of potential offsite routes. The final route will be subject a separate planning application where impacts will be assessed in detail.

9.9.2.3.3. The Abnormal Indivisible Load (AIL) assessment identifies three potential routes and assesses each with regard to identified constraint points along with their potential to be overcome. The three identified routes are as follows with Route A, the preferred route (see Figure 12.4 in Chapter 12 (Traffic and Transport)):

- Route A: M53 – A55 – A483 – A5 – A543 – B4501 – unclassified roads;
- Route B: M53 – A55 – A483 – A5 – B4501 – unclassified roads; and
- Route C: M53 – A55 – B5381 – A548 – A544 – A543 – B4501 – unclassified roads

9.9.2.3.4. Route A was assessed to produce vehicle body and wheel over-sail diagrams for the route which show that there will be only minor land take required to allow abnormal load access onto the site during construction (see Chapter 12 (Traffic and Transport)). Land take will be kept to a minimum, and will largely involve the trimming back of vegetation or
the loss of small areas of improved and semi improved grassland verge, rather than the total loss of any significant features as identified in Annex 9.11 Ecological Assessment Route A (2011). Where road junctions have to be re-aligned they have been designed so as to avoid, or to only 'take' as little habitat of ecological value as possible. As part of the AIL routing assessment four areas within Route A were identified where third party land outside the highway boundary is required, as detailed below in the following points:

- A5/ A453 junction at Pentrefoelas impacting improved and semi-improved grassland of limited ecological value;
- A453 left turn east of Coed Hafod-y-dre improved grassland of limited ecological value;
- B4501 220m north east of Tyn-y-Ffynnon Farm impacting small section (less than 100m) of hedgerow which requires removal with the potential for translocation to maintain habitat linkages) to allow road widening; and
- B4501 Bryn Glas Depot impacting a mosaic of bare ground, tall ruderal and semi-improved species poor grassland of limited ecological value.

9.9.2.3.5. Due to the limited impacts Access Route A is considered to have a non-significant effect with regards habitats. Confidence in this prediction is only probable as this is only a high level assessment. In addition it is considered impacts on protected species can be mitigated through best practice guidance e.g. timing of work etc. to have a non-significant effect. Confidence in this prediction is only probable as this is only a high level assessment.

9.9.2.3.6. Access routes B and C follow a similar route to Route A with a varied end access to the Application Site (see Annex 9.9 Off-site Infrastructure and Potential Access Routes A-D – Extended Phase 1 Habitat Survey (2010)), with third party access requirements similar to those detailed for Route A. Therefore, due to the limited impacts Access Route B and C are considered to have no significant effect with regards to land take. Confidence in this prediction is only probable as this is only a high level assessment.

9.9.2.3.7. General Habitat

9.9.2.3.8. Wind farm specific infrastructure within the site will permanently occupy approximately 12.21 ha (of which 9.8 ha is associated with widening of existing and provision of new access tracks), which represents >1 % of the total Application Site and largely occurs on areas of cleared coniferous forest. Therefore, general habitat impact (other than heathland and blanket bog which is assessed separately below) of the infrastructure is considered to have a non-significant impact on the habitats present with regards to land take. Confidence in this prediction is certain/near certain.

9.9.2.3.9. Acid Heath

9.9.2.3.10. In trying to limit the amount of pre-development tree clearance required as part of the Project and taking into account other environmental and technical constraints, four turbines have been located on areas of permanent heath habitat. Turbines T2, T9, T25, T26 and the northern construction compound and substation are located directly on heath habitat, in addition the micro-siting area for T22 also contains heath habitat.

9.9.2.3.11. Total heath habitat 'take' has been calculated for all new tracks, existing track widening, turbine bases and related infrastructure - it is estimated that in a worst case scenario c. 2.1 ha of heath habitat will be lost, from a current total of c. 219 ha. This figure has
been derived using the Phase 1 habitat map (dry acid heath category) and overlaying the Project infrastructure plan. As such it is likely to represent a worst case scenario as the figures assume that 100% of the habitat to be lost at each location represents heathland whereas in reality each turbine base or track widening area may not have 100% heathland cover.

9.9.2.3.12. It is anticipated that the overall area of heath within the Application Site may increase with regeneration in deforested areas, although the precise nature of habitats that will develop is not known. The demised areas within the turbine over sail, track corridors and open habitats that will not be restocked during the operational phase of the wind farm totals 76 ha and it is considered the majority is likely to revert to heathland. Therefore the loss of heathland is not considered to be significant, the confidence in this prediction is probable.

9.9.2.3.13. Blanket Bog

9.9.2.3.14. Peat has been discussed and assessed in depth in Chapter 8 (Hydrology and Geology) and this section focuses on the assessment of impacts on areas of blanket bog habitat as identified through the Phase 1 and NVC surveys. The main blanket bog areas located at Gors y Wern and between Turbine 22 and 26 are not likely to be impacted with no construction or infrastructure located within 10m of these habitat areas. However, small areas of blanket bog habitat could potentially be impacted at Turbine 11, 14, 16 and the spur road to Turbine 27, as identified in Appendix A of Annex 8.2 Peat Depth Survey Report and Annex 9.12 National Vegetation Classification Survey Report (2011). The blanket bog located in these areas to be impacted are of relatively small scale and modified by previous forestry, in addition micro-siting as detailed in Annex 2.3 Overview of initial micro-siting work to reach Key Layout 4 and Annex 8.2 Peat Depth Survey Report has limited impacts on these habitats where associated with deep peat.

9.9.2.3.15. The construction of the wind farm will result in the loss of an area of ~14.9 ha of peat >0.35m deep (i.e. peat considered capable of supporting blanket bog vegetation (CCW, 2010)). These figures include an allowance for degradation due to drainage (see ES Annex 8.2). All of the areas affected are relatively shallow and most have been degraded by forestry and other factors, e.g. through the creation of ditches (during forestry planting) and the subsequent lowering of the water table in these areas, with most not fitting blanket bog vegetation classifications as described by JNCC.

9.9.2.3.16. Due to the limited area and modified nature of blanket bog habitat that will be lost directly and indirectly through drainage degradation as a result of the Project, loss of blanket bog habitat is considered to be not significant. Confidence in this prediction is near certain. In addition, outline proposals for peatland restoration are provided in Annex 9.10 Outline Habitat Management Plan and Section 9.7.2 to provide mitigation for peat loss (see Chapter 8 (Hydrology and Geology)). These are likely to commence during or immediately after construction so are assessed here. The proposals include the restoration of up to 25.4 ha of peat through the clearance of self-sown trees, the blocking of ditches and forestry plough furrows and subsequent management of vegetation as appropriate. Positive impacts will are likely to occur on associated blanket

50 It is recognised that further areas of habitat on peat >0.35m (peat capable of supporting blanket bog vegetation (CCW, 2010) are present but these do not fit blanket bog vegetation classifications and largely have not been classified as blanket bog but the dominant habitat present.

51 The distance where it is considered construction activities could have a hydrological impact on the habitat.
bog habitats both qualitatively and quantitatively as a result of the embedded mitigation for peat loss. Therefore, a significant positive impact is anticipated during construction of the wind farm for blanket bog habitats. The confidence in this prediction is near certain.

9.9.2.3.17. Common Lizard and Adder

9.9.2.3.18. The construction of turbines and associated infrastructure on heath habitat will result in the permanent loss of c. 2.1ha of potentially suitable heath habitat for common lizard and adder during construction. Widening of tracks may also impact on these species due to habitat loss. However large areas will remain and given the small scale of habitat they are not considered to be significant. This prediction is considered near certain.

9.9.2.3.19. As discussed, in relation to pre-development tree clearance operations small numbers of common lizards and adder could potentially be inadvertently injured or killed during construction works. Indeed, such impacts are probably more likely during construction than forestry operations, as works will largely be taking place in potentially suitable habitat for common lizard and adder (i.e. open areas, including cleared areas). Nevertheless, the number of animals likely to be affected is considered to be relatively small due to the relatively small proportion of suitable habitat being impacted.

9.9.2.3.20. The total area of the Application Site potentially impacted by construction land take (12.21 ha permanent and 12.74 ha temporary) is limited in comparison to the total open area available for reptiles across the site during construction. Therefore, the possible loss of these animals is considered not significant in terms of the conservation status of common lizard in the area. However, in the absence of mitigation measures the killing or injuring of individual lizards could represent an offence under the Wildlife and Countryside Act 1981 (as amended) and mitigation may be required. Confidence in this prediction is considered near certain.

9.9.2.3.21. In addition the positive impact of additional suitable habitat as detailed for pre-development tree clearance will continue to be felt throughout the construction phase.

9.9.2.3.22. Otter

9.9.2.3.23. The majority of the watercourses within the Application Site have been avoided during the design mitigation. Current proposals include no additional track crossings of watercourses, however, additional track crossings may require upgrading. All crossing points will be assessed prior to development for suitability. Where crossings are deemed inappropriate and require upgrade, they will be designed and constructed in accordance with EAW and CIRIA good practice guidance and will be agreed in advance with EAW. During the original design process all turbines were located to maintain a buffer of at least 50m from the nearest watercourse from the centre point of the area allowed for micro-siting of the turbine (see Chapter 2 (Project Design)). There are, however, six turbines (T3, T7, T10, T11, T14 and T32) which could be closer than 50 m to a watercourse if they were micro-sited in that direction (i.e. due to ground conditions which could not be predicted during the original planning stage). In these instances micro-siting restrictions will be placed on these turbines to prevent them being located too close to watercourses. Minimum buffers of 20 m (for watercourses over 2 m wide) and 10 m (for watercourses less than 2 m wide) will be applied, in line with the Forestry Commission Forests and Water Guidelines (2011), for further information refer to Chapter 8 (Hydrology and Geology).
9.9.2.3.24. Otters are known to travel across upland areas away from riparian corridors to move between watercourse catchments, and it is possible the Application Site is used by commuting otters in this way. However, the wind farm will only impact a relatively small area of the site (12.21 ha permanent and 12.74 ha temporary infrastructure land take) over a two year construction period. Therefore, no significant impacts are anticipated on otter populations within the Application Site during construction. However, if previously unidentified otter resting places were present, the construction of upgraded watercourse track crossings has the potential to cause an offence under the Wildlife and Countryside Act 1981 (as amended) and Conservation of Habitats and Species (Amendment) Regulations 2012 and mitigation may be required. This prediction is considered near certain.

9.9.2.3.25. There could be an indirect, temporary negative impact on otters using watercourses during the construction period. Increased discharges of sediment laden runoff from upgrade works on existing stream crossing or creation of a new stream crossing; may flow into surrounding watercourses may impact upon fish which serve as prey for otter (see Chapter 8 (Hydrology and Geology)). In the absence of mitigation measures, impacts on water quality and on fisheries in surrounding watercourses are considered to potentially be of moderate to high significance (see Chapter 8, (Hydrology and Geology)), and, therefore, could have potentially significant negative impacts on otter outside the Application Site; although such an incident is considered unlikely to occur as a result of the lack of potential pollutants expected to be present on site during construction and adherence to best practice guidance (see Chapter 8, (Hydrology and Geology)). As such significant negative impacts on the conservation status of otter are unlikely. The confidence in this prediction is probable.

9.9.2.3.26. Otters are inquisitive animals and if present, in the absence of prevention measures could be injured by falling into excavations, coming into contact with dangerous substances and machinery, although such events are unlikely and no impact on the conservation status of otter is predicted. In the unlikely event that an otter was killed or injured, this may represent an offence under the Wildlife and Countryside Act 1981 and The Conservation of Habitat and Species (Amendment) Regulations 2012 and mitigation may be required (see Section 9.9).

9.9.2.3.27. Due to the design mitigation which has taken place with regards to the siting of infrastructure and turbine bases away from water features, limited land take from construction and lack of otter records from the site; it is considered that there will be no significant long term impact on otter populations within the Application Site due to habitat loss. Confidence in this prediction is near certain.

9.9.2.3.28. **Water Vole**

9.9.2.3.29. Water voles are less likely to be negatively impacted than otters by temporary negative impacts on water quality due to runoff during wind farm construction. This is because water voles are herbivorous, and, therefore, their food supply is less likely to be affected by a temporary increase in suspended sediment / acidity or nutrient enrichment. Impacts on water voles through changes in water quality, if present, are therefore considered likely to be not significant. The confidence in this prediction is probable.

9.9.2.3.30. As noted above in relation to otters, current proposals include no additional track crossings of watercourses, however, additional track crossings may require upgrading. Although water voles are only very sparsely distributed throughout the site they may be present in the vicinity of some stream crossings in areas of suitable habitat.
Disturbance during the construction of stream crossings will only affect a very small proportion of stream habitat within the site, and, therefore, even if water voles are present in some affected sections, impacts are not likely to be significant in terms of the conservation status of water vole in the area. The confidence in this prediction is probable. In the absence of mitigation measures, however, such disturbance could represent an offence under the legislation.

9.9.2.3.31. Due to the design mitigation which has taken place with regards to the siting of infrastructure and turbine bases away from water features and therefore the minimal take of riparian habitat; it is considered that there will be no significant long term impact on water vole populations within the Application Site due to habitat loss. Confidence in this prediction is near certain.

9.9.2.3.32. Badger

9.9.2.3.33. Although no badger setts were recorded within the Application Site, evidence of badger activity was found within the Application Site and given the difficulties of surveying dense blocks of coniferous woodland, the possible presence of badger setts within the plantation cannot be ruled out.

9.9.2.3.34. Any previously unrecorded setts within the Application Site are likely to be identified during pre-development tree clearance with appropriate mitigation included as part of clearance. If any setts are present and remain in use post pre-development tree clearance, in the absence of mitigation it is possible that damage or disturbance to them could occur if construction works take place within approximately 30m of them. Although disturbance or damage to any setts, if present, is not likely to be significant in terms of the conservation status of badger in the area, such disturbance could represent an offence under the legislation and mitigation may be required (see Section 9.9). Confidence in this prediction is considered near certain.

9.9.2.3.35. If badgers are present, in the absence of mitigation measures they could be adversely affected if they enter construction areas (e.g. by falling into excavations, coming into contact with dangerous substances). If any badgers were killed or injured in construction areas this is not likely to have a significant impact on their conservation status, although it may represent an offence under the legislation and mitigation may be required (see Section 9.9). Confidence in this prediction is considered probable.

9.9.2.3.36. The new infrastructure within the site will permanently occupy 12.21 ha and 12.74 ha temporarily, therefore, it is considered that long term habitat loss within the Application Site, which has a total area of c. 1,581 ha represents a non-significant impact on the conservation status of badger. Confidence in this prediction is near certain.

9.9.2.3.37. Pine Marten

9.9.2.3.38. As pine marten are largely arboreal and build dens high in branches, direct impacts on pine marten are most likely during pre-development tree clearance and no significant impacts are anticipated at the construction stage. However, although unlikely there is a potential risk that if present, pine marten could be killed or injured during construction works e.g. by increased traffic related to construction. In the absence of mitigation measures, the killing or injuring of individual pine marten could represent an offence under the legislation and mitigation may be required (see Section 9.9). Confidence in this prediction is considered probable.
9.9.2.3.39. The new infrastructure within the site will permanently occupy 12.21 ha and 12.74 ha temporarily, therefore, it is considered that long term habitat loss within the Application Site, which has a total area of c. 1,581 ha represents a non-significant impact on the conservation status of pine marten. Confidence in this prediction is near certain.

9.9.2.3.40. Polecat

9.9.2.3.41. Although disturbance or damage to any dens or injury/killing of an individual is highly unlikely during the construction phase, as it is only considered only a small population of polecat within the Application Site is potentially present and therefore no significant impacts are predicted; the confidence in this prediction is probable. However death or injury if it did occur could represent an offence under the Wildlife and Countryside Act 1981 and mitigation may be required (see Section 9.9).

9.9.2.3.42. The new infrastructure within the site will permanently occupy 12.21 ha and 12.74 ha temporarily, therefore, it is considered that long term habitat loss within the Application Site, which has a total area of c. 1,581 ha represents a non-significant impact on the conservation status of polecat. Confidence in this prediction is near certain.

9.9.2.3.43. Dormouse

9.9.2.3.44. As dormice are largely arboreal and all suitable vegetation and brash will be cleared from the site prior to construction, direct impacts are most likely during pre-development tree clearance. The new infrastructure within the site will permanently occupy 12.21 ha and 12.74 ha temporarily being located on open ground previously cleared and, therefore, no significant impacts on dormice are anticipated at the construction stage. Confidence in this prediction is near certain.

9.9.2.3.45. Red squirrel

9.9.2.3.46. As red squirrels are largely arboreal and build nests (dreys) high in branches, direct impacts on red squirrel are most likely during pre-development tree clearance. However, there is an unlikely but potential risk that squirrels could be killed or injured during construction works e.g. by increased traffic related to construction. Although the occurrence of injury or death is very unlikely, if it were to occur it is considered that this would be significant in terms of the declining red squirrel population at a national level; the confidence in this prediction is probable. In the absence of mitigation measures (see Section 9.9); the killing or injuring of individual red squirrels could also represent an offence under the legislation and mitigation may be required.

9.9.2.3.47. Additional control of grey squirrels (see Section 9.7.2) will start during the construction phase and may have a positive impact on red squirrels by reducing competition for food and also reducing the possible transmission of disease (pox. virus). If remnant populations of red squirrel are sufficient, then the eradication of grey squirrel should allow for a recovery of the red squirrel population. An increase in the red squirrel population would be a significant and positive impact. Confidence in this prediction is probable.

9.9.2.3.48. Bats

9.9.2.3.49. Given the relatively low levels of current usage of the Application Site by bats, the relatively small areas that will impacted by construction, and the fact that construction will mainly take place during daylight hours during the season when bats are active
(April to October 0700 to 1900 hours), any disturbance to foraging bats during construction is not likely to be significant. The confidence in these predictions is near certain.

9.9.2.3.50. No known or potential bat roost sites will be affected by construction works and there will, therefore, be no impact on roosting bats. The confidence in this prediction is considered near certain.

9.9.2.3.51. The new infrastructure within the site will occupy 12.21 ha permanently and 12.74 ha temporarily. As a result of this it is considered that long term habitat loss within the Application Site, which has a total area of c.1,581 ha represents a non-significant impact on the conservation status of bats during the construction phase. Confidence in this prediction is near certain.

9.9.2.3.52. Small Pearl-Bordered Fritillary

9.9.2.3.53. Construction works in open habitats will be limited but could cause small areas of suitable habitat to be lost and temporary disturbance to small pearl bordered fritillary habitat; although the majority of existing continuous populations occur on open riparian areas which will not be impacted upon by construction. Any impacts during construction are, therefore, considered unlikely to be significant. Confidence in this prediction is considered certain/near certain.

9.9.3. Operational Impacts

9.9.3.1. Designated sites

9.9.3.2. Chapter 8 (Hydrology and Geology) and Annex 9.15 Report to Inform Habitat Regulations Assessment provides more detail on water quality impacts and impacts to qualifying features respectively with respect the River Dee and Bala Lake SAC.

9.9.3.3. No evidence of otter was recorded on any watercourse within the Application Site and, therefore, it is considered unlikely, due to distance and limited habitat suitability, that significant otter numbers that form part of the SAC utilise the Application Site. In addition, operational impacts are limited to site maintenance and monitoring with limited activities taking place within 50 m of the watercourses onsite (see section on otter impact). Therefore, it is considered certain/near certain there will be no significant impacts on the SAC otter population as a result of operation of the wind farm.

9.9.3.4. There should be no significant negative impacts on the Mynydd Hiraethog SSSI (see Chapter 10 (Avian Ecology)) or any of the Wildlife Sites within the Application Site as a result of the operation of the Project. Confidence in this prediction is considered certain/near certain.

9.9.3.5. Acid Heath

9.9.3.6. Positive impacts associated with the control of self-sown trees and the instigation of grazing management of c. 189 ha of heath will begin at the start of wind farm operation and continue throughout the operational phase. This management is likely to represent a significant positive impact for heath habitats which may otherwise have declined over time due to canopy closure and scrub invasion. Confidence is this prediction is considered certain/near certain.
9.9.3.7. Blanket bog

9.9.3.8. There should be no significant negative impacts on blanket bog during the operational phase. This prediction is considered certain/near certain. However positive impacts associated with the bog habitat restoration of up to 25.4 ha will continue to be felt throughout the operational phase of the wind farm.

9.9.3.9. Common Lizard and Adder

9.9.3.10. Positive impacts associated with the control of self-sown trees and the instigation of grazing management of c. 189 ha of heath will commence and should then continue through the operational phase. This is considered to represent a positive impact on common lizard and adder. The confidence in this prediction is certain/near certain as whatever the precise make up of habitats which develop is; increases in the extent of suitable habitat for common lizard and adder are highly likely.

9.9.3.11. Otter

9.9.3.12. No evidence of otter was recorded on any watercourse within the Application Site and, therefore, it is considered unlikely, due to distance and limited habitat suitability, that significant otter numbers utilise the Application Site. In addition, operational impacts are limited to site maintenance and monitoring with limited activities taking place within 50 m of the watercourses onsite (see section on otter impact). Therefore, it is considered probable there will be no significant impacts on the local otter population as a result of operation of the wind farm.

9.9.3.13. Water Vole

9.9.3.14. The only likely source of impact on water voles during the operational phase would be from an accidental spillage of chemicals or other pollutants into a watercourse. In the absence of mitigation this is considered to represent an impact of ‘negligible or minor’ significance (see Chapter 8 (Hydrology and Geology)) in relation to water quality in surrounding watercourses. Therefore, no significant impacts are considered likely on the local water vole population. This prediction is considered near certain (as a major pollution incident is unlikely to occur during site operation).

9.9.3.15. Badger

9.9.3.16. There should be no significant negative impacts on badger during the operational phase. This prediction is considered certain/near certain.

9.9.3.17. Pine Marten

9.9.3.18. There should be no significant negative impacts on pine marten during the operational phase. This prediction is considered certain/near certain.

9.9.3.19. Polecats

9.9.3.20. There should be no significant negative impacts on polecat during the operational phase. This prediction is considered certain/near certain.

9.9.3.21. Dormouse
9.9.3.22. There should be no significant negative impacts on dormouse during the operational phase with no impacts to habitat and no known research indicating an adverse impact from turbine operation (e.g. noise). This prediction is considered certain/near certain. However positive impacts will continue to be felt through the establishment and management of 16.7 ha of habitat. In addition further enhancement will occur through funding of a PhD studentship post consent to undertake research into specific aspects of dormouse ecology within upland forests in Wales, using Clocaenog Forest as a case study. This will lead to a better knowledge of dormice use of these habitats; and could start prior to the operation of the wind farm (dependant on precise subject matter) however its impacts are considered as part of the operation phase. It is considered in combination the detailed embedded mitigation and enhancement will represent a significant positive impact on dormice. The confidence in this prediction is probable.

9.9.3.23. Red Squirrel

9.9.3.24. There should be no significant negative impacts on red squirrel during the operational phase with no impacts to habitat and no known research indicating an adverse impact from turbine operation (e.g. noise). This prediction is considered certain/near certain. Positive impacts associated with the control of grey squirrel and the establishment of self-sown broadleaved trees, as described for dormice, were assessed in the pre-development tree clearance and construction sections but should continue throughout the operational period.

9.9.3.25. Bats

9.9.3.26. Natural England (2009) provides information regarding the likely risk to individual bat species and populations from wind turbine strike. Based on this information the only bat species identified within the Application Site considered to be at high risk from collision with wind turbines would be noctule. Of the three other species recorded within the Application Site, common pipistrelle and Soprano pipistrelle are considered to have a medium risk of collision and natterer’s are considered to have a low risk.

9.9.3.27. A paper by Baerwald et al. (2008) analyses results from experiments undertaken in Alberta, Canada and deals with issue of bat fatalities and turbine strike. The main issue the scientists are trying to understand is why bat deaths involving wind turbines are primarily involving migratory species during autumn migration, when bat sonar is better at picking up moving objects rather than stationary ones. The paper concludes that pressure changes created by the moving turbine blades are great enough to kill bats through barotrauma; therefore flying ‘close’ to a turbine blade may be enough to induce death. UK bat populations are considered to be generally non migratory, (en masse, over large geographic distances) and the majority of UK bat species fly low, following linear features, therefore, the findings of this paper are considered unlikely to directly relate to the UK bat population as a whole, although a small number of barotraumas deaths (as with direct collision) cannot be ruled out.

9.9.3.28. Data from the bat surveys suggest that the low numbers of noctules recorded are most likely to be roosting outside the Application Site and only foraging/transiting across the Application Site on an infrequent basis to take advantage of foraging opportunities during calm weather conditions. This is due to lack of suitable roosting sites within the Application Site (trees over 80 years old).

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52 Baerwald et al. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology 18:695-696
9.9.3.29. The lowest blade height of the turbines proposed here would be 55 m above ground height. This is higher than at many existing onshore wind farms to account for potential turbulence caused by the retained forest. Anecdotal evidence collected during nightjar surveys conducted by the BTO and WYG recorded three registrations of presumed noctule at a height of between 20-30m. This is lower than the anticipated lowest blade tip height, suggesting noctules are not regularly flying at a height that would put them at risk of collision with turbine blades. This supports the idea that noctule flight activity over the Application Site is relatively low. The ornithological surveys (Chapter 10 (Avian Ecology)) took place by observing and recording flights at different height bands. Therefore, although noctules were recorded at 20 – 30 m they were not visually recorded flying above this height.

9.9.3.30. Pre-development tree clearance for the wind farm will create new forest edge habitat through the use of key hole felling. Edge habitat will be located at least 50 m from the turbine tips in line with the currently adopted Natural England Guidance note TN051 (2012) advisory distance.

9.9.3.31. On comparing these figures with the bat flight figures set out in Russ (1999) it can be concluded that the majority of bat species (Myotis, pipistrelle (common and soprano) and brown long eared bat) all generally forage below a height of 10 m, so are unlikely to come into contact with the turbine blades during foraging activity.

9.9.3.32. No visible lighting will be installed on the turbines with the use of infrared lighting only. As bats are not thought to see infrared light and most invertebrates are least attracted to infrared light it is considered there will be no significant impacts on bats from lighting. The confidence in this prediction is only probable owing to a general lack of available research on impacts of infrared lighting on bats.

9.9.3.33. In the event that individual bats are occasionally killed through turbine strike, impacts on the conservation status of the relevant species’ populations are not considered likely to be significant. This is because the numbers of bats present is considered to be low and the impact of collision fatalities on pipistrelle and natterer’s populations is also considered low (Natural England 2009). Given that the collision risk for all species including noctule is considered low due to the height of the turbines and the relatively low levels of bat activity, significant impacts on all populations are not considered likely. The confidence in this prediction is only probable owing to a general lack of knowledge in relation to bat-turbine interactions at this time and monitoring is therefore proposed (see Section 9.9.2).

9.9.3.34. Small Pearl-Bordered Fritillary

9.9.3.35. Positive impacts associated with the control of self-sown trees and the instigation of grazing management of c.189 ha of heath will commence and should continue through the operational phase and is likely to represent a significant positive impact for small pearl bordered fritillary, which may otherwise have declined over time due to canopy closure and scrub invasion. Where the opening up of habitat encourages the growth of Violets viola spp. the food plant of the Small pearl-bordered fritillary adjacent to woodland edges, populations of this species are likely to increase. Confidence is this prediction is considered probable.

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9.9.4. **Decommissioning Impacts**

9.9.4.1. This section characterises and evaluates, insofar as it is possible, the significance of potential impacts on important non avian ecological receptors during the decommissioning of the Project.

9.9.4.2. Following decommissioning an additional 76 ha (including turbine demised areas, adjacent to access tracks and borrow pits) is available to be restocked or allowed to re-establish subject to the revised FDP.

9.9.4.3. It is difficult to predict impacts which would arise from decommissioning and the confidence in all predictions is considered to be uncertain, both due to the length of the operational period (25 years) and the industry-wide lack of knowledge about the very long-term effects of decommissioning for modern wind farms. However, impacts are likely to be substantially less than at the construction stage as there is unlikely to be additional tree clearance and the infrastructure required for accessing the turbine locations will already be in situ.

9.9.4.4. **Designated Sites**

9.9.4.5. No significant impacts are predicted for any designated sites as a result of decommissioning. However, as noted above this prediction is uncertain.

9.9.4.6. **Habitats and Vegetation**

9.9.4.7. No significant impacts, either positive or negative, are predicted for any important habitats or plant species as a result of decommissioning and the reinstatement of soil on turbine, substation and met mast bases. As noted above however, this prediction is uncertain due to a lack of information both about decommissioning methods and the nature and extent of habitats likely to be present at the end of the 25 year operational period.

9.9.4.8. Update surveys would be undertaken prior to decommissioning taking place to inform an up to date assessment of potential impacts on important habitats with mitigation measures to avoid or reduce negative impacts employed as appropriate.

9.9.4.9. **Protected Faunal Species**

9.9.4.10. Decommissioning could cause temporary impacts to protected faunal species (notably common lizard, adder, otter, water vole, badger, pine marten, red squirrel and dormouse – bats are less likely to be affected) through disturbance similar to that predicted to occur during the construction period; although in most cases impacts are likely to be less as there will be no tree clearance and very limited vegetation clearance during decommissioning. The presence and distribution of protected faunal species at the time of decommissioning, potentially including species not currently present at the site or not currently subject to legal protection, cannot be predicted at this stage. However, it is reasonable to assume that protected faunal species are likely to be present within the wind farm site at this time and could therefore be affected by decommissioning works.

9.9.4.11. The level of negative impact will depend on the species present, the size and location of their populations at the time, and the precise nature of decommissioning works and so cannot be reliably predicted at this stage. On the basis of impact predictions made in relation to disturbance during the construction stage however, impacts resulting from decommissioning are anticipated to be not significant. This prediction is considered
uncertain due to a lack of information both about decommissioning methods and the extent of protected faunal species’ populations likely to be present at the end of the 25 year operational period.

9.9.4.12. Update surveys would be undertaken prior to decommissioning taking place to inform an up to date assessment of potential impacts on protected faunal species.

9.9.5. Cumulative Impacts

9.9.5.1. Cumulative impacts are assessed for other wind farms within 5km. No guidance currently exists as to the distance which should be taken in to account for such an assessment; however 5km has been chosen as this distance as this is likely to represent the extent of range for the majority of terrestrial species described in this Chapter. One exception to this is bats, particularly noctule, however, due to the comparatively low levels of bat activity present on the site, 5km is considered to be an acceptable distance for which to assess cumulative impacts. The current and proposed wind farms within 5 km of this Project include:

- Tir Mostyn and Foel Goch (operating), 25 turbines.
- Brenig (consented), 16 turbines.
- Cae Gwynn (consented) 1 turbine
- Cae’r Weirglodd (consented) 1 turbine
- Cerrig, Cyffylliog (consented) 2 turbines
- Derwydd Bach (consented), 10 turbines
- Nant Bach (consented) 11 turbines
- Cilgoed (consented), 1 turbine.

9.9.5.2. Tir Mostyn and Foel Goch wind farm was operational at the time of the baseline surveys for this Project and falls within the study area and therefore is included within the baseline information. Significant cumulative impacts arising with the other wind farms on habitats and species covered within this Chapter are considered unlikely as those species identified as being of county value or greater in this assessment were not recorded and/or were not subject to any significant impacts on the other wind farm sites. However it should be noted available information for a number of small single wind farms (including Cilgoed, Cae Gwynn, Cae’r Weirglod and Cerrig, Cyffylliog) was limited and therefore survey information has not been assessed.

9.10. Mitigation enhancement and compensation Measures

9.10.1. Mitigation, compensation and enhancement measures incorporated into the site design (see Section 9.7) form part of the Project and have been assessed as such in Section 9.8. This section describes additional measures that are proposed to avoid or reduce significant impacts on important ecological receptors, to ensure compliance with the relevant legislation and in certain cases to provide ecological enhancements.

9.10.2. Full details of proposed mitigation measures and monitoring to be employed during construction would be provided within a detailed Construction Environmental Management Plan (CEMP), to be produced following receipt of planning consent, but
prior to construction commencing. However an outline CEMP is provided in Annex 3.1 Construction Method Report.

9.10.3. An OHMP is included in Annex 9.10, which covers the proposed mitigation, compensation and enhancement measures to be employed during wind farm operation. As noted in Section 9.7.2.5 the OHMP is intended as a precursor to a more detailed Habitat Management Plan (HMP), which would be produced and agreed with FCW (on behalf of Welsh Government), DCC and CCBC, in consultation with CCW following planning consent (see Annex 9.10 for further details). As a result of this, all of the mitigation contained within the OHMP will be treated within this Chapter as Embedded Mitigation (see Section 9.7.2).

9.10.4. A summary of all mitigation measures for the Project is provided in Chapter 16 (Project Mitigation and Enhancement).

9.10.1. Micro-siting

9.10.1.1. The Project includes a proposed micro-siting allowance of up to 50 m in any direction for each turbine, tracks and other infrastructure. The use of micro-siting carried out to date and the process for the approval of the final layout for other elements are described in Chapter 2 (Project Design).

9.10.1.2. The requirement for further micro-siting is most likely to be required for geotechnical reasons or for the avoidance of previously unrecorded features of cultural heritage importance, which will only become apparent once pre-development tree clearance occurs. Micro-siting may also be employed to avoid specific locations used by protected species, e.g. badger setts or otter holts. The need for such micro-siting, however, will only be able to be determined following forest clearance and will comply with all relevant buffers as described in this Chapter i.e. 50m bat buffer from forest edge to turbine tip.

9.10.2. Hydrological Mitigation Measures

9.10.2.1. Mitigation measures that will be employed in relation to predicted negative impacts on water quality and peat during pre-development tree clearance, construction and, where relevant, operation and decommissioning are described in Chapter 8 (Hydrology and Geology) and are not repeated here.

9.10.2.2. Hydrological mitigation measures during pre-development tree clearance will follow standard FCW best practice guidelines as detailed in Chapter 7 (Land Use, Access and Forestry) and Chapter 8 (Hydrology and Geology).

9.10.3. Pre-development Tree Clearance mitigation

9.10.3.1. Pre-development tree clearance operations will be undertaken by FCW and will be subject to standard FCW European Protected Species procedures with respect to dormice, otters and bats. In addition, pre-development tree clearance potentially

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55 Forestry Commission Wales (2010) Woodland Management in the presence of otter: Guidance for compliance with the Habitat Regulations
impacting other protected species (reptiles, badgers, water voles, pine martin, polecat and red squirrel) would be undertaken in accordance with UK Forestry Standard, under which protected species (and other, non-protected species of concern) are taken into account during the planning of pre-development tree clearance operations. Proposed mitigation measures to be employed during wind farm specific pre-development tree clearance are outlined in the following sections.

9.10.3.2. All pre-development tree clearance mitigation measures will follow FCW coupe survey methodologies following UK Forestry Standard and FCW guidelines as agreed with CCW and EAW.

9.10.3.3. Common Lizard and Adder

9.10.3.4. In order to ensure compliance with the Wildlife and Countryside Act 1981 mitigation will be required to reduce the chances of inadvertently killing or injuring individual common lizards and adder during pre-development tree clearance works.

9.10.3.5. During wind farm specific pre-development tree clearance, given that large areas of suitable habitat will remain unaffected by the works and given also the very large scale of the works, fencing and translocation are not considered appropriate. Proposed mitigation, therefore, involves habitat management and removal of potential refugia and hibernacula within open areas.

9.10.3.6. During the active season for reptiles (April to October) all potentially suitable reptile habitats within open areas present that are located within pre-development tree clearance areas will be cut under the guidance of the FCW Conservation Manager (using e.g. a brush cutter or tractor mounted flail) to reduce the height of vegetation, and make it less attractive for reptile habitation. Immediately following the cutting of vegetation, working areas would be surveyed by a suitably qualified ecologist/FCW Conservation Manager. Wherever possible potential refugia or hibernacula would be moved out of working areas. Areas would then be kept unsuitable for reptile through regular cutting until pre-development tree clearance commences.

9.10.3.7. Otter

9.10.3.8. Pre-development tree clearance carried out within 50m of a watercourse will be carried out in line with standard FCW guidelines. An assessment will be carried out on the likelihood of otters being present within the coupe to be cleared and, if present, whether the operations would have an impact on otters. If further surveys are required to confirm presence, a survey will be carried out prior to pre-development tree clearance to identify the location of holts and/or resting places. If an otter holt or resting place is recorded and works cannot be micro sited to retain a 30m buffer to a holt or resting site (100-200m around a breeding site) a Welsh Government (WG) licence will be required. Measures are likely to include working methods to reduce disturbance including timing of works to avoid sensitive periods (when otter present with young) and potentially the provision of additional artificial holts. Licences to disturb otters will only be granted if there are imperative over-riding reasons to continue working and risk disturbance however the

56 Forestry Commission Wales (2010) Woodland Management in the presence of bat species: Guidance for compliance with the Habitat Regulations

57 Effectively any open habitats within the forest including grassy road verges or stream banks through plantation and structurally diverse open heathland and pre thicket restock with heathland vegetation; areas of dense plantation or very recent clearfell are likely to provide little or no reptile habitat
likelihood a licence is required is low based on existing survey data and ability to micro
site infrastructure.

9.10.3.9. In addition, the following procedures will be carried out in areas where otters are
potentially present to avoid committing an offence during pre-development tree
clearance:

- Removal of riparian scrub within 30m of watercourse will be avoided and if removed
  thickets will be checked individually before removal. Brash piles in these areas will
  be immediately removed following clearance.
- Timber will be removed shortly (1-2 months) after pre-development tree clearance or
  stacked more than 50m away from watercourses.

9.10.3.10. Badger

9.10.3.11. Should any setts be located within 20m of any pre-development tree clearance to avoid
impacts on badger setts, works will be designed to avoid impacts on badgers in line with
FCW guidance\textsuperscript{58}. If pre-development tree clearance methods cannot be designed to
avoid impacts on badgers, such as clearance by chainsaw without the use of heavy
machinery, a licence will be obtained with appropriate mitigation from the relevant
authority, if required. Measures are likely to include timing works to avoid periods of
maximum sensitivity (i.e. December to June) and avoiding the use of certain types of
machinery within close proximity of sett entrances.

9.10.3.12. Pine Marten

9.10.3.13. Should any evidence of pine marten presence be found at any point during pre-
development tree clearance, field signs would be investigated by a suitably qualified
ecologist and potential scats would be sent to an appropriate laboratory for
identification. Subsequently, the need for any further surveys or mitigation, such as
timing of works to avoid disturbance should be determined.

9.10.3.14. Polecat

9.10.3.15. Should any evidence of polecat presence be found at any point during pre-development
tree clearance, field signs would be investigated by a suitably qualified ecologist and, as
with pine marten, potential scats would be sent to an appropriate laboratory for
identification. Subsequently, the need for any further surveys or mitigation, such as
timing of works to avoid disturbance would be determined.

9.10.3.16. Dormouse

9.10.3.17. All pre-development tree clearance in suitable habitat will be carried out under a WG
licence which will be produced in line with FCW guidance\textsuperscript{18, 54}. The full licence
application will be applied for on receipt of planning permission, and will include details
on dormouse distribution and the measures proposed to reduce impacts on dormouse
during pre-development tree clearance and maintain the favourable conservation status
of the species and meet licensing requirements. A draft of the dormouse licence
(including application form, method statement and reasoned statement) is included in

9.10.3.18. Mitigation measures are detailed in a draft method statement detailing all dormouse mitigation (see Annex 9.14 Draft Dormouse Licence Method Statement (2012)) and are summarised in the following points which will be applied where suitable habitat is present:

- A ‘tool box talk’ will be given to all operatives prior to pre-development tree clearance commencing explaining presence of dormouse, and that work is being carried out under licence. It will also explain the working requirements of the licence;
- The preferred timing of operations to carry out work, are during September-October or April- May, however work will be carried out outside this period in winter where required; however no work will be carried out during June- August;
- Where ground conditions allow from November to March inclusive (when dormice are hibernating) a harvester will be used to cut and remove trees without the trunk touching the ground;
- Where ground conditions allow timber will be extracted with a forwarder rather than a skidder over a minimum number of extraction routes;
- Timber will be stacked on sparsely vegetated ground where hibernation nests are not likely with stack removal between 1 April and 30 September or in the winter/spring work period as when stacked.

9.10.3.19. Red Squirrel

9.10.3.20. In addition to measures already outlined in Section 9.7, to avoid pre-development tree clearance in habitats of moderate to high suitability for red squirrel, and to incorporate control of grey squirrels, a number of other measures will be taken to ensure maintenance of habitat connectivity and reduce the risk of killing or injury to red squirrels.

9.10.3.21. In line with current FCW practices (pers. comm Dai Rees, FCW), around 12 months before pre-development tree clearance is proposed to take place, a survey of forest coupes to be cleared will be undertaken to identify areas where some tree retention may provide dispersal corridors beneficial to red squirrel. Agreement with FCW and RWE NRL over which trees to retain will then be made (taking into account other issues such as wind blow and the location of wind farm infrastructure) and pre-development tree clearance will then take place within 12 months of this survey.

9.10.3.22. To reduce the risks of killing or injury of squirrels during forest operations, a pre-tree clearance check of trees for red squirrel dreys will be carried out. If red squirrel dreys are found, pre-development tree clearance would need to be delayed until breeding has been completed (between February and September).

9.10.4. Construction mitigation

9.10.4.1. Proposed mitigation measures to be employed during wind farm construction are outlined below.

9.10.4.1. Ecological Clerk of Works

9.10.4.1.1. An Ecological Clerk of Works (ECoW) will be employed for the duration of the construction period. The duties of the ECoW would be set out in detail in the CEMP but are likely to include:
Providing advice with respect to the micro-siting of turbines or other infrastructure;
ensuring suitable measures are in place to protect retained and created habitats;
undertaking any necessary pre-construction protected species surveys and supervising the implementation of any mitigation measures required;
undertaking the necessary surveys and providing advice to ensure legal compliance with respect to nesting birds (see Chapter 10 (Avian Ecology));
ensuring that the terms of the CEMP are adhered to by all contractors working on site;
supervising the implementation of habitat creation and management outlined in the CEMP (where such works take place during the construction period);
undertaking the required monitoring of created and managed habitats as outlined in the CEMP (where this is required during the construction period);
providing regular reports and maintaining regular contact with nature conservation organisations and any other relevant stakeholders; and
providing advice with respect to any other ecological issues that arise.

9.10.4.1.2. Common Lizard and Adder

9.10.4.1.3. In order to ensure compliance with the Wildlife and Countryside Act 1981 mitigation will be required to reduce the chances of inadvertently killing or injuring individual common lizards and adder during construction works.

9.10.4.1.4. During construction, given that large areas of suitable habitat will remain unaffected by the works and given also the very large spatial scale of the works, fencing and translocation are not considered appropriate. Proposed mitigation therefore involves habitat management and removal of potential refugia and hibernacula.

9.10.4.1.5. All construction working areas with potentially suitable open habitats for reptiles will initially be cut during October to end of February, under the guidance of the ECoW (using e.g. a brush cutter or tractor mounted flail), to reduce the height of vegetation and make it less attractive for reptile habitation. The ECoW will ensure any potential refugia or hibernacula will not be disturbed during this period. Following this during the active season for reptiles (April to October) working areas would be surveyed by a suitably qualified ecologist/ECoW and wherever possible potential refugia or hibernacula would be moved out of working areas. In addition areas would then be kept unsuitable for reptiles through regular cutting until construction commences.

9.10.4.1.6. Otter

9.10.4.1.7. All proposed extended stream crossings will be surveyed for otter 200m upstream and downstream of the proposed crossing locations) prior to construction work on the relevant crossing taking place. If micro-siting is not possible then works would be delayed until an EPS licence had been obtained and mitigation measures agreed, such as the timing of works to avoid sensitive periods.

9.10.4.1.8. All potentially dangerous substances or materials within the temporary construction compounds will be carefully stored to ensure they could not cause any harm to otters that may enter the compound at night. During construction, all excavations greater than 1m depth will either be covered at night or designed to include a ramp to allow otters (and other animals) a means of escape should they fall in.
9.10.4.1.9. During construction, site speed limits of 15 mph will reduce the likelihood of accidental injury/killing of otter by construction traffic.

9.10.4.1.10. Water Vole

9.10.4.1.11. All proposed extended or newly proposed stream crossings will be surveyed for water vole (50m upstream and downstream of the proposed crossing locations) prior to construction work on the relevant crossing taking place. Surveys for water voles can only take place during the period April to October and therefore careful planning of surveys will be required. In the event that any water vole nests or burrows are found within 20 m of the proposed new crossing point, the impacts will be assessed and construction and design updated or crossing point micro-sited, to avoid potential disturbance impacts. If construction design or micro-siting is not possible to avoid potential disturbance impacts (e.g. streams are occupied by water voles for some distance up and down stream) then works would be delayed until mitigation, such as temporary exclusion, had been agreed with CCW.

9.10.4.1.12. Badger

9.10.4.1.13. Should any setts be located within 30m of any construction operation following micro-siting to avoid impacts on badger setts, works will be delayed until assessed for potential impacts on badgers. Impacts will be dependent on the construction operation and if required mitigation measures will been agreed with CCW, and if necessary the relevant licence obtained. Mitigation measures are likely to include timing works to avoid periods of maximum sensitivity (i.e. December to June) and avoiding the use of certain types of machinery within close proximity of sett entrances.

9.10.4.1.14. During construction, all excavations greater than 1m depth will either be covered at night or designed to include a ramp to allow badgers (and other animals) a means of escape should they fall in. In addition, all potentially dangerous substances or materials stored within temporary construction compounds will be carefully stored to ensure they could not cause any harm to badgers that may enter the compounds at night.

9.10.4.1.15. During construction, site speed limits of 15 mph will reduce the likelihood of accidental injury/killing of badger by construction traffic.

9.10.4.1.16. Pine Marten

9.10.4.1.17. Should any evidence of pine marten presence be found at any point during construction, field signs should be investigated by a suitably qualified ecologist and potential scats should be sent to an appropriate laboratory for identification. Subsequently the need for any further surveys or mitigation, such as timing of works to avoid disturbance should be determined.

9.10.4.1.18. During construction, site speed limits of 15 mph will reduce the likelihood of accidental injury/killing of pine marten by construction traffic.

9.10.4.1.19. Polecat

9.10.4.1.20. Should any evidence of polecat presence be found at any point during construction, field signs should be investigated by a suitably qualified ecologist and potential scats should be sent to an appropriate laboratory for identification. Subsequently the need
for any further surveys or mitigation, such as timing of works to avoid disturbance should be determined.

9.10.4.1.21. During construction, site speed limits of 15 mph will reduce the likelihood of accidental injury/killing of polecats by construction traffic.

9.10.4.1.22. **Red squirrel**

9.10.4.1.23. During construction site speed limits of 15 mph will reduce the likelihood of accidental injury/killing of red squirrels by construction traffic.

9.10.5. **Operation mitigation**

9.10.5.1. **Monitoring**

- The effects of wind farms on bats in the UK remain relatively poorly understood. Monitoring is therefore proposed as an enhancement to provide information on the effects of wind farms on bat activity. Monitoring for bats would commence during year one of wind farm operation and take place bi-annually thereafter until year five. The precise methodology will be agreed with CCW; however, the methodology is most likely to reflect the original survey work and will also include the monitoring and surveying of bat roosts within 1 km of the site, if appropriate. The survey methodology ultimately agreed, may also depend upon the outcome of the Defra commissioned, University of Exeter and BCT research project, on bats and wind turbines, which began in 2009, has been completed. This is an on-going project, gathering data on bat activity at wind farms in England, Scotland and Wales. This project has/is using a number of survey techniques to assess the effect of wind turbines on bat species. The results of the effectiveness of the monitoring techniques used will be taken into consideration, once the results have been published.

- Monitoring of the success of the mitigation measures for dormice employed during pre-development tree clearance is likely to form a condition of the WG licence. Monitoring is likely to involve as a minimum the continued monitoring of in situ dormouse boxes and tubes from the 2009 - 2011 surveys. Detailed monitoring proposals will form part of the application for a WG dormouse licence prior to construction (see Annex 9.13 Dormouse Habitat Suitability Assessment (2012)). Subject to agreement within the WG licence post construction monitoring for dormice would commence during year one of wind farm operation and take place annually for five years, with further monitoring in year 7 and year 10.

- Given the limited impacts resulting from the wind farm, dedicated monitoring of red squirrel populations within the Application Site is not considered appropriate, although monitoring will be undertaken as part of the ongoing programme of control of grey squirrels. All other sightings of red squirrel will also be recorded and results provided to local records centres and any other red squirrel monitoring programmes taking place.

- Habitat survey – During years 1-5 monitoring will consist of simple, qualitative condition assessments, undertaken on an on-going basis. This will provide regular information on the nature of change (both in terms of vegetation and other factors). The purpose of these assessments would be to rapidly inform on-going management, such that prescriptions can be altered quickly, if necessary. Detailed botanical monitoring will commence in year five of operation. In year five a survey will be undertaken covering the whole of the site. Methods will follow those used during the EIA, i.e. Phase 1 Habitat survey (JNCC, 2010) with NVC survey (Rodwell (ed), 1991)
in open habitats, to enable comparisons to be made with pre-construction data and further inform the need to review/amend management prescriptions. This survey will be repeated at five year intervals thereafter.

- Hydrological monitoring of bog restoration areas e.g. the monitoring of groundwater levels using dipwells, will be carried out in the areas where ditch blocking is proposed. The number and location of dipwells will be determined following ditch blocking but at this stage it is anticipated that dipwells will be installed at a density equivalent to one per hectare. Monitoring will take place annually during years 1-5 and thereafter every five years with the results used to determine whether the restoration has been successful and whether management prescriptions need to be reviewed/amended.

9.10.5.2. The results of all monitoring will be reported to the HMP stakeholder group and wider scientific community as appropriate.

9.11. Residual Significant Effects

9.11.1. Table 9.7, 9.8 and 9.9 present a summary of residual effects during pre-development tree clearance operations, construction and the operation of the Clocaenog Forest Wind Farm respectively. Each table takes into account the proposed mitigation measures outlined in Section 9.9 and summarised in Chapter 16 (Project Mitigation and Enhancement), for each of the ecological receptors for which significant impacts (positive and negative) were predicted in Section 9.8, or which could represent an offence according to relevant legislation. Impacts during the decommissioning phase are likely to be similar to those experienced during construction (albeit, in many cases on a smaller scale) and therefore a separate table covering decommissioning is not considered necessary.

9.12. Conclusion

9.12.1. Following the employment of a range of mitigation measures there will be potentially be one significant residual negative effect, on Nant Y Derwydd cLWS during the pre-development tree clearance. No further significant residual negative effects are likely with respect to flora and non avian fauna.

9.12.2. Significant positive effects have been predicted for dry acid heath, common lizard, adder, and small pearl bordered fritillary, where a change in management of c.193 ha of open land and the creation of open ‘over sail’ areas and open habitats along tracks will increase areas of suitable habitat for these habitats/species. A significant positive effect is predicted for blanket bog habitats as a result of the restoration of 25.4 ha of peat land habitat and enhancement of Gors y Wern.

9.12.3. No significant negative effect on red squirrel is predicted due to avoidance, as far as possible, of high and moderate suitability habitat during the Project design process. In addition a significant positive effect has been predicted for red squirrel through grey squirrel control. A significant positive effect is predicted for dormice due to the establishment of a linked area of suitably created and managed habitat and the funding of research into dormouse ecology within upland forests in Wales, using Clocaenog Forest as a case study.
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<tbody>
<tr>
<td>Nant Y Derwydd cLWS County (Denbeighshire &amp; Conwy)</td>
<td>Pre-development Tree clearance during forestry operations</td>
<td>Temporary Negative</td>
<td>Significant</td>
<td>All pre-development tree clearance will follow standard FCW practices and the UK Forestry Standard</td>
<td>Significant</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Rationale: No citation information is available but given the limited size (0.7ha) of the site and its linear nature trackside tree clearance could have a significant impact on the site. Confidence in prediction: Uncertain</td>
<td></td>
<td>Confidence in this prediction: Uncertain</td>
</tr>
<tr>
<td>Dry acid heath County (Denbeighshire &amp; Conwy)</td>
<td>Pre-development tree clearance of c.22.6ha of woodland for heathland/ black gouse mitigation</td>
<td>Permanent Positive</td>
<td>Significant</td>
<td>N/a</td>
<td>Significant Positive</td>
</tr>
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<td></td>
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<td>Rationale: The management of c.22.6ha will ensure heathland habitat is established</td>
<td></td>
<td>Confidence in this prediction: Near certain</td>
</tr>
<tr>
<td>County (Denbighshire &amp; Conwy)</td>
<td>Pre-development tree clearance of 222 ha of forest with 76 ha of open area not subject to restocking.</td>
<td>Permanent Positive</td>
<td>Significant</td>
<td>N/a</td>
<td>Significant Positive</td>
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<td></td>
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<td></td>
<td>Rationale: Heath habitats has potential to expand into deforested areas such as turbine demised areas and widened track corridors</td>
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<td>Confidence in prediction: Probable</td>
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<tr>
<td>Common lizard and adder</td>
<td>Local and Partially protected under Wildlife and Countryside Act 1981</td>
<td>Inadvertent killing or injuring of individual animals during forestry operations</td>
<td>Temporary Negative (in population terms)</td>
<td>Not significant but could represent an offence under the legislation</td>
<td>Works undertaken in accordance with UK Forestry Standard with habitat manipulation of suitable open areas under the guidance of FCW Conservation Manager to reduce impacts.</td>
</tr>
<tr>
<td>Local and Partially protected under Wildlife and Countryside Act 1981</td>
<td>Pre-development tree clearance of 222 ha of forest with 76 ha of open area not subject to restocking.</td>
<td>Permanent Positive</td>
<td>Significant</td>
<td>Rationale: Open habitats in deforested areas such as turbine demised areas and widened track corridors will offer suitable reptile habitat</td>
<td>N/a</td>
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<tr>
<td>Otter</td>
<td>Less than local but Protected under Wildlife and Countryside Act and Conservation of Habitats and Species (Amendment) Regs. 2012</td>
<td>Disturbance to resting places (if present) during forestry operations</td>
<td>Temporary Negative</td>
<td>Not significant but could represent an offence under the legislation</td>
<td>All pre-development tree clearance within 50m of water courses would follow FCW procedures for otter</td>
</tr>
<tr>
<td>Otter</td>
<td>Less than local but Protected under Wildlife and Countryside Act and Conservation of Habitats and Species (Amendment) Regs. 2012</td>
<td>Negative impacts on water quality in surrounding watercourses during modification of stream crossings or due to accidental spillage of chemicals or other pollutants</td>
<td>Temporary Negative</td>
<td>Significant</td>
<td>All pre-development tree clearance will follow relevant UK Forestry Guidelines and FCW standard guidelines to prevent impacts on water quality.</td>
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<tr>
<td>Badger</td>
<td>Less than local but Protected under Protection of Badgers Act 1992</td>
<td>Disturbance to setts during forestry operations (if setts are present).</td>
<td>Temporary Negative</td>
<td>Not significant but could represent an offence under the legislation</td>
<td>Works undertaken in accordance with standard Forestry Commission guidelines to redesign pre-development tree clearance to reduce impacts; or if not possible a licence would be gained from the relevant authority.</td>
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<td>Rationale: no known setts, disturbance only temporary and likely to impact upon small numbers of animals</td>
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<td>Confidence in prediction: Probable</td>
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<tr>
<td>Pine Marten</td>
<td>Less than local but Protected under Wildlife and Countryside Act</td>
<td>Disturbance and/or inadvertent killing of individual animals during forestry operations</td>
<td>Temporary Negative (in population terms)</td>
<td>Not significant but could represent an offence under the legislation</td>
<td>Where any possible evidence of pine marten presence is found in the Application Site, field signs would be investigated and potential scats would be sent for identification. Subsequently the need for any for further surveys or mitigation, such as timing of works to avoid disturbance would be determined.</td>
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<td></td>
<td>Rationale: no evidence currently that pine marten are present within the Application Site. If present only likely to be in small numbers</td>
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<td>Confidence in prediction: Probable</td>
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<tr>
<td>Polecat</td>
<td>Less than local but Protected under Wildlife and Countryside Act</td>
<td>Disturbance and/or inadvertent killing of individual animals during forestry operations</td>
<td>Temporary Negative (in population terms)</td>
<td>Not significant but could represent an offence under the legislation</td>
<td>Where any possible evidence of polecat presence is found in the Application Site, field signs would be investigated and potential scats would be sent for identification. Subsequently the need for any for further surveys or mitigation, such as timing of works to avoid disturbance would be determined.</td>
</tr>
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<td>Rationale: a single polecat record suggests that they are present within the Application Site. However due to sub optimal habitat they are only likely to be present in small numbers</td>
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<td>Confidence in prediction: Probable</td>
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</table>
| Dormouse | County (Denbighshire and Conwy) and Protected under the Wildlife and Countryside Act and Conservation of Habitats and Species (Amendment) Regs. 2012 | Disturbance and/or inadvertent killing of individual animals during forestry operations | Temporary Negative (in population terms) | Significant and could represent an offence under the legislation  
Rationale: Breeding, resting and hibernation sites likely to be widely distributed. Dormice unable to move around forest quickly leading to possible loss of small numbers of animals via forest operations (Pre-development tree clearance)  
Confidence in prediction: Probable | All pre-development tree clearance in suitable habitat would follow FCW procedures for dormice and be carried out under a WG licence where necessary. | Not significant  
Confidence in prediction: Probable |
| County (Denbighshire and Conwy) and Protected under the Wildlife and Countryside Act and Conservation of Habitats and Species (Amendment) Regs. 2012 | Establishment of 16.7 ha of suitable dormouse habitat to replace 13.8 ha lost as a result of pre-development tree clearance | Permanent positive | Significant  
Rationale: Linked network of suitable dormouse habitat established within the south of the site that will be positively managed and retained for dormice  
Confidence in prediction: Probable. | N/a | Significant Positive  
Confidence in prediction: Probable |
|---------------|-----------------------------------------------|---------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Red squirrel  | National (i.e. Wales) and Protected under Wildlife and Countryside Act | Disturbance and/or inadvertent killing of individual animals during forestry operations | Permanent negative         | Significant and could represent an offence under the legislation  
Rationale: Possible killing of small numbers of red squirrel in an already declining population  
Confidence in prediction: Probable                                                                                                                                                                                                                                           | Pre-tree clearance check for red squirrel dreys and subsequent timing of forestry operations where red squirrel dreys are present | Not significant  
Confidence in prediction: Probable                                                                                          |
## Table 9.8 Summary of Residual Effects - Construction

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<tr>
<td>Blanket Bog County</td>
<td>Restoration of up to 25.4 ha of peatland habitat and enhancement of Gors y Wern to mitigate for loss of peat.</td>
<td>Permanent Positive</td>
<td>Significant</td>
<td>N/a.</td>
<td>Significant Positive</td>
<td>Significant Positive Confidence in prediction: Near certain</td>
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</tr>
<tr>
<td>Common lizard and adder</td>
<td>Local and Partially protected under Wildlife and Countryside Act 1981</td>
<td>Inadvertent killing or injuring of individual animals during construction in open habitats</td>
<td>Temporary Negative (in population terms)</td>
<td>Not significant but could represent an offence under the legislation</td>
<td>Habitat manipulation of suitable open areas under the guidance of Ecological Clerk of Works to reduce impacts. Removal of refugia and hibernacula by an Ecological Clerk of Works</td>
<td>Not significant Confidence in prediction: Certain/near certain</td>
</tr>
<tr>
<td>Otter</td>
<td>Less than local but Protected under Wildlife and Countryside Act and Conservation of Habitats and Species (Amendment) Regs. 2012</td>
<td>Disturbance to resting places (if present) during construction/upgrade of stream crossings</td>
<td>Temporary Negative</td>
<td>Not significant but could represent an offence under the legislation</td>
<td>Pre-construction survey. Crossings micro-sited if possible. If micro-siting not possible WG licence will be agreed to include suitable mitigation</td>
<td>Not Significant Confidence in prediction: Certain/near certain</td>
</tr>
<tr>
<td>Less than local but Protected under Wildlife and Countryside Act and Conservation of Habitats and Species (Amendment) Regs. 2012</td>
<td>Negative impacts on water quality in surrounding water courses during modification of stream crossings or due to accidental spillage of chemicals or other pollutants</td>
<td>Temporary Negative</td>
<td>Significant</td>
<td>Use of appropriate sediment control measures; monitoring; use of best practice techniques for soil storage; use of temporary bunding if required; damming water courses so that track crossings can be installed in dry conditions; development of a pollution prevention and emergency response plan; and adoption of relevant Environment Agency PPGs</td>
<td>Not Significant Confidence in prediction: Probable</td>
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<tr>
<td>Less than local but Protected under Wildlife and Countryside Act and Conservation of Habitat and Species (Amendment) Regs. 2012</td>
<td>Killing or injury to individual otters entering construction areas</td>
<td>Temporary (in population terms) Negative</td>
<td>Not Significant but could represent an offence under the legislation</td>
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<td>Rationale: Otters are inquisitive and will enter construction areas where close to water courses where they could be harmed e.g. becoming trapped in excavations, ingesting dangerous chemicals, etc.</td>
<td>Confusion in prediction: Near certain</td>
<td>Careful storage of dangerous substances and materials at temporary compounds</td>
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<td></td>
<td>Ramped excavations to allow egress</td>
<td>Site speed limit of 15mph</td>
<td>Not Significant in prediction: Certain/near certain</td>
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</tr>
<tr>
<td>Water vole</td>
<td>Local and Protected under Wildlife and Countryside Act 1981</td>
<td>Disturbance water voles and burrows during construction / upgrading of stream crossings</td>
<td>Temporary Negative</td>
<td>Not Significant but could represent an offence under the legislation</td>
<td>Pre-construction survey. Crossings micro-sited if possible. If micro-siting not possible, mitigation agreed based on temporary exclusion method</td>
<td>Not Significant</td>
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<td>Confidence in prediction: Probable</td>
</tr>
<tr>
<td>Badger</td>
<td>Less than local but Protection under the Protection of Badgers Act 1992</td>
<td>Disturbance to setts during construction</td>
<td>Temporary Negative</td>
<td>Not Significant but could represent an offence under the legislation</td>
<td>Pre-construction survey. Wind farm infrastructure micro-sited if possible. If micro-siting not possible, mitigation agreed and licence obtained from relevant authority if necessary. Mitigation likely to be include timing of work to avoid sensitive periods, etc.</td>
<td>Not Significant</td>
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<td>Confidence in prediction: near certain</td>
</tr>
<tr>
<td>Less than local but Protection under the Protection of Badgers Act 1992</td>
<td>Killing or injury to individual badgers entering construction areas</td>
<td>Temporary (in population terms) Negative</td>
<td>Not Significant but could represent an offence under the legislation</td>
<td>All excavations to be covered or ramped. Careful storage of dangerous substances and materials at temporary compounds Site speed limit of 15mph</td>
<td>Not significant</td>
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<td>Confidence in prediction: near certain</td>
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### Chapter 9: Non-Avian Ecology

#### Receptor

|---------------|-----------------------------------------|----------------------------------------------------------------|------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------|
| Pine Marten   | Less than local but Protected under Wildlife and Countryside Act | Disturbance and/or inadvertent killing of individual animals during construction operations | Temporary Negative (in population terms) | Not significant but could represent an offence under the legislation  
  **Rationale:** no evidence currently that pine marten are present within the Application Site. If present only likely to be in small numbers  
  **Confidence in prediction:** Probable | Where any possible evidence of pine marten presence is found in the Application Site, field signs should be investigated and potential scats should be sent for identification. Subsequently the need for any for further surveys or mitigation, such as timing of works to avoid disturbance should be determined.  
  Site speed limit of 15mph | Not Significant  
  **Confidence in prediction:** Probable |
| Polecat       | Less than local but Protected under Wildlife and Countryside Act | Disturbance and/or inadvertent killing of individual animals during construction operations | Temporary Negative (in population terms) | Not significant but could represent an offence under the legislation  
  **Rationale:** a single polecat record suggests that they are present within the Application Site. However due to sub optimal habitat they are only likely to be present in small numbers  
  **Confidence in prediction:** Probable | Where any possible evidence of polecat presence is found in the Application Site, field signs should be investigated and potential scats should be sent for identification. Subsequently the need for any for further surveys or mitigation, such as timing of works to avoid disturbance should be determined.  
  Site speed limit of 15mph | Not Significant  
  **Confidence in prediction:** Probable |
| Red squirrel  | National (i.e. Wales)  
  Protected under Wildlife and Countryside Act | Disturbance and/or inadvertent killing of individual animals during construction operations | Temporary negative | Significant and could represent an offence under the legislation  
  **Rationale:** Potential for killing/injury greatest during forestry operations.  
  **Confidence in prediction:** Probable | Site speed limit of 15mph | Not significant  
  **Confidence in prediction:** Near certain |
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</thead>
<tbody>
<tr>
<td>National (i.e. Wales) Protected under Wildlife and Countryside Act</td>
<td>Contribution to on-going grey squirrel control</td>
<td>Permanent positive</td>
<td>Significant</td>
<td>N/A</td>
<td>Significant</td>
<td>Confidence in prediction: Probable</td>
</tr>
</tbody>
</table>
### Table 9.9 Summary of Residual Effects – Operation

|---------------------------|------------------|------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------|-------------------------------|---------------------------------|
| Dry acid heath County (Denbighshire & Conwy) | Control of self-sown trees and instigation of grazing management of c189ha | Permanent Positive | Significant  
Rationale: Heath habitats which may otherwise have declined over time due to a lack of management  
Confidence in prediction: Near certain. | N/A | Significant Positive  
Confidence in prediction: Near certain. |
<table>
<thead>
<tr>
<th>Receptor</th>
<th>Value/Importance</th>
<th>Activity/Source of Impact</th>
<th>Nature of Impact on Receptor</th>
<th>Significance of Impact (in the Absence of Mitigation Measures)</th>
<th>Proposed Compensation Measures</th>
<th>Mitigation/Residual Significance</th>
<th>Confidence in prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common lizard and adder</td>
<td>Local and Partially protected under Wildlife and Countryside Act 1981</td>
<td>Control of self-sown trees and instigation of grazing management of c189ha and the creation of open areas under turbine over sail areas.</td>
<td>Permanent positive</td>
<td>Significant</td>
<td>N/A</td>
<td>Significant Positive</td>
<td>Near certain</td>
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<td>Rationale: Heath habitats which may otherwise have declined over time due to a lack of management will be maintained providing permanent open habitat</td>
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<td></td>
<td>Confidence in prediction: Near certain</td>
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<tr>
<td>Dormice</td>
<td>County (Denbighshire and Conwy) protected under the Wildlife and Countryside Act and Conservation of Habitat and Species (Amendment) Regs. 2010</td>
<td>Funding of PhD studentship to undertake research into specific aspects of dormouse ecology</td>
<td>Permanent positive</td>
<td>Significant</td>
<td>N/A</td>
<td>Significant Positive</td>
<td>Probable</td>
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<td>Rationale: Research will enable better understanding of dormouse ecology in forest and provide additional enhancement</td>
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<td>Confidence in prediction: Probable</td>
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<tr>
<td>Small pearl bordered</td>
<td>County (Denbighshire and Conwy)</td>
<td>Control of self-sown trees and instigation of grazing management of c189ha</td>
<td>Permanent Positive</td>
<td>Significant</td>
<td>N/A</td>
<td>Significant Positive</td>
<td>Probable</td>
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<tr>
<td></td>
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<td>Rationale: Heath habitats which may otherwise have declined over time due to a lack of management will be maintained providing permanent open habitat</td>
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<td>Confidence in prediction: Probable</td>
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