

7 Ecology and Nature Conservation

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7 Ecology and Nature Conservation

7.1 Executive Summary

- 7.1.1 This chapter provides an assessment of the potential effects associated with the Revised Development on ecological resources present, utilising baseline data obtained for the Consented Development and results gathered during update surveys in 2017.
- 7.1.2 The Revised Development is based on a 13 turbine layout with a maximum tip height of 149.9 m (compared to a 15 turbine layout with a maximum tip height of 131 m for the Consented Development). The Revised Development turbine layout is similar to that of the Consented Development across the northern half of the Revised Development site, although now extends further south, with turbines T10 to T13 located south of previous turbine locations.
- 7.1.3 The main changes in assessment associated with the Revised Development relate to: changes in the area of habitat loss due to infrastructure; distance of infrastructure to protected species' features; and advised stand-off distances of turbines from woodland, as mitigation for bats, due to change in turbine height. In general, conditions have remained similar to those recorded during the baseline period for the Consented Development, and so the ecological receptors taken forward to assessment have remained consistent. These are: North Atlantic Wet Heath (an Annex I habitat) and bats.
- 7.1.4 All changes associated with the Revised Development compared to the Consented Development are considered to be minimal, and so the evaluation of significance on each receptor has remained unchanged. As with the Consented Development, no significant effects are predicted for any ecological receptor.

7.2 Introduction

- 7.2.1 This chapter evaluates the effects of the Revised Development on the ecological resources present within and around the Revised Development site. Effects on birds are addressed separately in Chapter 8: Ornithology of this Environmental Statement (ES).
- 7.2.2 This chapter utilises baseline data gathered for, and presented and assessed in the Ecology and Nature Conservation ES chapter of the 2015 Application (for the Consented Development) by 3R Energy Solutions Ltd (Planning Reference: CL/15/0273). The Consented Development site boundary shares the same site boundary as the Revised Development (Figure 7.1). The desk study, initial consultation and baseline surveys were conducted by Dunnock Environmental Services in 2014 and 2015. Reports detailing this work are provided in the associated appendices (as outlined below).
- 7.2.3 A Supplementary Environmental Information (SEI) report for Douglas West and Dalquhandy DP Renewable Energy Project was submitted in September 2015, and an updated ecology assessment accompanied a Non-Material Variation submission (ref. CL/15/0273/01) in March 2016 to increase the tip height to 131m and rotor size to 113m. Information pertinent to the Revised Development from these earlier submissions has also been considered here. MacArthur Green conducted the baseline surveys for bats in 2014 for the ES, and in 2015 for the SEI. Protected species surveys to update/validate previous results were also conducted by MacArthur Green in 2017.
- 7.2.4 Ecological surveys were carried out on the site of the Revised Development during 2009 and 2010 on behalf of Community Windpower Ltd, the previous developers of this project. Under the control of Community Windpower Ltd the project was referred to as the proposed Douglas West Community Wind Farm (DWCW). Following initial baseline surveys, Community Windpower Ltd issued a Scoping Report in March 2012 which set out the scope of the proposed Environmental Impact Assessment (EIA) to be undertaken for the project (Community Windpower, Douglas West Scoping Report, dated March 2012 – see Table 7.1 for further details). This report was issued to SLC, Scottish Natural Heritage (SNH) and other stakeholders. No planning submission was subsequently made for the project by Community Windpower Ltd, but the ecology survey data have been made

available to the Applicant for consideration here. This will complement the baseline survey results obtained during 2014, 2015 and 2017 for the Revised Development, as agreed with SNH (Table 7.1). A review of published ecological survey data for neighbouring wind farm developments, the survey buffers of which cover parts of the Revised Development site, has also been undertaken.

- 7.2.5 This ES chapter and proposed management plans have been written by MacArthur Green and consider information and data provided by Dunnock Environmental Services, Starling Learning and MacArthur Green.
- 7.2.6 The Revised Development is described in full within Chapter 3: Revised Development. In order to determine the potential ecological effects of the Revised Development, this chapter:
- describes the current ecological condition of the site;
 - identifies the potential for ecological effects and the potential for mitigation of these effects; and,
 - assesses the residual effects remaining after mitigation has been implemented.
- 7.2.7 This chapter is supported by the following appendices (author company provided in parenthesis):
- 7.1 2014 Habitat Survey [Dunnock Environmental Services];
 - 7.2 2014/2015 Otter and Water Vole Survey [Dunnock Environmental Services];
 - 7.3 Great Crested Newt Habitat Suitability Assessment 2014 [Dunnock Environmental Services];
 - 7.4 Great Crested Newt eDNA & Presence/Absence Surveys 2015 [Dunnock Environmental Services];
 - 7.5 2014 Badger Survey [Dunnock Environmental Services];
 - 7.6 Bat Survey Report [MacArthur Green];
 - 7.7 Fisheries Habitat and Fish Fauna Surveys July 2012 [Eco Fish Consultants];
 - 7.8 Outline Habitat Management Plan [MacArthur Green];
 - 7.9 Draft Species Protection Plan [MacArthur Green];
 - Confidential Annex C.1: 2014/2015 Otter Survey Results [Dunnock Environmental Services];
 - Confidential Annex C.2: 2014 Badger Survey Results [Dunnock Environmental Services]; and
 - Confidential Annex C.3: Protected Species Survey Results 2017 [MacArthur Green]
- 7.2.8 Figures 7.1 to 7.10 and Confidential Figures C7.1 to C7.4 are referenced in the text where relevant. These figures have been updated to include all up to date and relevant information pertinent to the Revised Development and therefore vary slightly from those provided within the Dunnock Environmental Services Appendices 7.1 to 7.5 and Confidential Annexes C.1 and C.2.
- 7.2.9 For the purposes of this chapter, the definitions used are detailed below for ease of reference:
- The 'Revised Development' refers to the Douglas West Wind Farm in general. This comprises 13 wind turbines, access tracks, hardstanding, foundations, construction compounds, substation and met mast (see Figure 7.2 for details). All components of the Revised Development are included in the scope of this impact assessment.
 - The 'site' - this is the area within which all infrastructure associated with the Revised Development shall be contained (including the access tracks), equating to the area within the Planning Application Boundary (Figure 7.1).
 - The 'Study Area' – in general this equates to the Planning Application Boundary (Figure 7.1). Depending on type of survey (e.g. habitats, protected species), the Study Area has an additional

buffer to record any receptors that may be influenced by the presence of the Revised Development. In this regard, it should be noted that the site boundary has been reduced (refer to Chapter 2) since some of the initial surveys were commissioned in 2014, therefore, the earlier surveys covered a larger area as identified in the relevant appendices.

7.3 Legislation, Policy and Guidelines

7.3.1 This section summarises the legislation, policy and guidance considered as part of the assessment.

Legislation

7.3.2 Relevant legislation has been reviewed and taken into account as part of this ecological assessment. Of particular relevance are:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (“Habitats Directive”);
- Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (“Water Framework Directive”);
- Environmental Impact Assessment Directive 2011/91/EU;
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011;
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS);
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011;
- The Wildlife and Countryside Act 1981 (as amended);
- Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (‘The Habitats Regulations’); and
- The Protection of Badgers Act 1992.

Planning Policy

7.3.3 This section summarises the policies directly relevant to this Ecology chapter. Refer to Chapter 5 of this ES for detailed planning policies relevant to the Revised Development.

UK Post-2010 Biodiversity Framework (2012)

7.3.4 The Framework (JNCC and Defra, 2012) aims to set a broad enabling structure for action across the UK between 2011 and 2020 for conservation of biodiversity. It supersedes the UK Biodiversity Action Plan (UK BAP) which was in response to the Convention on Biological Diversity (CBD) signed in 1992. The Convention called for the development and enforcement of national strategies and associated action plans to identify, conserve and protect existing biological diversity, and to enhance it wherever possible. Action plans and species information provided in the UK BAP can still be used.

Scottish Biodiversity Strategy: It’s in Your Hands (2004)/2020 Challenge for Scotland’s Biodiversity (2013)

7.3.5 This Scottish Biodiversity Strategy sets out how the Scottish Government will conserve biodiversity for the health, enjoyment and wellbeing of the people of Scotland now and in the future. This has

been supplemented by '2020 Challenge for Scotland's Biodiversity' in response to the UK Post-2010 Biodiversity Framework.

South Lanarkshire Biodiversity Strategy 2010

- 7.3.6 The Biodiversity Strategy sets out the long and medium term aims of the Local Biodiversity Action Plan (LBAP) and identifies measures and actions which can deliver biodiversity gains over a longer timescale than a more traditional LBAP. The Strategy also sets the strategic policy framework for the associated, stand-alone Biodiversity Action Plan. The Strategy includes a compilation of projects and programmes taking place across South Lanarkshire which are contributing towards the delivery of the aims outlined in the Strategy. This Plan details the habitats deemed as important at a local level and receiving dedicated plans for their conservation as a result. The Strategy does not contain particular species of importance but considers that all species which are viewed as a priority nationally are considered to be a priority locally.

Scottish Planning Policy

- 7.3.7 SPP was published in June 2014 and sets out national planning policies which reflect Scottish Ministers' priorities for operation of the planning system and for the development and use of land. Under the subject policy "Valuing the Natural Environment" it states that, "*the presence (or potential presence) of a legally protected species is an important consideration in decisions on planning applications. The level of protection afforded by legislation must be factored into the planning and design of development and any impacts must be fully considered prior to the determination of an application*".

South Lanarkshire Local Development Plan (2015)

- Policy 2, Climate Change. Proposals for new development must, where possible, seek to minimise and mitigate against the effects of climate change by, among other aspects, having no significant adverse impacts on the water and soils environment, air quality, biodiversity (including Natura 2000 sites and protected species) and green networks;
- Policy 4, Development management and placemaking. When assessing development proposals, the Council will ensure that there is no significant adverse impact on landscape character, built heritage, habitats or species including Natura 2000 sites, biodiversity and Protected Species nor on amenity as a result of light, noise, odours, dust or particulates;
- Policy 14 Green network and greenspace. Any development proposals should safeguard the local green network, identified on the proposals map, and identify opportunities for enhancement and/or extension which can contribute towards mitigating greenhouse gases and supporting biodiversity. Partial loss of priority greenspace will only be considered where it can be demonstrated that there is no significant adverse impact on natural and/or built heritage resources, including Natura 2000 sites and Protected Species; or compensatory provision of at least equal quality and accessibility is provided locally.
- Policy 15 Natural and historic environment. The Council will seek to protect important natural and historic sites and features from adverse impacts resulting from development, including cumulative impacts. This includes development which could affect Category 1 Natura 2000 sites which will only be permitted where an appropriate assessment of the proposal demonstrates that it will not adversely affect the integrity of the site following the implementation of any mitigation measures. In Category 2 areas, development will be permitted where the objectives of the designation and the overall integrity of the area can be shown not to be compromised following the implementation of any mitigation measures. Development which will have an adverse effect on protected species following the implementation of any mitigation measures will not be permitted unless it can be justified in accordance with the relevant protected species legislation.

- Policy 19 Renewable Energy. Applications for renewable energy infrastructure developments will be supported subject to an assessment against the principles set out in the 2014 Scottish Planning Policy.

Guidance

7.3.8 The following guidance documents are considered as part of this assessment:

- Policy Advice Note PAN 1/2013 - Environmental Impact Assessment (Scottish Executive 2013);
- Planning Circular 3 2011: The Town & Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011;
- JNCC (2013) Guidelines for the Selection of Biological Sites of Special Scientific Interest (SSSIs);
- CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.
- Joint Nature Conservation Committee (2010) Handbook for Phase 1 Habitat Survey – a technique for environmental audit. JNCC;
- Rose, F. (2006) A Wild Flower Key, for the British Isles and North West Europe. Warne, London;
- Stace, C. (2010) New Flora of the British Isles (3rd Edition), Cambridge University Press;
- English Nature (2001) Great Crested Newt Mitigation Guidelines. August 2001.
- Gent, T. and Gibson, S. (2003) Herpetofauna Workers' Manual. JNCC.
- Hundt, L. (2012) Bat Surveys – Good Practice Guidelines 2nd Edition: Surveying for Onshore Windfarms. Bat Conservation Trust;
- Natural England (2014a) Natural England Technical Information Note TIN 051. Bats and Onshore Wind turbines – Interim Guidance – Third Edition;
- Natural England (2014b) EPS Mitigation Licensing: Latest Developments. Natural England EPS Newsletter, April 2014.
- Gurnell, J., Lurz, P. McDonald, R. & Pepper, H. (2009) Practical Techniques for Surveying and Monitoring Squirrels. Forestry Commission Practice Note, October 2009.
- SEPA (2014) Guidance Note 4 – Planning Guidance on On-shore Windfarm Developments;
- Reynolds, P. and Harris, M. (2005) Inverness Badger Survey 2003. Scottish Natural Heritage, Commissioned Report No. 096 (ROAME No. F02LE01);
- Sargent, G. and Morris, P. (2003) How to Find and Identify Mammals. The Mammal Society, London;
- Croose, E., Birks, J.D.S. & Schofield, H.W. 2013. Expansion zone survey of pine marten (*Martes martes*) distribution in Scotland. Scottish Natural Heritage Commissioned Report No. 520.
- Strachan, R., Moorhouse, T. and Gelling, M. (2011) The Water Vole Conservation Handbook. Third Edition, Wildlife Conservation Research Unit, Department of Zoology, University of Oxford;
- Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), Historic Scotland (2015). Good Practice During Windfarm Construction (3rd Edition).

- Scottish Government (2001) European Protected Species, Development Sites and the Planning System: Interim guidance for local authorities on licensing arrangements;
- Scottish Natural Heritage (March 2012) Assessing the cumulative impact of onshore wind energy developments; and
- Scottish Natural Heritage (2013) Planning for Development: What to consider and include in Habitat Management Plans.

7.4 Consultation

7.4.1 A consultation exercise was undertaken as part of the EIA process. Those organisations relevant to this chapter who were consulted are as follows:

- South Lanarkshire Council (SLC);
- Scottish Natural Heritage (SNH);
- Scottish Environment Protection Agency (SEPA);
- Scottish Badgers; and
- Clyde Bat Group.

7.4.2 Table 7.1 summarises the information or comments received from these organisations. The table also details where these have been addressed in the design of the Revised Development and assessment process (where relevant). It should be noted that Table 7.1 is not exhaustive and duplicated comments have not been included.

Table 7.1 – Findings of the Consultation Exercise for the Revised Development

Consultee	Comments	Where/How this is Addressed
SNH 23 May 2012	Surveys need to be conducted for European Protected Species (EPS) that may be present on the site; specifically, otter, bats and great crested newt (GCN).	Surveys for these species were undertaken. Section 7.5 of this chapter describes the methods and results of the surveys.
	Water vole, badger and red squirrels should also be considered (although SNH accept that red squirrels can be scoped out due to lack of woodland habitat within the site).	Survey and results for water voles are provided in Appendix 7.2 and Confidential Annex C.3. Methods for the badger survey are provided in Appendix 7.5 and results can be found in Confidential Annexes C.2 and C.3. Red squirrels are considered in Section 7.5 of this chapter.
	An assessment of how the Revised Development would affect deer movements and use of the site (during construction and operation), plus a fit for purpose deer management plan (DMP) should be included as part of the submission.	There is no existing deer management covering the site. Due to the very low numbers of deer known to be using the site and the relatively small area of development in comparison to the home ranges of deer, a Deer

Consultee	Comments	Where/How this is Addressed
		Management Plan is not considered necessary for the Revised Development.
SNH 23 May 2012 & SEPA 09 May 2012	Any nationally or internationally important habitats should be mapped to National Vegetation Classification (NVC) level. Any nationally or internationally important plant species should be identified and their locations avoided during the construction phase. Where this is not possible mitigation and restoration/enhancement measures should be described in the ES.	Habitat surveys are described in Appendix 7.1 and the results are shown on Figures 7.2 and 7.3 for Phase 1 and NVC respectively.
SNH Interim Response 21 August 2015	<i>“Great Crested Newts: SNH are satisfied with the survey approach and the interpretation of the findings. ... We agree with the results and can confirm that Great Crested Newts are not likely to be present on the development site.”</i>	No action required.
	<i>“Otters: The survey results show that the abundance of water features across the site has proven very attractive to otters (and their prey species). The recorded presence of the holt is of particular note and will require special measures to be put in place. ... we recommend that a fresh field survey is carried out shortly before the commencement of construction work. An Otter Management Plan should form a key component of the finalised Species Protection Plan.”</i>	Surveys for otter (and other protected species) will be conducted within six months of construction commencement to provide an update to the baseline conditions (as outlined in the Species Protection Plan, SPP – Appendix 7.9). Measures to protect otters and their resting areas are provided within the SPP. The SPP will be updated with more specific information relating to protection of holts (if required) and finalised following the pre-commencement surveys and agreed with SLC in consultation with SNH prior to construction commencement.
	<i>“Badgers¹: ...The EIA recommends measures to reduce the potential for impacts and ... Careful consideration of the need for a licence will be required</i>	Surveys for badger (and other protected species) will be conducted within six months of construction commencement to

¹ Confidential information relating to the location of badgers has been removed from this excerpt.

Consultee	Comments	Where/How this is Addressed
	<p><i>when the micro-siting ... has been finalised. We recommend that a pre-construction survey should be carried out ... We also recommend that the precautionary measures outlined Annex C.2 of the Environmental Statement are included in a Badger Management Plan as a key component of the finalised Species Protection Plan."</i></p>	<p>provide an update to the baseline conditions (as outlined in the SPP).</p> <p>The SPP will be updated and finalised following the pre-commencement surveys, and agreed with SLC in consultation with SNH prior to construction commencement.</p>
	<p><i>"Outline Habitat Management Plan (OHMP): We support the general approach to habitat management set out in the submitted outline plan. The use of grazing livestock as a management tool will enhance the long term sustainability of the management measures."</i></p>	<p>No action required.</p>
	<p><i>"Draft Species Protection Plan: ...It is recommended that the SPP includes specific protection measures for the EPS that have been recorded as being present on the site. It is also recommended that there is a section which clearly sets out measures and actions to minimise the impacts on badgers."</i></p>	<p>As stated above, the SPP will be updated and finalised following the pre-commencement surveys, and will be agreed with SLC in consultation with SNH prior to construction commencement.</p>
<p>SNH Email response to project update 12 May 2017</p>	<p>The approach set out [in an email dated 11 May 2017] will provide an adequate basis for the assessment of the potential impacts on the ecological interests at the site.</p>	<p>Noted. Protected species surveys were carried out in 2017 as planned (see Figures C7.3 and C7.4). No further surveys deemed necessary.</p>
<p>SEPA 09 May 2012</p>	<p>Groundwater dependent terrestrial ecosystems (GWDTEs) are specifically protected under the Water Framework Directive. The results of the NVC survey should be used to identify if wetlands are GWDTEs.</p>	<p>Figure 7.4 highlights the habitats classed as potential GWDTEs (under SEPA 2014a and 2014b guidance).</p>
	<p>If infrastructure cannot be relocated outwith the recommended buffer zones of GWDTEs then the likely impact on them will require further assessment. The results of this assessment and necessary mitigation measures should be included in the ES.</p>	<p>Assessment and mitigation associated with GWDTEs are detailed in the relevant sections of this chapter.</p>

Consultee	Comments	Where/How this is Addressed
SEPA 13 August 2015	Further information to be provided in relation to hydrology and geology for the Ground Water Dependent Terrestrial Ecosystem (GWDTE) assessment. Additional information in relation to the GWDTE assessment provided (via e-mail) to SEPA on 24 August 2015.	The additional information provided satisfied SEPA in that <i>“the applicant has fully addressed our previous concerns with regard to the potential impacts to areas of GWDTE at the proposed site”</i> . Letter received from Brian Fotheringham, dated 28 August 2015.
Scottish Badgers 15 January 2015	Request for badger records within the site plus a 2 km buffer.	Data received. Discussed in Confidential Annex C.2.
Clyde Bat Group 16 April 2015	Request for bat records within 10 km grid square that the site falls within.	No response received.

7.5 Assessment Methodology and Significance Criteria

Baseline Characterisation

Survey Areas

- 7.5.1 The area within which the surveys were undertaken varies between survey methods (e.g. the otter survey extends outwith the site by a distance of up to 250 m). Details of the extent of each survey are described in the relevant sections in the associated appendices.

Desk Study

- 7.5.2 A desk study was undertaken to collate available ecological information in relation to the site and surrounding environment. This comprised a thorough search of available online datasets, such as SNH’s SiteLink website and the Scottish Bat Atlas and requests for ecological datasets (as detailed in Table 7.1). Given the geographical range of species identified in this chapter (e.g. maximum 2 km for otter, or hydrological connectivity for fish), the desk study searched for ecological records within 5 km of the site boundary (refer to Figure 7.1) (designated sites with ornithological interests within 20 km are considered in Chapter 8).

Field Surveys

- 7.5.3 The following field surveys were undertaken for the Revised Development:

- Habitat Survey (Phase 1 and NVC of wetlands);
- GCN Habitat Suitability Index (HSI) Assessment;
- GCN eDNA (presence/absence) survey;
- Badger Survey;
- Otter Survey;
- Water Vole Survey;

- Fish Habitat and Fauna Surveys;
- Bat Habitat Assessment & Activity Survey; and
- Bat Roost Assessment.

7.5.4 The habitat, GCN HSI, badger, otter and water vole surveys were undertaken in 2014 (updated badger, otter and water vole surveys were conducted in 2017). The GCN eDNA testing and a second water vole survey were conducted in April and May 2015. The bat activity surveys started in September 2014 and continued to September 2015. Fish habitat and fish fauna surveys of all main watercourses on site were undertaken in 2012. The surveys concluded that the Study Area was of low value for fish species, therefore, no additional surveys have been undertaken. The full suite of survey methods and results is provided within Appendices 7.1 to 7.7 and Confidential Annexes C.1 to C.3.

Method of Assessment

7.5.5 The assessment method follows the process set out in The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (referred to as the 'EIA Regulations') and guidance on the implementation of the EU Habitats Directive.

7.5.6 The evaluation for wider countryside interests (i.e. all those receptors unrelated to any Natura 2000 sites) involves the following process:

- identification of the potential impacts of the Revised Development;
- consideration of the likelihood of occurrence of potential impacts where appropriate;
- defining the Nature Conservation Value of the ecological receptors present;
- establishing the receptor's Conservation Status where appropriate; and
- establishing the magnitude of the likely impact (both spatial and temporal).

7.5.7 Based on the above information, a professional judgement as to whether or not the identified effect is significant with respect to the EIA Regulations will be made as follows:

- if a potential effect is determined to be significant, measures to mitigate or compensate the effect are suggested where required;
- opportunities for enhancement are considered; and
- residual effects after mitigation, compensation or enhancement are considered.

Assessment of Potential Effect Significance

7.5.8 Sensitivity of a receptor is based on its Nature Conservation Value and its conservation status, as described below.

Determining Nature Conservation Value

7.5.9 Nature Conservation Value is defined on the basis of the geographic scale given in Table 7.2 (which follows the guidance within CIEEM, 2016). Attributing a value to a receptor is generally straightforward in the case of designated sites, as the designations themselves are normally indicative of a value level. For example, a Special Area of Conservation (SAC) designated under the Habitats Directive is implicitly of European (International) importance. In the case of species, assigning value is less straightforward as it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. This means that even though a species may be protected through legislation at a national or international level, the relative value of the population on site may be quite different (e.g. the site population may consist of a single transitory animal, which within the context of a thriving local/regional/national population of a species, is clearly of local or regional value rather than national or international).

- 7.5.10 Where possible, the valuation of habitat/populations within this assessment will make use of any relevant published evaluation criteria (e.g. Joint Nature Conservation Committee (2013) on selection of biological SSSIs).
- 7.5.11 Those ecological receptors affected at the site and deemed to be of local, regional, national and international importance are termed 'Valued Ecological Receptors' (VERs).
- 7.5.12 Where relevant, information regarding the particular receptor's conservation status shall also be considered in order to fully define its value. This will enable an appreciation of current population or habitat trends to be incorporated into the assessment.

Table 7.2 – Approach to Valuing Ecological Receptors (adapted from Hill *et al*, 2005)

Value of Receptor	Description
International	An internationally designated site (e.g. SAC). Site meeting criteria for international designations or qualifying species of an SAC where there is connectivity.
	Species present in internationally important numbers (>1 % of biogeographic populations).
National	A nationally designated site (SSSI, or a National Nature Reserve (NNR)), or sites meeting the criteria for national designation or qualifying species where there is connectivity.
	Species present in nationally important numbers (>1 % UK population).
	Large areas of priority habitat listed on Annex I of the EC Habitats Directive and smaller areas of such habitat that are essential to maintain the viability of that ecological resource.
Regional (Natural Heritage Zone or Local Authority Area)	Species present in regionally important numbers (>1 % of Natural Heritage Zone population).
	Areas of habitat of conservation concern falling below criteria for selection as a SSSI (e.g. areas of semi-natural ancient woodland larger than 0.25 ha).
Local	Local Nature Reserves (LNR).
	Areas of semi-natural ancient woodland smaller than 0.25 ha.
	Areas of habitat or species considered to appreciably enrich the ecological resource within the local context, e.g. species-rich flushes or hedgerows.
Negligible	Usually widespread and common habitats and species. Receptors falling below local value are not normally considered in detail in the assessment process.

- 7.5.13 The following sections further define the methods used to evaluate magnitude of likely effects and sensitivity.

Magnitude of Impact

- 7.5.14 Impact magnitude refers to changes in the extent and integrity of an ecological receptor. The only definition of ecological 'integrity' is found within circular 6/1995 (2000) which states that 'The

integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified'. Although this definition is used specifically regarding European level designated sites (SACs and SPAs), it is applied to wider countryside habitats and species for the purposes of this assessment.

- 7.5.15 Determining the magnitude of any likely impacts requires an understanding of how the ecological receptors are likely to respond to the Revised Development. This change can occur during construction, operation or after the decommissioning of the Revised Development.
- 7.5.16 Impacts can be adverse, neutral or beneficial.
- 7.5.17 Impacts are judged in terms of magnitude in space and time. There are five levels of spatial impacts and five levels of temporal impacts as described in Tables 7.3 and 7.4.

Table 7.3 – Definition of Spatial Impact Magnitude upon the VERs

Spatial Magnitude	Definition
Very high	Would cause the loss of the majority of a receptor (>80%), or would be sufficient to damage a receptor sufficient to immediately affect its viability.
High	Would have a major impact on the receptor, sufficient to result in short-term losses and impacts upon its long-term viability. For example, more than 20% habitat loss or damage.
Moderate	Would affect the receptor in the short and medium-term, but should not alter its long-term viability. For example, between 10 - 20% habitat loss or damage.
Low	Would have a minor impact upon the receptor, either of sufficiently small-scale or of short duration to cause no long-term harm. For example, less than 10% habitat loss or damage.
Negligible	Minimal change on a very small scale; impacts not dissimilar to those expected within a 'do nothing' scenario.

Table 7.4 – Definition of Temporal Impact Magnitude upon the VERs

Temporal Magnitude	Definition
Permanent	Impacts continuing indefinitely beyond the span of one human generation (taken as 26+ years), except where there is likely to be substantial improvement after this period in which case the category long term may be more appropriate.
Long term	Between 15 years up to (and including) 25 years.
Medium term	Between 5 years up to (but not including) 15 years.
Short term	Up to (but not including) 5 years.
Negligible	No impact.

Significance of Effect

- 7.5.18 The significance of potential effects is determined by integrating the assessments of sensitivity (Nature Conservation Value and Conservation Status) and magnitude of impact in a reasoned way.
- 7.5.19 Table 7.5 details the significance criteria that have been used in assessing the effects of the Revised Development:

Table 7.5 – Significance Criteria

Significance of Effect	Definition
Major	Significant effect, as the effect is likely to result in a long term significant adverse effect on the integrity of the receptor.
Moderate	Significant effect, as the effect is likely to result in a medium term or partially significant adverse effect on the integrity of the receptor.
Minor	The effect is likely to adversely affect the receptor at an insignificant level by virtue of its limited duration and/or extent, but there will probably be no effect on its integrity. This is not a significant effect.
Negligible	No material effect. This is not a significant effect.

7.5.20 Using these definitions, it must be decided whether there would be any effects which would be sufficient to adversely affect the VER to the extent that its Conservation Status deteriorates above and beyond that which would be expected should baseline conditions remain (i.e. the ‘do nothing’ scenario).

7.5.21 Major and moderate effects are considered significant in the context of the EIA Regulations (2011).

Cumulative Assessment

7.5.22 Cumulative effects are not possible to evaluate through the study of one development in isolation, but require the assessment of effects when considered in combination with other projects or activities. The context in which these effects are considered is heavily dependent on the ecology of the receptor assessed. For example, for water voles it may be appropriate to consider effects specific to individual catchments, should the distance between neighbouring catchments be sufficient to assume no movement of animals between them. Therefore, an assessment of cumulative impacts will be made for each receptor, appropriate to its ecology.

Limitations to Assessment

7.5.23 Limitations exist with regard to the knowledge base on how some species, and the populations to which they belong, react to impacts. A precautionary approach is taken in these circumstances, and as such it is considered that these limitations do not affect the robustness of this assessment.

7.5.24 The habitat survey was carried out on 16 and 19 October 2014, which is during the latter end of the optimal time period (April to October for Phase 1 Habitat Survey and May to September for NVC survey, with the latter period being more appropriate for moorland habitat). Some early flowering species may therefore have been missed. However, this is highly unlikely to have had any significant bearing on the habitat classifications due to the nature of the habitats present.

7.5.25 The otter, water vole and badger surveys in 2014 were carried out at the optimal times of the year (September and October) for these species. The weather during the September surveys was dry and sunny; the October surveys had some rain showers however the watercourses were not in spate during the surveys. A second water vole survey was carried out at the start of the water vole survey season in April 2015 in suitable weather conditions. Surveys in May 2017 were carried out during wet weather although the preceding days were dry. The survey timings and weather are not expected to alter the results of the surveys. The GCN surveys were conducted in the appropriate season under suitable weather conditions.

7.5.26 Baseline bat surveys of the Study Area were carried out by Starling Learning in 2012; however, it was considered prudent to update the baseline information for this assessment. Therefore, further baseline data collection covering all the bat survey seasons (spring, summer and autumn) was conducted in 2014 and 2015. Transect (spatial) and static (temporal, including ‘at height’) surveys

were conducted in autumn 2014 (September/October). Spatial and temporal surveys continued throughout the spring and summer seasons (2015) to provide an up to date baseline for the Study Area.

- 7.5.27 It should be noted that the layout of the turbines, tracks and cables, would be subject to a micro-siting allowance (50 m). The assessment of impacts presented within this chapter has been based upon the layout defined in Chapter 3. Any micro-siting changes would respect the exclusion zones defined within this chapter such that no infrastructure would be moved to the extent that impacts would be any greater than those reported in this chapter.

Project Assumptions

- 7.5.28 It is assumed that all electrical cabling between the proposed turbines and the associated infrastructure would be underground and follow the proposed access tracks. Connection between the substation and the electrical grid would form part of a separate consent application, as required.
- 7.5.29 Implementation of appropriate pollution prevention measures would occur across the site as standard which will be included in the Construction Environmental Management Plan (CEMP) (also refer to Chapter 3 and Chapter 11 of this ES).
- 7.5.30 A Species Protection Plan (SPP) (refer to Appendix 7.9) would be implemented during construction and decommissioning of the Revised Development.
- 7.5.31 An Outline Habitat Management Plan (HMP) would be implemented during the operational phase of the Revised Development (refer to Appendix 7.8 for the Outline HMP).

7.6 Baseline Conditions

Desk Study

Designated Sites

- 7.6.1 There are no statutory or non-statutory designated sites within the Revised Development site. Table 7.6 below details the sites designated for their ecological importance located within 5 km of the site (refer to Figure 7.1). There are also areas designated as Ancient Woodland within 5 km of the site.

Table 7.6 – Designated Sites within 5 km of the Site Boundary

Name	Designation	Designated For and Condition	Approximate Distance from Site
Miller’s Wood	SSSI	Upland birch woodland (status: unfavourable declining).	2.23 km
Coalburn Moss	SAC	Active raised bog (status: favourable maintained); Degraded raised bog (status: unfavourable recovering).	1.62 km
Coalburn Moss	SSSI	Raised bog (status: unfavourable recovering).	1.62 km

Species Records

- 7.6.2 The site falls within OS tile NS83. A search on SNHi Sitelink for species records in this tile from 1990 onwards contained records for the following:
- Brown/sea trout (*Salmo trutta*);
 - Common pipistrelle (*Pipistrellus pipistrellus*);

- Otter (*Lutra lutra*);
- Lesser noctule (Leisler's bat) (*Nyctalus leisleri*);
- Mountain hare (*Lepus timidus*);
- Nathusius pipistrelle (*Pipistrellus nathusii*); and
- European hedgehog (*Erinaceus europaeus*).

7.6.3 Scottish Badgers has provided records of badgers (*Meles meles*) within 5 km of the site. The results of the badger survey conducted in 2009 to 2010 at the Study Area by Starling Learning and all historical data are considered within Confidential Annex C.2.

Earlier Site Surveys

7.6.4 Previous baseline ecology surveys within the Study Area have been undertaken by Starling Learning, on behalf of previous developers Community Windpower Ltd (refer to Chapter 2). Information derived from these surveys have been considered in the relevant baseline sections of this chapter.

Bat Desk Study

7.6.5 The desk based study revealed no sites designated for their importance to bat species within 20 km of the site.

7.6.6 The Scottish Bats Atlas (Haddow and Herman, 2000) recorded eight species within a 100 km² grid square that the site is positioned within: Daubenton (*Myotis daubentonii*), Natterer's bat (*Myotis nattereri*), whiskered bat (*Myotis mystacinus*), noctule (*Nyctalus noctula*), *Nyctalus* sp. Nathusius's pipistrelle (*Pipistrellus nathusii*), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and brown long eared bat (*Plecotus auritus*).

7.6.7 The SNHi database was searched for records of bats within 10 km of the site. The results of this search are shown in Table 7.7.

7.6.8 Courtesy of the Scottish Leisler's Bat Project the 'Looking for Leisler's – in Scotland' (Haddow, 2012) distribution map was used to determine that *Nyctalus* species are within the surrounding environs of the site. This map shows Leisler records to be present around the Douglas and Lanark areas which are in the locality of the site.

Table 7.7 – SNHi Records within 10 km of Site

Species	No. of Records	Distance from Site	Area of Sighting	Date of Record
Common pipistrelle	2	2 km	100 m x 100 m	2005, 2008
Daubenton's bat	1	2 km	1 km x 1 km	1985
Daubenton's bat	2	1.9 km	10 km x 10 km	1999
Noctule	1	North-west of site, distance unknown	10 km x 10 km	2010
Noctule	1	<10 km	10 km x 10 km	2010
Nathusius's pipistrelle	2	<10 km	10 km x 10 km	2010

Species	No. of Records	Distance from Site	Area of Sighting	Date of Record
Pipistrelle	1	8 km	100 m x 100 m	2002
Pipistrelle	2	6.7 km	100 m x 100 m	2001
Pipistrelle	1	<10 km	10 km x 10 km	1999

7.6.9 A search was conducted of the baseline information for planned and approved wind farm developments surrounding the site. This search aims to provide contextual information relating to bat activity within the wider area. Table 7.8 shows the results of this search.

Table 7.8 – Planned and Approved Wind Farm Developments in the Surrounding Area

Development Name	Stage	Document Reviewed	Location & Distance from Site	High Risk Species	ES Assessment
Dalquhandy Wind Farm	Consented	Dalquhandy SEI. Echoes Ecology Bat Report, 2012	Immediately adjacent to the western boundary of site (refer to Figure 8.4).	<i>Nyctalus</i> bat (Noctule or Leisler's) passes were recorded during surveys at low levels.	Common pipistrelle were the most commonly encountered bat (40.1 % of all passes) followed closely by soprano pipistrelle (38.0 %). Unidentified pipistrelle were the next most frequently recorded (13.8 %), followed by <i>Myotis</i> species (7.1 %), <i>Nyctalus</i> species (1.0 %) and brown long-eared bat (0.02 %). With the exception of edge and edge/water habitats, the lower activity of bats on site supports a conclusion that bats are not at risk based on the anticipated operational layout of the turbines. A 50 m buffer (blade tip to tree edges) was recommended by SNH for this site.
Douglas West (under previous developers - Community Wind Power)	Not submitted into planning	Douglas West Community Wind Farm Draft Environmental Statement, Section 7, 2012	Covers the same area as the site.	A noctule bat was recorded on three occasions in 2012, along the plantation edge in	Common pipistrelle, soprano pipistrelle, noctule and <i>Myotis</i> species all recorded in 2012. Bat activity is low. No EIA assessment conducted.

Development Name	Stage	Document Reviewed	Location & Distance from Site	High Risk Species	ES Assessment
				the west of the site.	
Galawhistle Wind Farm	In construction	Galawhsitle ES Vol 1, 2010	2.2 km to the south-west (refer to Figure 8.4).	None	Common pipistrelle, soprano pipistrelle, brown long-eared bat, Daubenton's and <i>Myotis</i> species recorded. Common pipistrelle roost at Monkshead derelict farm building. Bat activity is low.
Poniel Wind Farm	Approved	Bat Survey Report 2012 and SEI February 2013	1 km to the north-east.	<i>Nyctalus</i> bat passes were recorded during surveys at very low levels.	No roosts confirmed on site. Common pipistrelle, soprano pipistrelle, brown long-eared bat and <i>Myotis</i> species also recorded. All bat activity was low. No significant impacts.

Site Description

- 7.6.10 The site (excluding the Dalquhandy access road) consists of two distinctive sections: a northern section and a southern section, which are separated by the former coal haul road, a tarmac road that crosses the site in an east-west direction.
- 7.6.11 The northern half of the site consists of previous opencast coal land which operated between 1988 and 2004, including restoration of the northern section of the study in the mid-1990s). This section has reverted predominantly to rough grassland consisting of a mixture of soft-rush (*Juncus effusus*) and tufted hair-grass (*Deschampsia cespitosa*) with patches of more open and improved grassland scattered in between. A number of small waterbodies, including former settlement lagoons, and running streams occur across the site. The concrete hardstanding of the former Disposal Point (DP) in the north-east corner of the site and the tarmac road are remnants of the previous opencast coal infrastructure.
- 7.6.12 The southern section of the site consists of unworked land that is more semi-natural in character, although has been drained in the past, and consists of a mixture of purple moor-grass (*Molinia caerulea*) dominated wet heath, marshy grassland and acid grassland. There is also a band of young mixed woodland plantation along the south-western site boundary which was recently planted as part of black grouse mitigation for Hagshaw Hill Wind Farm Extension.
- 7.6.13 The site sits between the eastern tip of the Cumberhead plantation on the west and Long Plantation on the east. The former is homogenous Sitka spruce (*Picea sitchensis*) plantation in the area close to the site. The latter, in addition to Sitka spruce, also has some areas of broadleaved woodland.
- 7.6.14 The Poniel Water corridor, deeply incised, particularly in the west, runs to the north of the site boundary, part of which is in a diverted channel which is the remnant diversion and re-profiling from the opencast coal site. The access track to Hagshaw Hill Wind Farm forms the southern boundary of the site, beyond which the rough grassland of the southern section continues south-eastwards for some distance.
- 7.6.15 The entire site is grazed by sheep and there is a low level of informal recreational use of the site, primarily along the former coal haul road in the centre of the site.

Field Survey

7.6.16 Details regarding field survey methodologies and results are included within Appendices 7.1 to 7.7. The following section summarises the baseline conditions as identified during these surveys.

Habitat Description – Phase 1 Habitat and NVC Surveys

7.6.17 The habitat survey methodology and results are detailed in Appendix 7.1. The Phase 1 Habitat survey results and the NVC results pertinent to this chapter are shown on Figures 7.2 and 7.3, respectively.

7.6.18 The habitat surveys were carried out within the Study Area on 16 and 19 October 2014. The northern half of the Study Area consists of previously worked and restored opencast coal land. Large areas of this section were re-seeded for use as grazing land and are fairly homogenous and species-poor and were therefore surveyed using the standard Phase 1 Habitat Survey methodology (JNCC, 2007).

7.6.19 The southern section of the Study Area, which consists of unworked land that is more semi-natural in character, was surveyed using the standard NVC methodology (Rodwell, 1991 *et seq.*; Rodwell, 2006).

7.6.20 To allow a consistent and accurate assessment of the habitat areas in relation to the infrastructure, MacArthur Green used the habitat information provided in Appendix 7.1 to establish the equivalent Phase 1 code for the southern section of the Study Area. The Phase 1 habitats are used in the habitat calculations below.

7.6.21 Table 7.9 also includes the direct habitat loss area from the infrastructure associated with each habitat. The original habitat surveys were conducted over a larger survey area: the habitat calculations below relate to the current site (refer to Chapter 2 for further information).

Table 7.9 – Extent of Phase 1 Habitats within the Site and Estimated Loss of Habitat (by area and percentage of habitat type)²

Habitat Type	Area (ha) (% of Overall Site)	Infrastructure Area (ha) (% of Individual Habitat Area)
Marshy grassland (B5)	132.91 (56.08%)	4.05 (3.05%)
Semi-improved acidic grassland (B1.2)	28.22 (11.91%)	0.75 (2.65%)
Wet dwarf shrub heath (D2)	31.34 (13.22%)	0.59 (1.87%)
Semi-improved neutral grassland (B 2.2)	25.33 (10.69%)	0.70 (2.77%)
Mixed woodland plantation (A1.3.2)	1.05 (0.44%)	0.00
Continuous Bracken (C1.1)	7.46 (3.15%)	0.18 (2.44%)
Bare ground (J4)	6.24 (2.63%)	1.10 (1.66%)
Standing water (G1)	4.71 (1.99%)	0.00
Improved grassland (B4)	2.48 (1.05%)	0.00
Dry dwarf shrub heath (D1)	0.21 (0.09%)	0.00
Broadleaved woodland plantation (A1.1.2)	0.65 (0.27%)	0.00
Amenity grassland (J1.2)	0.72 (0.31%)	0.00
Total	237.00	6.38 (2.69%)

² Discrepancy between these figures and the landtake areas quoted in Chapter 3 is caused by linear features, such as tracks, watercourses etc. not being included in the habitat calculations.

Groundwater Dependent Terrestrial Ecosystems

7.6.22 The results of the NVC survey were referenced against SEPA guidance (2014a and 2014b) to aid identification of those habitats which may be classified, depending on the hydrological setting, as being groundwater dependent (Ground Water Dependent Terrestrial Ecosystems – GWDTE) (refer to Figure 7.4). Table 7.10 lists the NVC habitats recorded (mainly within the southern section of the site) and highlights those communities listed in the SEPA guidance (2014a, 2014b) and those that fall within the Annex 1 habitat categories under the Habitats Directive.

7.6.23 The northern section of the Study Area was used for opencast coal mining with operations between 1988 and 2004, including restoration of the majority of the northern section of the Study Area in the mid-1990s. This area is known to be underlain by glacial till with a very thin layer of topsoil (0-25 cm) which indicates there is unlikely to be much in the way of shallow groundwater flow. Habitats in this area have reverted predominantly to rough grassland consisting of a mixture of soft-rush and tufted hair-grass with patches of more open and improved grassland scattered in between. The habitats within the area of the opencast mine are therefore not considered to be important wetland habitats and an NVC survey and subsequent GWDTE assessment is not considered necessary.

Table 7.10 – NVC Communities Recorded within the Study Area

Community Type	Community Name and Title		Potential Groundwater Dependency	Annex 1 Habitat
Dry Heath	H10a	<i>Calluna vulgaris</i> - <i>Erica cinerea</i> heath, typical sub-community	No	No
	H21a	<i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> - <i>Sphagnum capillifolium</i> heath, <i>Calluna vulgaris</i> - <i>Pteridium aquilinum</i> sub-community	No	No
Mesotrophic Grassland	MG9a	<i>Holcus lanatus</i> - <i>Deschampsia cespitosa</i> grassland, <i>Poa trivialis</i> sub-community	Moderate	No
Wet Heath	M15d	<i>Scirpus cespitosus</i> - <i>Erica tetralix</i> wet heath, <i>Vaccinium myrtillus</i> sub-community	Moderate	Yes: North Atlantic wet heath
Mires, Bog Pools and Flushes	M23b	<i>Juncus effusus/acuteiflorus</i> rush pasture, <i>Juncus effusus</i> sub-community	High	No
Swamps and tall-herb fens	S9	<i>Carex rostrata</i> swamp	No	No
	S11c	<i>Carex vesicaria</i> swamp, <i>Carex rostrata</i> sub-community	High	No
	S12a	<i>Typha latifolia</i> swamp, <i>Typha latifolia</i> sub-community	No	No

Community Type	Community Name and Title		Potential Groundwater Dependency	Annex 1 Habitat
Calcifugous Grassland	U5a	<i>Nardus stricta</i> - <i>Galium saxatile</i> grassland, <i>Carex panicea</i> - <i>Viola riviniana</i> sub-community	No	No

Invasive Non-Native Species

- 7.6.24 The only invasive non-native species (INNS) recorded within the Study Area was grey squirrel. No signs of American mink were recorded and no vegetation INNS were recorded.
- 7.6.25 The South Lanarkshire Biodiversity Partnership identifies grey squirrel as an INNS that is a priority for action. Bracken is also highlighted as an invasive species for action (due to its threat on upland heath habitats due to encroachment), which was recorded on site, mainly around the banks of Poniel Water (which was redirected and profiled as part of the previous coal mine workings).

Otter

- 7.6.26 Full details pertaining to the legal status of otters (*Lutra lutra*) are detailed within Appendix 7.2.
- 7.6.27 The field survey methods employed in all surveys are detailed within Appendix 7.2.
- 7.6.28 There are historical records of otter on and surrounding the site in the last 15 years. Otter is listed on the Scottish Biodiversity Action Plan.
- 7.6.29 The presence of otter was confirmed during 2014 baseline surveys for the Revised Development through identification of spraints along Poniel Water. A holt and potential resting up sites (couches) were recorded within the Study Area (refer to Confidential Annex C.1 for full survey results and Confidential Figure C7.1).
- 7.6.30 Surveys in 2017 again recorded otter presence on the Poniel Water and tributaries, including spraints, a couch and a potential holt (Figure C7.3). A second potential holt, where a spraint was also found, was recorded within the Study Area (at a different location to that in 2014, although a spraint was also recorded there in 2014).
- 7.6.31 It is likely that otter regularly use Poniel Water (along the northern site boundary) and its tributary Shiel Burn for foraging and commuting. There are numerous ponds within the Study Area along with Longhill Burn in the centre and Alder Burn in the north-eastern section of the Study Area which are also likely to be utilised by this species.
- 7.6.32 The fish resource in the upper section of Poniel Water is likely to be limited although otters may be attracted to the Study Area seasonally to prey on amphibians, especially in the ponds on site. The central pond may hold some fish and is likely to be the pond that is most attractive to otters. There was an apparent increase in activity around ponds in the Study Area in April 2015, coinciding with the amphibian spawning period. However, the Douglas Water valley to the east, outwith the Study Area, is likely to be a more attractive location for otters than Poniel Water.

Great Crested Newts

- 7.6.33 Full details pertaining to the legal status of great crested newts (GNC) (*Triturus cristatus*) are detailed within Appendix 7.3.
- 7.6.34 The HSI survey method is detailed within Appendix 7.3. Further surveys using the eDNA method and 'traditional' presence/absence survey methods are detailed in Appendix 7.4.
- 7.6.35 GCN is listed on the Scottish Biodiversity Action Plan. The desk study revealed no records of GCN and the most recent historical record of an 'unidentified newt' is from 1991.

Habitat Suitability Index Assessment

7.6.36 A total of 26 ponds within a 500 m buffer zone of the site were located during the survey and considered for their suitability to support GCN (refer to Figure 7.5). Due to access restrictions, two ponds, Pond 25 and Pond 26, were excluded from the field survey. Table 7.11 lists the HSI results of the ponds surveyed (refer to Appendix 7.3 for full details and Figure 7.5 for pond locations).

Table 7.11 – HSI Assessment Results of Ponds within 500 m of the Site

Pond No.	HSI Score	Category	Further Survey Required	Comments
1	-	-	-	No longer exists.
2	0.50	Below average	No	
3	0.43	Poor	No	
4	-	-	-	No longer exists.
5	-	-	-	No longer exists.
6	0.72	Good	Yes	
7	-	-	-	No longer exists.
8	0.70	Good	Yes	
9	0.61	Average	Yes	
10	0.63	Average	Yes	Ponding due to blocked drainage channel under existing road. Palmate newt (<i>Lissotriton helveticus</i>) recorded during HSI survey.
11	0.68	Average	Yes	
12	0.72	Good	Yes	
13	0.68	Average	Yes	Ponding due to blocked drainage channel under existing road.
14	-	-	-	No longer exists.
15	0.58	Below average	Yes	Palmate newt recorded during HSI survey.
16	-	-	No	Unsuitable due to pollution & separation from site by Poniel Water.
17	0.62	Average	No	outside main dispersal distance of 500 m.
18	0.66	Average	No	Poniel Water constitutes barrier to dispersal and more than 500 m from any likely construction-disturbed areas.

Pond No.	HSI Score	Category	Further Survey Required	Comments
19	0.73	Good	No	Poniel Water constitutes barrier to dispersal and ca. 750 m from any likely construction-disturbed areas.
20	0.66	Average	No	Poniel Water constitutes barrier to dispersal and ca. 750 m from any construction-disturbed areas
21	0.50	Below average	No	Below average habitat suitability; and Poniel Water constitutes barrier to dispersal and > 750 m from any construction-disturbed areas.
22	0.48	Poor	No	Poor habitat suitability; and ca. 1 km from nearest construction-disturbed area.
23	0.67	Average	No	Young palmate or smooth newt (<i>Lissotriton vulgaris</i>) caught during netting. ca. 1 km from nearest construction-disturbed area.
24	-	-	-	No longer exists
25	-	-	No access permission	Poniel Water constitutes barrier to dispersal and ca. 840 m from nearest known construction-disturbed areas.
26	-	-	No access permission	Poniel Water constitutes barrier to dispersal and ca. 730 m from nearest known construction-disturbed areas.

7.6.37 Two ponds, Pond 25 and Pond 26, had to be excluded from the field survey but potential effects of the Revised Development on these were considered unlikely due to their location and distance to construction-disturbed areas.

7.6.38 Of the remaining 24 ponds, 16 were considered unsuitable and scoped out of further assessment (either due to them no longer existing, heavy pollution or their distance to the closest infrastructure being over 500 m). The remaining 8 ponds were recommended for further survey work: ponds 6, 8 to 13 and 15.

eDNA and Presence/Absence Surveys

7.6.39 eDNA sampling has been approved by Natural England (NE) for the determination of the presence/absence of GCN in ponds in England since 2014 (Natural England, 2014b) following publication of the results of a study by the Freshwater Habitats Trust (Biggs *et al.*, 2014). Confirmation for the acceptance of this method to determine presence or absence of GCN on site

was received by SNH on 27 March 2015 via e-mail (refer to Appendix 4.3).

- 7.6.40 Samples from eight ponds (6, 8 to 13 and 15) were taken on 17 April 2015. Ponds 11, 12, 13 and 15 returned negative results; therefore, GCN are confirmed as being absent from these ponds. Ponds 6, 8, 9 and 10 returned 'inconclusive' results due to sampling error. These four ponds were resampled on 07 May 2015 and all returned negative results; therefore, GCN are confirmed as being absent from these ponds.
- 7.6.41 The sampling time period for e-DNA surveys is mid-April to end of June. The time period for conducting conventional presence/absence surveys is mid-March to mid-June, with at least two visits between mid-April and mid-May or at least three visits between mid-April and mid-May where relative population size class assessments are required. Due to the overlap in the sampling periods and the time between e-DNA sample collection and return of lab results (about two weeks), it was considered prudent to carry out some conventional survey technique visits prior to the lab results becoming available. This would have allowed for completion of sufficient surveys for a population size class assessment, if GCN presence had been confirmed.
- 7.6.42 Therefore, as a precautionary approach conventional presence/absence surveys for GCN were conducted on 17 April 2015 for the eight ponds. A further visit was also conducted on 07 May 2015 on ponds 6, 8, 9 and 10. The surveys involved egg searches, torching and natural refugia searches (refer to Appendix 7.4 for further details). Upon the receipt of the eDNA results for all ponds being negative no further surveys were conducted.
- 7.6.43 The two visits (torching, etc.) that were conducted did not record GCN. During the first visit, torching revealed the presence of small newts (palmate/smooth newts) in seven ponds; no newts were observed in pond 11. Numbers were generally small (up to six), except for pond 15, where a much larger number of small newts were recorded (69). The latter was the only pond where small newt eggs (smooth or palmate newt) were recorded. The searches of natural and artificial refugia did not reveal any newts. With regards to other amphibians, small numbers of common toads (*Bufo bufo*) (10-12) were recorded at ponds 11 and 12, with much larger numbers recorded at pond 15 (59) and pond 13 (73). Small numbers of common frogs (*Rana temporaria*) (1 to 9) were also recorded at ponds 11, 13 and 15. During the second visit only one small newt was observed during torching in pond 8, but none in ponds 6, 9 or 10. No newts were observed during any of the refugia checks.
- 7.6.44 To conclude, GCN are confirm as being absent from the Study Area. A number of ponds support other amphibians with the largest number being recorded in ponds 13 (in the west of the site, formed due to a block drain running underneath the existing road) and 15 (outwith the north of the site).

Bats

- 7.6.45 Full details pertaining to the legal status of bats in Scotland are detailed within Appendix 7.6.
- 7.6.46 There are historical records of common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Leisler (*Nyctalus leisleri*) and Nathusius pipistrelle (*Pipistrellus nathusii*) within 10 km of the site. A review of survey information from previous planned or approved wind farm developments in the area (Table 7.8) showed *Myotis* sp. and brown long-eared bats (*Plecotus auritus*) also to be present in the area and that bat levels are generally low across the sites surveyed.
- 7.6.47 Full details of the survey results are provided in Appendix 7.6. Figures 7.6 and 7.7 detail the spatial (walked transect and point count) and temporal (static, including 'at height') surveys in 2014 and 2015.
- 7.6.48 The Study Area is considered to be of 'medium' value due to its geographical location within range of high risk species (*Nyctalus* sp.) and its low to medium foraging/commuting suitability (Natural England, 2014a).
- 7.6.49 Five bat species were recorded during the temporal and spatial surveys: soprano pipistrelle, common pipistrelle, *Myotis* sp., brown long-eared and *Nyctalus* sp. When using the combined results for temporal and spatial surveys, the highest activity recorded was attributed to soprano pipistrelles (0.51 bat passes per hour, bpph), followed closely by *Pipistrelle* sp. (0.45 bpph) and

common pipistrelles (0.35 bpph); numbers were considerably lower for *Nyctalus* sp. (0.06 bpph), *Myotis* sp. (0.02 bpph) and brown long-eared (0.004 bpph).

- 7.6.50 The results of the spatial surveys show the highest activity (bpph) to be along the plantation edge in the north western section of the Study Area. This supports the data recorded during the temporal surveys which showed location 1 (A1) (along the plantation edge on the western boundary with a small pond and burn also located nearby) having the highest activity (3.65 bpph). Location 5 (A5) (along the burn in the east of the Study Area) recorded the next highest with 3.04 bpph. All other locations recorded under 0.3 bpph for the temporal surveys. The results show that bats primarily use the linear features on site, such as the watercourses and plantation edge, with very low activity recorded in the open habitats on site.
- 7.6.51 Low levels of *Nyctalus* sp., considered to be at high risk from turbines, were recorded every month except in September to October in 2014 (refer to Table 13 and Graph 5 of Appendix 7.6). They were also recorded at every static location. When considering the full data set (September 2014 to September 2015), the location with the most *Nyctalus* sp. passes was at location 1 (A1) (0.31 bpph) with the most bat passes recorded in July (0.38bpph). All other locations recorded *Nyctalus* passes below 0.2 bpph. The activity levels are considered to be low. The higher number of passes at location 1 (A1) may be due to this species foraging over the tree canopy adjacent to the detector to the west. The data suggests that *Nyctalus* sp. were not more active at height than at ground level with the ground detector at location 2 (0.1 bpph) recording similar activity levels to the detector at height Location 2b (0.2 bpph).
- 7.6.52 A number of structures within and outside of the site were assessed and inspected by a licenced MacArthur Green bat worker to determine their suitability for roosting bats in April 2015. No roosts were confirmed within the Revised Development site or Study Area. One bat roost was confirmed in a derelict building over 800m from the site boundary (target note 6 on Figure 7.8). Two trees and a stone railway bridge were considered to have varying levels of suitability for bat roosts (target notes 1, 2 and 4 on Figure 7.8), although none were recorded during the surveys. A summary of the roost assessment and inspection is provided in Table 7.12 below and Figure 7.8 shows the target note locations for each of the potential roost features inspected.

Table 7.12 – Details of Bat Roost Assessment Results

Target Note No.	Grid Ref.	Description	Results and Recommendations
1	NS 82550 32186	<p>Dead tree with 3 cavities and cracks. Unknown species. Category 1 tree.</p> <p>Centre cavity 1: Cavity open at the top and light coming into cavity (2 m off ground).</p> <p>Cavity 2: On leader closest to road. Narrows off and not deep. A single bat may be able to fit into the cavity (3 m from ground).</p> <p>Cavity 3: Is on the same leader as cavity 2. Not able to investigate due to position. Is open to the weather and considered not suitable.</p> <p>No signs of bats found.</p>	<p>All potential cavities investigated and no sign of bats. The open cavity is not suitable as it is too exposed.</p> <p>No felling or works to this tree proposed; however if this changes, i.e. if felling and/or lopping tree and/or working within root plate, the cavities must be checked prior to work.</p>
2	NS 82631 32103	<p>Stone railway bridge. Cavities at the side of arch stones. Cavities that could be reached with a ladder were investigated with an endoscope.</p>	<p>Low potential for hibernation roost.</p> <p>No works to the bridge proposed. No further work required.</p>

Target Note No.	Grid Ref.	Description	Results and Recommendations
		Cavities mostly shallow with loose mortar. One long cavity and one round cavity that extend for approx. 16 cm. No sign of bats.	
3	NS 83083 32593	Railway bridge. No cracks in arch. Some cracks on the abutments. One crack 20 cm, however damp soil in the crack and unlikely to be used by bats.	No sign of bats - unlikely that a roost is present. No works to the bridge proposed. No further work required.
4	NS 80384 33053	Dead tree with top cracked off. Unknown species. Tree is hollow with numerous cavities. Cavities visually inspected with a torch and an endoscope. Cavities with light spill. Category 2.	No sign of bats. No felling or works to this tree proposed; however if this changes, then the tree must be sensitively felled: cut tree in sections and lower sections gently to the ground. Cut sections to be left in-situ for 48 hours before cavities are opened up and removed from site.
5	NS 80384 33053	Stone ruin. Old farmhouse with no roof and the remaining walls exposed with a chimney still present. Internal and external inspection not carried out as the building is in very poor condition and is structurally unsafe. Some cracks in the walls could offer some roosting potential.	Low roost potential. No works to the ruin proposed. No further work required.
6	NS 80773 34056	Derelict building boarded up but front door open. Loose tiles. Internal walls with big gaps in plaster board. Ceiling not intact with parts missing and the attic visible. Attic with wooden sarking board. A few bat droppings and a butterfly wing (feeding remains) found within the building. Droppings possibly pipistrelle and/or brown long-eared.	Confirmed roost. 200 m buffer to turbines to be maintained (currently over 800 m from closest infrastructure). No further work required.
7	NS 80773 34056	Trees. Several category 1 trees around derelict building.	200 m buffer to turbines to be maintained (currently over 800 m from closest infrastructure). No further work required.
8	NS 80888 34241	No internal and external inspection carried out due to access constraints. Buildings	Over 900 m from closest infrastructure.

Target Note No.	Grid Ref.	Description	Results and Recommendations
		<p>surveyed from afar to determine if they are suitable for bats.</p> <p>The buildings are moderately suitable for bats.</p>	<p>200 m buffer to turbines to be maintained (currently over 900 m from closest infrastructure).</p> <p>No further work required.</p>

Water Vole

- 7.6.53 Full details pertaining to the legal status of water vole (*Arvicola amphibius*) are detailed within Appendix 7.2.
- 7.6.54 The field survey methods employed are detailed within Appendix 7.2.
- 7.6.55 The desk study did not reveal any records of water vole from the last 15 years including the surveys of the Study Area in 2009/2010 by Starling Learning. Water vole is listed on the Scottish Biodiversity Action Plan.
- 7.6.56 No signs of water voles were found during the survey visits in 2014, 2015 and 2017. Some of the burns flowing through the Study Area are slow-flowing, have soft substrate and an adjacent cover of rushes which would provide suitable habitat for water voles; however, due to the lack of historical records and no evidence within the Study Area, they are not considered to be present on site.
- 7.6.57 No evidence of mink (*Neovison vison*) (predator to water voles) was recorded during the surveys.

Badger

- 7.6.58 Full details pertaining to the legal status of badger (*Meles meles*) are detailed within Appendix 7.5.
- 7.6.59 The field survey methods employed for all surveys are detailed within Appendix 7.5.
- 7.6.60 Historical records of badger were provided by Scottish Badgers and surveys of the Study Area in 2009/2010 by Starling Learning recorded evidence of badgers (refer to Confidential Annex C.2 for further information).
- 7.6.61 The presence of badger was confirmed in 2014 through identification of latrines and prints within the Study Area. Setts were also recorded within the Study Area (refer to Confidential Annex C.2 for full survey results and Confidential Figure C7.2).
- 7.6.62 Surveys in 2017 recorded four setts within or on the edge of the Study Area, plus feeding signs, path, dung pit and footprints (Confidential Figure C7.4). As with 2014, evidence was found quite widely across the Study Area.
- 7.6.63 Badgers use the Study Area for foraging and for sett location, particularly the northern section. Berries from the small number of rowan trees (*Sorbus* sp.) on site have been used as a source of food.

Red Squirrel

- 7.6.64 Red squirrel (*Sciurus vulgaris*) is listed on Schedule 5 and are protected under Section 9(1) of the Wildlife and Countryside Act (1981), as amended by the Nature Conservation (Scotland) Act (2004), and is listed on the Scottish Biodiversity Action Plan.
- 7.6.65 Historical surveys of the local area (as cited in Dunnock Environmental Services, 2009), revealed very low levels of red squirrel activity within Townhead Wood (outwith the site, 1.8 km to the east) and Long Plantation (outwith but adjacent to the site on the east) with the most recent record dating from 2007. However, all the surveys recorded higher levels of grey squirrels in the area and the 2009 survey of Townhead Wood did not record any red squirrel evidence. Dunnock Environmental Services observed a grey squirrel during the 2014 surveys of the Study Area. The closest priority

woodland for red squirrel conservation is Todlaw and Cumberhead, located 3.5 km to the north-west (Poulsom *et al.*, 2005); although the desk study did not reveal any records of red squirrel in this area.

- 7.6.66 The site is not considered suitable for this species due to the lack of woodland areas within the site. If red squirrels remain in the wider area (within the forest block to the west and Long Plantation to the east) it is likely that their populations are very low due to competition from grey squirrels. The lack of red squirrel evidence during the 2009 surveys at Townhead Wood supports this assumption.

Fish

- 7.6.67 There is a variety of legislation, regulations and guidance in place relating to fish species that may be present in watercourses within the Douglas Water catchment. Atlantic salmon (*Salmo salar*) are restricted to watercourses downstream of the site due to the impassable Falls of Clyde approximately 3 km downstream. Salmon are listed under Annex II and V of the EC Habitats Directive and are listed on the UK Biodiversity Action Plan (BAP). Brown trout/sea trout (*Salmo trutta*) are also a UK BAP species and sea trout is listed on the Scottish BAP. Fishing or taking eels is illegal (unless licensed) under The Freshwater Fish Conservation (Prohibition on Fishing for Eels) (Scotland) Regulations 2008. Eels are also a UK BAP priority species.
- 7.6.68 Fish habitat and electrofishing surveys were conducted in June 2012 as part of the previous planned development of the same site (EcoFish Consultants, 2012). Ten locations were sampled, plus one control location, within and immediately downstream of the site. The survey report is included as Appendix 7.7.
- 7.6.69 The habitat suitability varied across the Study Area, with Poniel Water (running to the north of the site boundary) exhibiting moderate to high suitability; however, this watercourse currently lacks any bankside cover and has extensive areas of bedrock substrate. Shiel Burn in the west of the site flows from the forestry block into Poniel Water. Although Shiel Burn was assessed as having moderate suitability there is extensive bedrock in the area and the culvert on Shiel Burn (grid ref. NS 80834 33052) is impassable to fish. Longhill Burn and Alder Burn (locations within the centre of the site) and Broadlea Burn (on the southern boundary of the site) were considered to have low suitability for fish and were not surveyed further. The habitat suitability of Longhill Burn and Alder Burn improved slightly downstream (by the north-east corner of the site); however, it was still considered to be low.
- 7.6.70 The results of the electrofishing surveys recorded 'very low' numbers of brown trout within Poniel Water and Shiel Burn only. Population estimates were not able to be drawn due to the low numbers caught. There were not any perceived limitations to the survey.
- 7.6.71 There has been extensive historical modification of the watercourses on site, for example, the majority of the length of Poniel Water within the site was re-directed for the opencast mine workings, and the pond along Longhill Burn was created as part of the habitat restoration of the opencast mine. The culverts along Longhill Burn, Shiel Burn and Alder Burn are either impassable to fish or in a state of disrepair; and three culverts that run underneath the existing road within the site are blocked, causing pooling of water upstream (to the west) of the road (ponds 10, 12 and 13, Figure 7.5).
- 7.6.72 The conditions within the Study Area, and therefore the habitat suitability of the site, are not considered to have changed significantly since the 2012 surveys. Therefore brown trout are only expected to occur in Poniel Water and Shiel Burn in very low numbers. Alder Burn and Longhill Burn within the Study Area are not expected to sustain brown trout.

Other Species

Pine Marten

- 7.6.73 Pine marten (*Martes martes*) is listed on Schedule 5 and is protected under Section 9(1) of the Wildlife and Countryside Act (1981), as amended by the Nature Conservation (Scotland) Act (2004).

The protection afforded to this species is the same as for red squirrel, detailed above in paragraph 7.6.64.

- 7.6.74 Pine marten is listed on the Scottish Biodiversity Action Plan. Pine marten populations are known to be expanding geographically in southern Scotland (Croose *et al.*, 2013) and are therefore considered here for completeness.
- 7.6.75 The site is not considered suitable for this species due to the lack of woodland areas that are generally used for shelter and den sites. The forestry to the west (outwith the site) may provide sheltering opportunities if they are present in the wider area and the site may provide limited foraging opportunities within the marshy grassland areas.
- 7.6.76 Given that the closest confirmed record is 20 km to the north-west of the site and the lack of woodland areas within the site, it is considered that pine marten will not be present on the site.

Reptiles

- 7.6.77 Adder (*Vipera berus*), slow worm (*Anguis fragilis*) and viviparous (common) lizard (*Zootoca vivipara*) are protected under Section 9(1) and 9(5) of the Wildlife and Countryside Act (1981), as amended by the Nature Conservation (Scotland) Act (2004). Under Section 9(1) it is an offence to intentionally or recklessly kill, injure or take these species.
- 7.6.78 Slow worm, adder and common lizard are listed on the Scottish Biodiversity Action Plan.
- 7.6.79 It was not considered necessary to undertake targeted reptile surveys; however, incidental records of reptile sightings, or signs such as shed skins and features of particular importance (i.e. potential hibernacula) were recorded.
- 7.6.80 No reptiles were recorded during any surveys within the Study Area. The dilapidated building at Brackenside may provide some suitable hibernacula features. The areas of heath vegetation recorded across parts of the Study Area may provide varied structure and microtopography suitable for basking and foraging reptiles. Although no signs of reptiles were observed during the survey this does not confirm their absence from the Study Area.

Terrestrial Invertebrates

- 7.6.81 Habitats of particular importance to this group, e.g. dead wood piles or wild flower assemblages, were not found within the Study Area.

'Do Nothing' Scenario

- 7.6.82 A large portion of the site consists of a restored opencast mine with the associated habitats reflecting its disturbed nature. The remaining habitats across the site are indicative of ongoing anthropogenic influence, albeit at relatively low levels. In the absence of the Revised Development at the site it is likely that the existing habitats would prevail but at varying levels, reflecting the effects of current management across the site. This is likely to be most applicable to the grassland and heath habitats which will be the most affected by changes to grazing and trampling pressures. In light of this, it is possible to conclude that the relative ecological interest of the site and Study Area will remain at similar levels over time under the current management.

7.7 Potential Effects

Species/Habitats Scoped Out of this Assessment

- 7.7.1 Following the design mitigation described in Chapter 2 (and summarised in Section 7.8 Mitigation) and those measures described in the 'Project Assumptions' section above (including implementation of appropriate pollution prevention measures and a SPP), the following habitats and species are not considered to be impacted by the Revised Development and are therefore not considered further in this assessment.

Designated Sites

Miller's Wood SSSI

- 7.7.2 Miller's Wood SSSI is designated for upland birch woodland. The SSSI will not be directly impacted by the Revised Development. Due to the distance of the SSSI to the site (approximately 2.23 km) and that it is not hydrologically connected to the site due to being in a different catchment, it is not considered to be indirectly impacted by the Revised Development. Miller's Wood SSSI is therefore scoped out of this assessment.

Coalburn Moss SAC/SSSI

- 7.7.3 Coalburn Moss SAC/SSSI is designated for raised bogs. The SAC/SSSI will not be directly impacted by the Revised Development. Due to the distance of the SSSI to the site (approximately 1.62 km) and that it is not hydrologically connected to the site due to being in a different sub-catchment, it is not considered to be indirectly impacted by the Revised Development. Coalburn Moss SAC/SSSI is therefore scoped out of this assessment.

Ancient Woodland

- 7.7.4 No areas of Ancient Woodland will be directly affected by the Revised Development. The closest Ancient Woodland is Long Plantation which lies approximately 75 m to the east of the site boundary (refer to Figure 7.1). Due to the distance between the infrastructure and the woodland, and the topography of the area it is considered that the Ancient Woodland will not be impacted by the Revised Development and therefore is scoped out of this assessment.

Habitats

Broadleaved Woodland Plantation

- 7.7.5 It should be noted that the broadleaved woodland plantation mapped on the western boundary of the site is recently planted, with the majority of tree heights under 2 m. The majority of the underlying vegetation consists of scattered bracken with some patches of marshy grassland. This area is not directly or indirectly impacted by the Revised Development and is therefore scoped out of this assessment.

Groundwater Dependent Terrestrial Ecosystems

- 7.7.6 As previously discussed (refer to paragraph 7.6.23), the majority of the site lies over a restored opencast coal mine. Those habitats that fall under the SEPA (2014a, 2014b) categories of potentially high or moderate GWDTEs that exist on the site outwith the area of the restored opencast coal mine are assessed for their potential groundwater dependency.
- 7.7.7 The GWDTE assessment takes into account that habitats in the south and north-west of the site have been historically impacted by drainage.
- 7.7.8 Table 7.13 lists the habitats that fall under the SEPA GWDTE categories and provides an assessment of their potential groundwater dependency. Refer to Figure 7.4 for the location the habitats listed below.

Table 7.13 Groundwater Dependency Assessment

NVC Category	SEPA Category	Comments	Assessment Result
S11c	High	This community was recorded in one small area located on the north-western edge of a pond (no. 13) in the north-west of the site. It is downhill of T4 and associated with the margins of the pond. This intimate association with a surface water feature indicates that the S11 is of low (or no) groundwater dependency. Furthermore, the vegetation on the ground is a poor fit with the S11 community (as discussed in Appendix 7.1), thereby making the designation as a GWDTE technically inaccurate.	No groundwater dependency
M23b	High	All three M23 polygons in the southern section of the site are associated with watercourses that drain towards the scattered ponds in the central east and north. This indicates that they have a strong dependency on surface water flows and conversely, at most, a low dependency upon groundwater.	Low to no groundwater dependency
MG9a	Moderate	The extensive polygon occupied by this community is situated on the gentle slopes of the south-easternmost watercourse's catchment (unnamed burn). It occupies depressions and gentler slopes not occupied by the more freely-drained, mat grass dominated acid grasslands. Its topographic situation and particularly its association with the easternmost watercourse indicate that it is reliant on surface water flows. Furthermore, given the low soil flow rates and consequent waterlogging often associated with the habitat of this community (Rodwell, 1991 <i>et seq</i> ; Vol. 2), it may be inferred that direct rainfall is also a significant input. As such, this GWDTE is unlikely to be of more than low ground water dependence.	Low to no groundwater dependency

NVC Category	SEPA Category	Comments	Assessment Result
M15d	Moderate	This community is characteristically less mesic than the other M15 sub-communities and it typically grades into acid grassland at the drier end of the continuum along which it may occur. Such a situation is evident here where small areas (of up to several squares metres) of partially improved 'acid grassland' are frequent within the M15's extent; with the widespread absence of Sphagnum, other than in occasional, small, waterlogged depressions; and in the prominence of hypnaceous mosses. This combination of characteristics suggests that the related polygons are not groundwater dependent but ombrogenous, with localised surface water flows/ponding sustaining the Sphagnum within depressions.	No groundwater dependency

7.7.9 Further assessment on the potential GWDTEs identified within the site is provided in Chapter 11 Hydrology, Hydrogeology and Geology (Section 11.7). It concludes that, those plant communities identified within the site with the potential to have dependence on groundwater are, in reality, likely to be predominantly dependent on surface and/or rain water, and are therefore not GWDTEs. SEPA has previously agreed with this conclusion in its response to South Lanarkshire Council, dated 28 August 2015, in connection with the Consented Development.

7.7.10 Due to the assessment showing that the habitats listed have low or no groundwater dependency, potential effects on GWDTEs or these habitats are scoped out of this assessment. Despite the habitats having low or no groundwater dependency, standard mitigation measures for GWDTE habitats will be implemented to ensure those habitats will be protected (as described in Section 7.7 below).

Species

Otter

7.7.11 Two potential otter holts and couches were recorded in 2017, in close proximity to the site boundary and proposed water crossings (Confidential Figure C7.3). Unmitigated construction activity associated with the water crossings and increased vehicle movements within the site have the potential to disturb this species. However, given the mitigation measures to protect and reduce disturbance to this species (which are provided in the Section 7.8 and the SPP, Appendix 7.9), and the pollution prevention measures (within the CEMP) to protect the main prey species within the water environment, the effect on this receptor is considered to be negligible and therefore this species is scoped out of this assessment. The SPP also provides details of monitoring for this species prior to construction and the procedure to follow should these potential holts be confirmed, or any new features be identified.

Great Crested Newt

7.7.12 GCN are confirmed as being absent from the site. Pollution prevention measures that will be in place to protect the water environment will ensure these habitats are not impacted for the other amphibians present. GCN and other amphibians are therefore scoped out of this assessment.

Bats (Construction)

- 7.7.13 The loss of habitat to the Revised Development will slightly reduce the foraging opportunities within the site; however, given the abundance of these habitat types in the surrounding environs and the small extent of their loss, it is considered to be negligible.
- 7.7.14 The closest confirmed bat roost is over 800 m from the closest infrastructure (outwith the site to the north). The infrastructure is not situated along any foraging or commuting routes (refer to Section 7.7 in this chapter). Given the distance between the roosts and the infrastructure and the measures to reduce disturbance to diurnal mammals (outlined in the SPP), disturbance to roosting bats during construction is considered to be negligible and is therefore scoped out of this assessment.
- 7.7.15 Residual impacts on bats during the operational phase of the Revised Development are considered below.

Water Vole

- 7.7.16 There are no historical records of water vole within the vicinity of the site. No evidence was found of water vole during any surveys. Some suitable habitat exists within the Study Area along the minor burns; however, given the recent disturbance within the site, the lack of historical records and lack of field evidence water vole are not considered to be present on the site. Water vole is therefore scoped out of this assessment.

Badger

- 7.7.17 Badger setts recorded within the Study Area are over 30 m away from any infrastructure, and over 100 m from new or major infrastructure (Confidential Figures C7.2 and C7.4). The increased vehicle movements within the site have the potential to disturb this species. However, given the mitigation measures to protect and reduce disturbance to this species (which are provided in Section 7.8 and the SPP, refer to Appendix 7.9), the effect on this receptor is considered to be negligible and therefore this species is scoped out of this assessment. The SPP also provides details of monitoring changes to the baseline for this species prior to construction and the procedure to follow should any new features be identified.

Red Squirrel

- 7.7.18 The site is not considered suitable for this species due to the lack of woodland within the site. If red squirrels remain in the wider area there is a possibility that they may commute across the site between the surrounding woodland plantations. The woodland plantations will not be directly impacted by the Revised Development. Given the inclusion of this species in the SPP to reduce potential disturbance, disturbance to this species during construction, operation and decommissioning is considered to be negligible and this species is therefore scoped out of this assessment.

Fish

- 7.7.19 Resident brown trout were recorded in very low numbers during the 2012 surveys and the current baseline is expected to remain at similar levels. An impassable waterfall to migratory salmonids exists over 3 km downstream at the Falls of Clyde. Given the implementation of the appropriate pollution prevention measures (within the CEMP), pollution impacts on fish resulting from the Revised Development are considered to be negligible and fish are not considered further in this assessment.

Pine Marten

- 7.7.20 Pine marten are not considered to be present on the site and are therefore scoped out of this assessment. Should the range of pine marten extend into the area of the site then the measures to protect and reduce disturbance to mammals (as detailed in the SPP) will be applicable to this species.

Reptiles / Terrestrial Invertebrates

7.7.21 There were no sightings of reptiles and the dilapidated building at Brackenside is over 100 m from the closest infrastructure. There were no features of interest for terrestrial invertebrates observed in the Study Area. Given the mobile and reactive nature of these species, should they be present in the area, disturbance to these species is considered to be negligible and they are therefore scoped out of this assessment.

VERs Considered in the Assessment

7.7.22 A summary of the remaining habitats and species identified as VERs within the Study Area, and their conservation value is given in Table 7.14, together with the justification for this qualification.

Table 7.14 – Nature Conservation Value of Confirmed Valued Ecological Receptors within the Study Area

Valued Ecological Receptor (VER)	Nature Conservation Value	Relevant Legislation/Guidance and Justification
North Atlantic wet heath	Local	This habitat consists mainly of the M15 community associated with the Annex 1 category North Atlantic wet heath; however, it is degraded due to historic land drainage and grazing pressure causing a lack of distinctive M15 species which appear to have been replaced by widespread acid grassland and purple moor-grass pasture species. Upland heathland is listed as a priority habitat on the Scottish BAP. As this habitat is relatively widespread throughout Scotland and given its degraded nature, it is assigned a Local nature conservation value.
Bats	Local	All bat species are listed on Annex IV of the EC Habitats Directive, and fully protected through The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Bat species are listed on the Scottish BAP. A bat roost was confirmed at a derelict building to the north of the site; however, this is over 800 m from the closest infrastructure. Bat activity as a whole was, and is expected to remain low. As such, their nature conservation value within the site is considered to be Local.

Construction

North Atlantic Wet Heath

7.7.23 Effects upon wet dwarf shrub heath during construction will be direct (through limited habitat loss) and indirect (through drying effects upon neighbouring habitats). The total amount of direct habitat loss on this habitat will be 0.59 ha, which represents 1.87 % of the overall habitat extent within the site (Table 7.). In addition, and for the purposes of this assessment, this figure has been increased to allow for indirect losses as a result of the zone of drainage around infrastructure (it is acknowledged that full habitat loss within this buffer is not guaranteed, but is assumed to enable

an assessment of the 'worst-case' in this regard). In order to quantify this a drainage zone of 20 m will occur around drainage features, and the overall loss is considered to be 3.00 ha (9.57 % of the overall habitat).

- 7.7.24 The total upland heathland coverage across Scotland (including wet and dry heathlands) is estimated to be between 1,700,000 ha and 2,500,000 ha (Maddock, 2008): the proportion of this habitat that will be directly and indirectly lost due to the Revised Development is a negligible amount of the Scottish, and regional resource.
- 7.7.25 When considering potential impacts upon this receptor prior to any mitigation and accounting for the relative abundance of upland heathland across Scotland, an impact magnitude of negligible spatial and long term temporal is assigned.
- 7.7.26 The wet dwarf shrub heath within the site has a nature conservation value of Local. The overall effect significance prior to mitigation is therefore considered to be **minor** and **not significant** under the terms of the EIA Regulations.

Bats

- 7.7.27 The effects on bats during the construction phase have been considered and scoped out of further assessment (refer to paragraphs 7.7.13 to 7.7.15 above).

Operation

North Atlantic Wet Heath

- 7.7.28 Effects on wet heath from drying impacts in relation to the infrastructure have been considered in the Construction section above. This habitat will not be further impacted during operation; therefore it is not considered further in this section to avoid duplication.

Bats

- 7.7.29 During the operation phase, a risk exists with regard to the potential collision risk upon bat species, together with the risk that animals are affected by barotrauma when flying in proximity of the turbines. For the purposes of this assessment, the potential impacts from barotrauma are assumed to be the same as for collision risk. This is due to the lack of published empirical evidence in causes of bat fatalities around wind farms and the difficulties in determining whether bat fatalities are due to strikes (collisions) with the turbine blades or barotrauma (Hundt, 2012).
- 7.7.30 Common and soprano pipistrelle bats are assessed by Natural England (2014a) guidance to be of medium risk in terms of collision although they are of low risk in terms of any threat to national populations. These pipistrelle species regularly fly at low heights, typically less than 25 m and, assuming that their behaviour is not modified by the presence of turbines, then the collision risk of common and soprano pipistrelle bats is considered to be medium. Avoidance through design mitigation to site turbines away from key commuting areas is described in Section 7.8, with the recommended buffers provided in Figure 7.9. Activity within the Study Area was mainly recorded around edge habitats such as burns and plantation edge, and it declined in more open exposed habitats such as open moorland. Given the low activity levels of these species within the Study Area, and the incorporation of the avoidance buffers to the design, the impacts on the populations of these two species are therefore considered to be of low spatial and long term temporal magnitude. Bats are considered to be of Local nature conservation value: this would result in an overall **minor adverse** effect which is **not significant** under the terms of the EIA Regulations.
- 7.7.31 *Myotis* sp. and brown long-eared bats are assessed by Natural England guidance (2014a) to be of low risk in terms of collision and threat to national populations. When considering the low levels of total activity across the Study Area and the incorporation of the avoidance buffers to the design, the impact magnitude on this species is considered to be negligible, which results in an overall **negligible** effect which is **not significant** under the terms of the EIA Regulations.

- 7.7.32 *Nyctalus* sp. bats are assessed by Natural England guidance (2014a) to be of high risk in terms of collision and threat to national populations. *Nyctalus* species are known to commute and forage up to 13.4 km away from their roosts (Shiel *et al.* 1999) over a range of habitats, both open and closed, as well as using linear features such as watercourses or drainage channels. *Nyctalus* species are also known to be more active at heights of 30 m (dependant on habitat type) than other species, such as *Myotis* sp. (Collins and Jones, 2009); however, the study found the difference between *Nyctalus* passes at the upper and lower detectors not to be statistically significant.
- 7.7.33 Given the low activity recorded, the apparent fidelity to the plantation to the west of the site and the incorporation of the relevant avoidance buffers to the design, the impact on *Nyctalus* sp. is considered to be of low spatial and long term temporal magnitude. Bats are considered to be of Local nature conservation value; resulting in a **minor adverse** effect and **not significant** under the terms of the EIA Regulations.

Decommissioning

- 7.7.34 It is considered that the effects during the decommissioning phase of the Revised Development would be the same as those identified during the construction phase, with the exception of habitat loss that has already occurred during construction.

7.8 Mitigation

- 7.8.1 In light of the potential effects on VERs identified within the assessment, a number of mitigation measures are proposed in order to avoid or minimise these effects on VERs.

Mitigation through Design

- 7.8.2 It should be noted that the assessment above takes into account the design mitigation incorporated into the layout of the infrastructure; however, it is included here for completeness.
- 7.8.3 An iterative design process allowed the incorporation of various ecological constraints in order that effects can be avoided/minimised from the outset; these are described in Chapter 2. This has resulted in avoidance of highly groundwater-dependent ecosystems (Figure 7.4) and key features for otter (e.g. watercourses) and badger. The existing road running through the site and farm tracks are utilised as much as possible to reduce habitat and watercourse disturbance. Watercourse crossings will be designed to allow the passage of small mammals in the site (particularly otters) through the use of wide, bottomless culverts or culverts with integral mammal ledges. Existing hardstandings and tracks will be utilised across the site to reduce the requirement for construction of new foundations or tracks.
- 7.8.4 To protect and reduce disturbance to bats turbines are located over 50 m away from features (blade tip to the top of the feature) that are used by commuting and foraging bats, according to Natural England (2014a) guidance, as illustrated in Figure 7.9 and detailed further below.
- 7.8.5 The recommended stand-off distance between the feature (woodland edges/hedgerows) and the centre of the turbine has been calculated using the following equation:
- $$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$
- 7.8.6 Where bl = blade length; hh = hub height; and fh = feature height.
- 7.8.7 Feature height is assumed to be a maximum of 20 m as a 'worst case' scenario for the trees on the edge of the site (note that trees adjoining the site have been measured subsequent to the preparation of the Consented Development ES). This results in a stand-off distance of 94 m as follows:
- $$b = \sqrt{(50 + 64)^2 - (85 - 20)^2}$$
- 7.8.8 This stand-off distance will reduce the already minimal potential adverse effects further. The bat-tree stand-off distance of 94 m has been rounded up to 100 m.

Measures Prior to Construction and Decommissioning

- 7.8.9 Arrangements for pre-construction ecological surveys will be conducted within 6 months of construction commencement and will be set out in the CEMP. The CEMP will be agreed with relevant statutory consultees and SLC prior to the commencement of construction.

Mitigation during Construction

- 7.8.10 Pollution prevention mitigation measures and arrangements for ecological monitoring and safeguards during construction shall also be set out in the CEMP. The CEMP will be implemented across the whole site during construction. These measures shall be designed in order that the watercourses on site (and those into which the site drains) are protected against pollution. These aspects of the CEMP will be monitored by a suitably qualified Ecological Clerk of Works (ECoW).
- 7.8.11 The ECoW will also be required to advise and supervise, where appropriate, and will have the power to stop works at any stage should it be deemed necessary. The ECoW will provide tool box talks on the ecological sensitivities within the site to all site personnel prior to them commencing work.
- 7.8.12 The existing culvert along the Shiel Burn is damaged and does not allow for easy passage by small mammals; it also does not allow for the upstream passage of fish species. The culvert will be removed and the watercourse reinstated in this area during -construction. This will provide enhancement of the watercourse in this area.

GWDTes

- 7.8.13 Mitigation measures that will be implemented during construction to minimise or avoid impacts on potential GWDTes include:
- The ECoW to direct and oversee micrositing of infrastructure and activities on site to avoid impacts on potential GWDTes where possible, for instance micrositing to avoid flushes;
 - The permeability of roads will be maintained by installation of regular cross drains (which would be detailed in a construction method statement);
 - If clay is sourced from excavations it can be used to create bunds to restrict drainage effects from construction;
 - Natural re-colonisation will ensure full vegetation reinstatement of excavated areas (that do not have infrastructure overlain); and
 - Should any bare peat or soil exist, this will be monitored by the ECoW at regular intervals over the following 6 months to 1 year to ensure that re-vegetation is successful. If early growth does not appear then action (such as re-seeding) should be taken to prevent erosion or sediment washing off site.

Disturbance Reduction / Mammal Protection

- 7.8.14 Good practice measures will be implemented throughout the construction phases to ensure that reasonable measures are taken to minimise the risks associated with a construction site on all wild animals in line with SNH guidance.
- 7.8.15 As detailed in the 'Project Assumptions' section above (paragraph 7.5.30), the Species Protection Plan (SPP) will be agreed with the Local Authority, in consultation with SNH prior to construction commencement (refer to Appendix 7.9 for the draft SPP). The SPP will include measures to protect and reduce disturbance to species on site, as outlined below:
- Covering/securing all excavations and piping or provision of an 'exit route' where covering is not practical;

- Night time working will be minimised to reduce disturbance to nocturnal and diurnal fauna. Where this is not possible, directional lighting away from features (including mammal paths, tree lines and watercourses) will be used to minimise light disturbance; and
- A speed limit of 15 mph for all vehicles on site will help to reduce the risk of disturbance and mortality to protected species.

7.8.16 Badger setts and otter holts within the site will be protected by a 30 m protection zone, demarcated using coloured tape, or something of similar visible marking prior to commencement of works. There will be no blasting activities within 100 m of the badger setts. A licence from SNH to disturb otters or badgers is not likely to be required provided appropriate buffer distances are maintained.

Mitigation and Enhancement during Operation

7.8.17 The CEMP will contain provisions such as habitat restoration measures and ecological monitoring that will be undertaken throughout the operational phase of the Revised Development. Maintenance operations will follow the same safety and environmental procedures as for the construction phase.

7.8.18 Although only a small area of wet heath on the site will be impacted (paragraphs 7.7.23 to 7.7.27) which is assessed as not significant under the EIA Regulations, measures to restore and enhance areas of similar habitat is proposed as mitigation and enhancement, refer to Appendix 7.8 Outline Habitat Management Plan (HMP). The aim of this will be to restore wet heath in the southern part of the site and enhance surrounding habitats across the previously restored opencast coal mine area. This represents an enhancement measure and will more than offset the minor losses to the wet heath. The HMP will be finalised and then approved with the Local Authority and SNH prior to construction commencement. The HMP will remain a live document for the lifetime of the Wind Energy Component of the Revised Development. The Outline HMP also proposes habitat enhancement for black grouse (refer to Chapter 8).

Mitigation during Decommissioning

7.8.19 Mitigation measures proposed for the construction phase of the Revised Development will also be implemented for the decommissioning phase. These measures will be agreed with the planning authority as part of the CEMP approval process.

7.9 Residual Effects

Construction

North Atlantic Wet Heath

7.9.1 When considering potential impacts (direct and indirect habitat loss) upon this receptor (as described within paragraphs 7.7.23 to 7.7.26), accounting for its degraded nature and the relative abundance of the habitat within the wider area, and the restoration and enhance measures outlined in the OHMP (Appendix 7.8), an effect magnitude of negligible is assigned.

7.9.2 The wet dwarf shrub heath within the site has a nature conservation value of Local; the overall effect significance is therefore considered to be **negligible** and **not significant** under the terms of the EIA Regulations.

Bats

7.9.3 The effects on bats during the construction phase have been considered and scoped out of further assessment (refer to paragraphs 7.7.13 to 7.7.15 above).

Operation

Wet Heath

- 7.9.4 Effects on wet heath from drying impacts in relation to the infrastructure have been considered in the construction section above. The HMP aims to improve this habitat during the operational phase. This will result in a **minor positive** effect on this habitat.

Bats

- 7.9.5 As no further mitigation measures are proposed for bats during the operation of the Revised Development, the residual effects on all bats species remain the same (**minor or negligible and not significant** under the terms of the EIA Regulations) as described in paragraphs 7.7.29 to 7.7.33 above.

Decommissioning

- 7.9.6 It is considered that the effects during the decommissioning phase of the Revised Development would be the same as those identified during the construction phase, with the exception of habitat loss that has already occurred during construction.

7.10 Cumulative Assessment

- 7.10.1 A number of other wind farms are present within the wider area (both in planning, under construction and operational); however, it is not considered likely that any significant cumulative effects will arise (in line with SNH, 2012). This is due to the negligible/minor scale and nature of the predicted effects for the Revised Development, the application of appropriate mitigation measures, and small geographical range of the species discussed in this chapter.

7.11 Summary

- 7.11.1 This chapter describes the assessment of the potential effects of the Revised Development on the ecological resources present within the site and Study Area.
- 7.11.2 A desk based study and a series of field surveys were undertaken to establish the baseline conditions of the Study Area.
- 7.11.3 There are no ecological designations within the site. The main habitats within the site include wet heath and marshy grassland. Potential GWDEs were also identified within the site (according to SEPA, 2014a and 2014b guidance); however, those which are potentially highly groundwater dependent were avoided during the design layout process. Bat activity on site is considered to be low. Otter and badger were recorded within the Study Area. Trout species recorded in 2012 showed low numbers in Shiel Burn and Poniel Water only and this status is not expected to have changed significantly. No other protected species were recorded within the Study Area.
- 7.11.4 The ecological receptors present were considered during the design of the Revised Development. Design mitigation measures included maintenance of a stand-off distance between woodland edges and turbine centres of 94 m to reduce the potential for bats colliding with turbines. Otter and badger features within the site have been avoided. The number of watercourse crossings has been reduced where possible to minimise the potential of pollution entering the watercourses. Watercourse crossings have been designed to allow the passage of mammals (such as otter) and fish up- and down-stream. Existing hardstanding areas and tracks are utilised to reduce ground disturbance.
- 7.11.5 Pollution prevention measures and a SPP will be in place throughout the life time of the Revised Development, and will be detailed in the CEMP. An ECoW will be present during the construction phase to monitor construction works to ensure the requirements of the CEMP are met.
- 7.11.6 An HMP will be implemented post-construction to restore and enhance wet heath and marshy grassland habitats within the site. This would also benefit bird species, such as black grouse and waders.

- 7.11.7 With the implementation of the mitigation and enhancement measures as described, it is considered that all effects would be reduced to either **minor** or **negligible** and would be therefore be **not significant** under the terms of the EIA Regulations.
- 7.11.8 Table 7.15 below provides a summary of the potential and the residual effects of the Revised Development on VERs.

Table 7.15 – Summary Table

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect		Comparison with the Consented Development
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse	
During Construction/Decommissioning						
Direct and indirect habitat loss to wet heath	Minor	Adverse	Restoration/ enhancement of habitats (Appendix 7.8).	Negligible	Neutral	No Change
During Operation						
Collision risk/ barotrauma to bats	For medium risk <i>Pipistrelle</i> sp. bats: minor <i>Nyctalus</i> sp.: minor ; <i>Myotis</i> sp.: negligible .	Adverse Adverse Neutral	Avoidance of linear features (design mitigation) NB. Already factored into original assessment.	For medium risk <i>Pipistrelle</i> sp. bats: minor ; <i>Nyctalus</i> sp.: minor ; <i>Myotis</i> sp.: negligible .	Adverse Adverse Neutral	No Change (<i>Nyctalus</i> sp. now minor adverse instead of negligible) No Change
Cumulative Effects						
Direct and indirect habitat loss to wet heath	Minor	Adverse	None required	Minor	Adverse	No Change
Collision risk/ barotrauma to bats	Minor / negligible	Adverse / Neutral	None required	Minor / negligible	Adverse / Neutral	No Change

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