06
Appendices

Appendix 6.1 Methodology

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1. Introduction

1. This appendix accompanies Chapter 6: Ecology of the Environmental Impact Assessment Report (EIAR). It includes a list of sources used when carrying out the desk study and describes in detail the field survey carried out to establish the baseline conditions within the zone of influence (ZoI) of the Proposed Development.
2. Throughout this appendix, species are given their common and scientific names when first referred to and their common names only thereafter. All distances are cited as the shortest distance 'as the crow flies', unless otherwise specified.
3. The field surveys described in this appendix carried out by AECOM were done so by suitably qualified ecologists. All ecologists are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) at the appropriate grade and adhered to their strict Code of Professional Conduct.
4. Where relevant, reference is made to surveys undertaken independently by Bowland Ecology Ltd along the XL route (Appendix 6.3: ECU – LWUP XL Route Refurbishment Ecological Walkover DRAFT REPORT). This report was commissioned by Scottish Power Energy Networks (SPEN) in relation to reconductoring works along the XL Route that was scheduled to be carried out in Autumn 2024.

2. Desk Study Data Sources

Table 2-1: Desk study data sources

Data source	Date accessed	Data obtained
Amphibian and Reptile Groups of the UK (ARG UK) and Amphibian and Reptile Conservation (ARC) Record Pool (https://www.recordpool.org.uk/)	25 September 2024	Amphibian/reptile hectad (10 km^2) records.
Ancient Tree Inventory (https://ati.woodlandtrust.org.uk/)	18 December 2024	Locations of known veteran or notable ancient trees.
Fife Council website (https://www.fife.gov.uk/)	25 September 2024	• LDP policies relevant to nature conservation. • Local non-statutory nature conservation designations and/or green infrastructure assets.
Fife Nature Records Centre	11 October 2024	• Records of protected and/or important species.

Data source	Date accessed	Data obtained
		• Records of non-statutory sites.
Mammal Society Species Hub (https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/)	25 September 2024	Information on protected and important mammals.
Marine Scotland Maps National Marine Plan Interactive (NMPi) (https://marinescotland.atkinsgeospatial.com/nmpi/)	25 September 2024	Atlantic salmon *Salmo salar* distribution in Scotland
NatureScot Natural Spaces webpage (https://cagmap.snh.gov.uk/natural-spaces/)	25 September 2024	Ancient Woodland Inventory for Scotland.
NatureScot SiteLink webpage (https://sitelink.nature.scot/home)	25 September 2024	• Internationally designated sites within at least 10 km of the Proposed Development. • Nationally designated sites within at least 2 km of the Proposed Development.
NBN Atlas Scotland (https://scotland.nbnatlas.org/)	25 September 2024	Commercially available records of protected and/or important species within 1 km of the Proposed Development, made since 2000.
Ordnance Survey (OS) 1:25,000 maps and aerial photography (https://www.bing.com/maps/)	25 September 2024	Habitats and connectivity relevant to interpretation of planning policy and potential protected/important species constraints.
Saving Scotland's Red Squirrels (scottishsquirrels.org.uk)	25 September 2024	Red squirrel *Sciurus vulgaris* records within 1 km of the Proposed Development.
Scotland's Environment Map (https://map.environment.gov.scot/sewebmap/)	25 September 2024	Obstacles to fish migration.

Data source	Date accessed	Data obtained
SEPA Water Classification Hub (https://www.sepa.org.uk/data-visualisation/water-classification-hub/)	25 September 2024	Status of watercourses and standing waters.
The National Water Vole Database Project (NWVDP) (https://www.wildlifetrusts.org/national-water-vole-database-project)	25 September 2024	Water vole *Arvicola amphibius* hectad records.

3. Field Survey Methods

5. Field survey buffers were based on the Kincardine Substation boundary as it was understood at time of survey. This is herein referred to as the 'original KINN Site'.

3.1 Habitat Surveys

6. Habitat surveys were carried out within the original KINN Site plus a 25 m buffer on 15 and 16 April 2024 where access was possible and safe. The area surveyed for habitats is herein referred to as the "habitat survey area" and is shown on Figure 6.4: Habitat Survey Results.

7. The surveys followed the Phase 1 habitat survey method (Ref 1), by which all areas of land within the habitat survey area are assigned standard habitat types and ecological notes are recorded. Notes were made for each habitat which reflect conditions at the time of survey. Typical and important/notable plants (including invasive non-native species) were recorded using the DAFOR (D=dominant; A=abundant; F=frequent; O=occasional; R=rare) scale, and relevant ecological characteristics were documented.

8. Surveys along the XL route were carried out on 08 and 09 July 2024 by Bowland Ecology Ltd and the methodology followed is described in paragraph 2.7 of Appendix 6.3: ECU – LWUP XL Route Refurbishment Ecological Walkover DRAFT REPORT. The presence of the most common invasive plant species subject to strict legal control was also noted as described in paragraph 2.8 of Appendix 6.3: ECU – LWUP XL Route Refurbishment Ecological Walkover DRAFT REPORT.

3.2 Bat Surveys

9. In accordance with industry-standard guidelines published by the Bat Conservation Trust (BCT) (Ref 2), a Daytime Bat Walkover (DBW) was carried out to assess the suitability of habitats for roosting, commuting and foraging bats within the original KINN Site plus a 25 m buffer where access was possible and safe on 15 and 16 April 2024. Preliminary Roost Assessment (PRA) of structures and Ground Level Tree Assessment (GLTA) were completed concurrently with the DBW. The GLTA surveys involved a ground-based assessment only and were not conducted with any specialist equipment (climbing equipment or endoscopes). The area surveyed in relation to bats is herein referred to as the "GLTA survey area" and is shown on Figure 6.5: Important Species Survey Results.

10. Habitat suitability for commuting/foraging bats was categorised according to the descriptions in Table 4.1 of the BCT guidelines (Collins, 2023). Structures were assigned a suitability category based on the presence of Potential Roost Features (PRF). Trees were

assessed as having 'PRF-M', where they had potential suitability for use by multiple bats (including maternity colonies), or 'PRF-I', where they contained features unlikely to be PRF-M but are potentially suitable for only individual or very small numbers of bats.

11. PRFs searched for included suitable holes, cracks or splits in trees, and any possible ingress points to buildings or structures. Where such features existed, searches were made for evidence of bat use such as droppings, staining, foraging remains, auditory evidence and the presence of live or dead bats. The diameter at breast height (DBH) was estimated for all trees with PRFs.

12. An external and ground level search for potential roost sites for bats within trees and a more general assessment of the suitability of bat roosting, foraging and commuting habitat along the XL route was carried out on 08 and 09 July 2024 by Bowland Ecology Ltd and the methodology followed is described in paragraph 2.8 of Appendix 6.3: ECU – LWUP XL Route Refurbishment Ecological Walkover DRAFT REPORT.

13. Note that, as discussed under Limitations and Assumptions below, the search for PRFs south of the Site was highly constrained by lack of land access.

3.3 Great Crested Newt Surveys

14. A desk-based search for ponds within 250 m of the original KINN Site was carried out using aerial imagery and OS mapping. This area is herein referred to as the "great crested newt survey area" and is shown on Figure 6.5: Important Species Survey Results. Four ponds potentially suitable for great crested newt *Triturus cristatus* were identified – KINN01, KINN02, KINN03 and KINN04. Two additional waterbodies north of the Site but within the great crested newt survey area were scoped out due to being unsuitable (a large metal tank or drum filled with rainwater and a dry concrete SUDS). The locations of these ponds in relation to the Proposed Development are shown on Figure 6.5: Important Species Survey Results. No additional ponds are present within 250 m of the final KINN boundary.

Habitat Suitability Index Assessment

15. Habitat Suitability Index (HSI) for great crested newt is a numerical index between 0 (indicating unsuitable habitat) and 1 (representing optimal habitat). The HSI assessment sought to establish the suitability of the ponds for great crested newt and thus the potential that they would be used by the species for breeding.

16. HSI assessment was carried out on all safely accessible ponds identified by the desk-based search, and that were not scoped out, following industry-standard guidance (Ref 3; Ref 4) on 15 and 16 April 2024. This included field-based observations of habitat attributes plus the use of Esri ArcPro software to calculate the number of waterbodies within 1 km and waterbody surface area. HSI assessment considers the following ten habitat attributes that influence the suitability of a pond for breeding great crested newts:
    - Location – within a Scotland-wide context reflecting the differences in national distribution of this species (Ref 5).
    - Area – waterbodies between 100-300 m^2 in size are considered to represent the most suitable habitat for great crested newt.
    - Drying – the number of years in which a pond dries over a ten-year period. Occasional drying kills fish, which is beneficial for great crested newt, but the species predominantly favours ponds that do not dry out every year.

- Water quality – qualitative evidence-based assessment to infer good (diverse aquatic invertebrate assemblage), moderate (moderate invertebrate diversity), poor (low invertebrate diversity, few submerged plants) or bad (clearly polluted) water quality.
- Shade – percentage of pond perimeter shaded to at least 1 m from the shore. Great crested newt favours lightly shaded waterbodies.
- Waterfowl – qualitative evidence-based assessment of presence or absence and numbers is made. Large numbers of waterfowl can result in nutrient enrichment of the water and habitat damage, which is less favourable for great crested newt.
- Fish – qualitative evidence-based assessment of likely presence or absence is made. Great crested newt favour breeding ponds that do not support fish because their open-water swimming larvae are vulnerable to fish predation.
- Number of waterbodies within 1 km – great crested newt populations are typically best developed where they have access to a network of ponds, and therefore the species is more likely to be found where there are several ponds within 1 km that are linked by suitable terrestrial habitat.
- Macrophyte cover – percentage of pond surface area occupied by macrophyte cover. Female great crested newts require aquatic vegetation for egg-laying.

17. The ten field scores (one per habitat attribute) are converted into suitability index scores which are multiplied together then calculated to the power of 0.1. The categorises of pond suitability for great crested newt are defined by HSI score as follows:
    - <0.5 = Poor
    - 0.5 to 0.59 = Below average
    - 0.60 to 0.69 = Average
    - 0.7 to 0.79 = Good
    - >0.8 = Excellent
18. The system is not sufficiently precise to conclude that any particular waterbody with a high score will support great crested newt or that a waterbody with a low score will not support the species, though it does provide useful context regarding the suitability of a waterbody for great crested newt. Oldham *et al* (Ref 4) reported that the lowest scoring pond supporting great crested newt in their study was 0.43 and was therefore considered to have Poor suitability.
19. HSI assessment of ponds within 200 m of 50 m tower buffers and access tracks along the XL Route was also carried out independently on 08 and 09 July 2024 by Bowland Ecology Ltd along the XL Route and the methodology followed is described in paragraph 2.8 of Appendix 6.1: ECU – LWUP XL Route Refurbishment Ecological Walkover DRAFT REPORT.

Environmental DNA sampling

20. Concurrently with HSI assessment within 250 m of the original KINN Site on 15 and 16 April 2024, environmental DNA (eDNA) sampling was carried out following approved field and laboratory protocols (Ref 6). eDNA is nuclear or mitochondrial DNA that is released from an organism into the environment. In aquatic environments, eDNA is diluted and distributed in the water. Sources of eDNA in pond water derive from faeces, mucous, gametes, shed skin and carcasses. The eDNA survey involves the collection of water samples for laboratory

analysis to detect the DNA of species of interest, in this case great crested newt. Sample kits supplied by SureScreen Scientifics LTD (a laboratory which takes part in Natural England's eDNA proficiency testing scheme, achieving 100% between 2021-2024) were used to collect water samples. The sampling procedure is prescribed in the published method and requires that the water sample be taken between mid-April and end of June.

21. Waterbodies were not entered by surveyors during sample collection and new sterile equipment provided by the laboratory was used to collect each water sample to prevent contamination between waterbodies. A total of twenty sub-samples of 30 ml each were collected from around the periphery of each waterbody and mixed together before transferring the samples to six laboratory-supplied test tubes, which were then shaken. The collected samples were then transported to SureScreen Scientifics LTD for analysis to confirm the presence or likely absence of great crested newt eDNA.

3.4 Otter, Water Vole and Beaver Survey

22. Surveys for otter *Lutra lutra*, water vole *Arvicola amphibius* and beaver *Castor fiber* were carried out on 15 and 16 April 2024 along all watercourses and other waterbodies within a suitable buffer of the original KINN Site (100 m for otter and 25 m for water vole and beaver), as far as access was possible and safe (excluding land east of the railway – see Section 5 Limitations and Assumptions). The areas within which surveys were carried out are herein referred to as the "otter survey area" and the "water vole and beaver survey area" respectively and are shown on Figure 6.5: Important Species Survey Results.

23. The surveys followed guidance in published literature (Ref 7; Ref 8; Ref 9; Ref 10; Ref 11; Ref 12). Any evidence found during the survey was mapped and accompanying field notes taken. Evidence of otter searched for included refuges (holts and layups), spraints (faeces), footprints, trails and foraging signs. Where found, spraints were recorded as fresh, recent or old, according to their apparent age. Evidence of water vole searched for included latrines, footprints, droppings, burrows, trails, and foraging evidence. Evidence of beaver searched for included refuges (burrows or lodges), trails, footprints, scent mounds, feeding caches and foraging signs. Where found, foraging signs were recorded as fresh, old, or mixed.

24. Surveyors walked in the channel of watercourses where possible and visually inspected all parts of the banks. Where dense vegetation (especially scrub) prevented this, searches for field signs were made as far as access allowed.

25. Evidence of, and the potential for, otter and water vole was noted by Bowland Ecology Ltd within suitable habitats along the XL Route (relevant to XL uprating and reconductoring works) on 08 and 09 July 2024 and the methodology followed is described in paragraph 2.8 of Appendix 6.3: ECU – LWUP XL Route Refurbishment Ecological Walkover DRAFT REPORT.

3.5 Badger and Pine Marten Survey

26. Surveys for badger *Meles meles* and pine marten *Martes martes* were carried out in areas of potentially suitable habitat within 25 m of the Site (as it was understood at the time of survey), as far as access was possible and safe on 15 and 16 April 2024. This area is herein referred to as the "badger and pine marten survey area" and is shown on Figure 6.5: Important Species Survey Results.

27. The surveys largely followed guidance in published literature (Ref 13; Ref 14; Ref 15) but with a reduced survey buffer (discussed in Section 5 Limitations and Assumptions). Any evidence of badger or pine marten found during the survey was mapped and accompanying field notes taken. Badger evidence searched for included setts, spoil heaps, bedding, guard hairs, latrines, footprints, trails, scratch marks and foraging activity. If present, setts were classed

as main, annexe, subsidiary or outlier where possible, and holes described as well-used, partially used, or disused, based on relevant guidance (Ref 13). Pine marten evidence searched for included den sites, scats and footprints.

28. Evidence of, and the potential for, badger was noted by Bowland Ecology Ltd within suitable habitats along the XL Route (relevant to XL uprating and reconductoring works) on 08 and 09 July 2024 and the methodology followed is described in paragraph 2.8 of Appendix 6.3: ECU – LWUP XL Route Refurbishment Ecological Walkover DRAFT REPORT.

3.6 Other Terrestrial Species

29. No dedicated red squirrel *Sciurus vulgaris*, wildcat *Felis silvestris*, mountain hare *Lepus timidus*, brown hare *Lepus europaeus* or hedgehog *Erinaceus europaeus* surveys were carried out. However, any sightings of these mammal species, or evidence of them (such as squirrel-eaten cones), were noted if encountered during all fieldwork.

30. Observations of reptiles, other amphibians and important invertebrates were recorded if encountered during all fieldwork, but no targeted survey was carried out for these species.

31. Evidence of, and the potential for, other amphibians and reptiles was noted along the XL Route (relevant to XL uprating and reconductoring works) by Bowland Ecology Ltd on 08 and 09 July 2024 and the methodology followed is described in paragraph 2.8 of Appendix 6.3: ECU – LWUP XL Route Refurbishment Ecological Walkover DRAFT REPORT.

3.7 Wintering Waterbird Surveys

32. Survey of wintering waterbirds was carried out once per month from October 2023 to March 2024 inclusive, in areas of suitable habitat within the Site (as it was understood at the time of survey) plus a 500 m buffer (herein referred to as the “wintering waterbird survey area” and shown on Figure 6.6: Wintering Waterbirds Survey Results). The surveys were stratified according to tide times (as given for Kincardine by the UK Hydrographic Office https://easytide.admiralty.co.uk/) and focussed on high and low tides, to investigate use of the area by birds under different tidal conditions. Where possible, surveys were carried out from two hours before to two hours after the focal tide condition and comprised a similar number of high and low tide surveys.

33. The surveys broadly followed the method adopted by the British Trust for Ornithology (BTO) for the national WeBS scheme (Ref 16), which itself is based on the ‘look-see’ method described in Bibby et al. (Ref 17). However, while the WeBS scheme does not involve the collection of any spatial data, the location of birds present within the wintering waterbird survey area was recorded during the non-breeding waterbird surveys carried out for the Proposed Development.

34. Binoculars and a telescope were used to scan the fields within the Site for birds from a single vantage point and then the surveyor undertook a driven survey, stopping at suitable vantage points to scan the surrounding fields for birds. All waterbirds encountered during the survey were counted and mapped. Gulls over-flying the wintering waterbird survey area were not recorded.

35. Details of the waterbird survey visits are provided in Table 3-1: Wintering waterbird survey details.

Table 3-1: Wintering waterbird survey details

Survey date	Tidal state	Tide time	Start time	End time	Weather conditions
31/10/23	High	09:13	08:13	11:00	No wind. Partly cloudy with excellent visibility. Temperature 6-9°C.
21/11/23	Low	14:36	12:45	15:36	Force 1-2 southwesterly winds. Overcast but excellent visibility. Temperature 7-6°C.
11/12/23	High	13:50	12:15	15:15	No wind. Partly cloudy with excellent visibility. Temperature 6°C.
15/01/24	Low	10:25	09:25	12:30	Force 1-2 northwesterly winds. Clear skies and excellent visibility. Temperature -1 to 1°C.
07/02/24	High	12:50	11:15	14:30	Force 2 westerly winds. Clear skies and excellent visibility. Temperature 5°C.
13/03/24	Low	10:00	09:00	12:00	Force 2 southwesterly winds. Overcast and drizzly but excellent visibility. Temperature 9-10°C.

4. Assessment Methodology

4.1 Introduction

Throughout this appendix, the term 'ecological feature' refers to all sites designated for nature conservation, habitats, and plant and animal species. The method adopted follows the guidelines for Ecological Impact Assessment (EcIA) published by the Chartered Institute of Ecology and Environmental Management (Ref 18). These guidelines have been endorsed by, amongst others, the Institute of Environmental Management and Assessment (IEMA), the Wildlife Trusts, the Association of Local Government Ecologists (ALGE) and NatureScot.

36. The aims of EcIA are to:

- identify relevant ecological features which may be impacted;
- provide a scientifically rigorous and transparent assessment of the likely ecological impacts and effects of the Proposed Development. Impacts and effects may be beneficial (i.e., positive) or adverse (i.e., negative);
- facilitate scientifically rigorous and transparent determination of the consequences of the Proposed Development in terms of national and local policies relevant to nature conservation and biodiversity, where the level of detail provided is proportionate to the scale of the project and the complexity of its potential impacts; and,
- set out what steps will be taken to adhere to legal requirements relating to the relevant ecological features concerned.

37. The principal steps in the CIEEM approach to EcIA are summarised below:
    - baseline conditions are determined through targeted desk study and field survey to identify ecological features that are both present and might be affected by the Proposed Development (both those present at the time works begin, and for comparison, those predicted to be present at a set time in the future);
    - the importance of identified ecological features is evaluated to place their relative biodiversity and nature conservation value into a geographic context, determining those that need to be considered further within the impact assessment;
    - the potential impacts of the Proposed Development on relevant ecological features are described, taking into account established best practice, legislative requirements and embedded design measures;
    - the likely effects (adverse or beneficial) on relevant ecological features are assessed, and where possible quantified;
    - measures to avoid or reduce (or, if necessary, compensate) any predicted significant effects, if possible, are developed in conjunction with other elements of the design (including mitigation for other environmental disciplines);
    - any residual effects of the Proposed Development and their significance are reported; and
    - scope for enhancement measures is considered.
38. Throughout the assessment, the professional judgement of experienced ecologists is applied as necessary.
39. In line with the CIEEM guidelines, the terminology used within the EcIA draws a clear distinction between the terms 'impact' and 'effect'. For the purposes of the EcIA, these terms are defined as follows:
    - impact – actions result in changes to an ecological feature. For example, tree felling activities leading to the loss of a bat roost; and,
    - effect – the outcome resulting from an impact acting upon the conservation status or structure and/or function of an ecological feature. For example, killing/injury of bats and reducing the availability of breeding habitat as a result of the loss of a bat roost may lead to an adverse effect on the conservation status of the population concerned.

4.2 Assessing the Importance of Ecological Features

Only those ecological features that are 'important' and that could be significantly affected by the Proposed Development require detailed assessment. The CIEEM guidelines state *"it is not necessary to carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable"* (Ref 18). Although this does not mean that efforts should not be made to safeguard wider biodiversity and national policy documents emphasise the need to minimise impacts on and provide benefits for biodiversity from development. This is consistent with the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, which require investigation of likely significant effects. This also enables compliance with Schedule 9 of the Electricity Act 1989 which states *"in formulating any relevant*

proposals, a licence holder or a person authorised by an exemption to generate, distribute, supply or participate in the transmission of electricity –

a. *shall have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and*

b. *shall do what he reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."*

40. To support focussed EcIA there is a need to determine the importance of the specific ecological features identified through the desk studies and field surveys carried out for the Proposed Development. The approach taken when establishing the importance of ecological features needs to be robust as it provides much of the rationale for the identification and further assessment of relevant ecological features. Factors which can determine the relative importance of an ecological feature can include:

- naturalness;
- animal or plant species, sub-species or varieties that are rare or uncommon, either internationally, nationally or more locally, including those that may be seasonally transient;
- ecosystems and their component parts, which provide the habitats required by important species, populations and/or assemblages;
- endemic species or locally distinct sub-populations of a species;
- habitats that are rare or uncommon;
- habitats that are effectively irreplaceable;
- habitat diversity;
- size of habitat or species population;
- habitat connectivity and/or synergistic associations;
- habitats and species in decline;
- rich assemblages of plants and animals;
- large populations of species or concentrations of species considered uncommon or threatened in a wider context;
- plant communities (and their associated animals) that are considered to be typical of valued natural / semi-natural vegetation types, including examples of naturally species-poor communities; and,
- species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change.

Where available, published trends, evidence, and relevant guidance is used to inform the importance of ecological features. Professional judgement is also used as appropriate when assigning importance, particularly where habitats or species are poorly known, or where guidance is lacking. Ecological features may be identified that are not included in lists of

important habitats or species, but that can be considered important on the basis of expert judgement (e.g., because of their local rarity, or because they enable effective conservation of other important features) (Ref 18).

41. Requirements to comply with legislation are stated during the assessment, but legislative protection or priority listing does not necessarily translate to importance. For example, a transitory roost of a single bat would not be afforded the same importance as a regularly-occurring maternity roost (although legal obligations must still be met), and areas of priority habitat could be unfavourably small or in poor condition and not practically restorable.

The importance of ecological features is described within a geographic scale. Examples of the types of ecological features which might fall into various importance categories are given in Table 4-1, which is adapted from CIEEM (Ref 18).

42. For the purposes of this assessment, the geographical level of 'National' means Scotland, 'Regional' is defined as the area encompassed by the Eastern Lowlands Natural Heritage Zone (NHZ) (NHZ 16) (Ref 19), and 'Local' as the area within 10 km of the Proposed Development.

Table 4-1. Importance of Ecological Features

Importance	Example of Ecological Feature
International	• Special Protection Area (SPA), Special Area of Conservation (SAC) or Wetland of International Importance (Ramsar site), or site satisfying criteria for such designation, or feature essential to maintaining such sites. • Sustainable area (or part of a larger sustainable area) of best examples of Annex I habitat[1]. • A regularly-occurring, internationally-significant population (e.g., 1% of the international population, or potentially less for critical parts of wider populations or those at a critical life-cycle stage) of internationally important species listed on Annex 1 of the Birds Directive[2] or Annex II of the Habitats Directive.
National	• Nationally designated site (or proposed site), or site satisfying criteria for such designation. • Sustainable area of good quality Annex I habitat not deemed to be of international importance, or of a national priority habitat, which is a significant proportion of the national resource. • Regularly-occurring nationally significant population (e.g., 1% of the national population, or potentially less for critical parts of wider populations or those at a critical life-cycle stage) of species protected under national legislation or identified as being of national importance for conservation (e.g. through listing on the Scottish Biodiversity List (SBL)[1]). • A site supporting a regularly-occurring, nationally-significant population.
Regional	• Sustainable area of Annex I habitat or national priority habitat not deemed to be of higher importance (e.g., lower quality, highly fragmented, small and/or low restoration potential).

[1] Owing to the time of surveys all references to the SBL relate to the 2012 version, not the newest 2025 update.

Importance	Example of Ecological Feature
	• Regularly occurring regionally significant population (e.g., 1% of regional resource, or potentially less for critical parts of wider populations or those at a critical life-cycle stage) of species protected by legislation or identified as being a regional priority for conservation (e.g. through a Local Biodiversity Action Plan). • A site supporting a regularly occurring, regionally-significant population.
County	• Locally designated nature conservation site (or proposed such site). • Priority habitat of insufficient size or quality for higher importance, or degraded with low restoration potential. • Irregularly occurring locally significant population (e.g., 1% of local resource, or potentially less for critical parts of wider populations or those at a critical life-cycle stage) of species protected by legislation or identified as being a regional priority for conservation (e.g. through a Local Biodiversity Action Plan). • A site supporting a regularly occurring, locally-significant population
Local	• Priority habitat of insufficient size or quality for higher importance, or degraded with low restoration potential. • Habitat providing significant biodiversity or important ecological corridors in a local context. • Small sustainable population of notable species not qualifying for high importance or that are uncommon locally.
Negligible	• Common, heavily managed or modified habitat. • Common and widespread species.

[1] Habitat listed on Annex I of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (more commonly known as the 'Habitats Directive').

[2] Directive 2009/147/EC on the conservation of wild birds (more commonly known as the 'Birds Directive').

4.3 Describing Potential Impacts

43. Impacts may occur during the construction, operation, decommissioning and restoration phases of a development. They may be direct or indirect (also termed 'secondary'). Direct impacts are attributable to an action associated with a development. Indirect impacts are often produced away from a development or as a result of other initial impacts.

44. Likely impacts are characterised using those parameters below that are necessary to understand them:

- direction – whether the impact will have a beneficial or adverse effect;
- magnitude – the 'size', 'amount' or 'intensity' of an impact, described in quantitative terms as far possible (e.g. the amount of habitat loss, sound levels experienced by an ecological feature, etc.);
- extent – the spatial or geographical area or distance over which the impact or effect occurs;

- duration – the time over which an impact is expected to last prior to recovery or replacement (if possible) of the resource or feature. Where appropriate, ecological aspects such as lifecycles are considered. The duration of an effect may be longer than the duration of an activity or impact;
- timing and frequency – timing is important since an impact might not occur if it avoids critical seasons or life stages. Frequency considers activity repetition, which may have greater impact; and,
- reversibility – whether the impact is temporary or permanent. A temporary impact is one from which recovery is possible or for which effective mitigation is possible and enforceable. A permanent impact is one from which recovery is either not possible, or cannot be achieved within a reasonable timescale (in the context of the feature being assessed).

45. Magnitude is independent of the value of an ecological feature. Impacts/effects can be temporary or permanent, of varying duration (short-term being less than five years, medium-term being between 5-15 years, long-term being 15-25 years and permanent being more than 30 years), adverse or beneficial.

4.4 Determining Significance of Effect

46. Potential impacts on relevant ecological features are assessed and a judgement reached on whether or not the resultant effect on the 'conservation status' or structure and function is likely to be significant. This process takes into consideration the characteristics of the impact, the sensitivity of the ecological feature concerned, and the geographic scale at which the feature is considered important.

CIEEM (Ref 18) states that *"for the purpose of EcIA, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general*".

CIEEM (Ref 18Ref 16 BTO (2017). *Wetland Bird Survey: Survey Methods, Analysis, and Interpretation*. Norfolk: BTO, RSPB, JNCC, WWT.

Ref 17 Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S. (2000). *Bird Census Techniques. 2nd Edition*. Academic Press, London.

Ref 18) states that, for habitats, "*conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area*".

47. NatureScot and CIEEM define the conservation status of a species as "*the sum of the influences acting on the species concerned that may affect its abundance and distribution within a given geographical area*" (Ref 20). A species' conservation status is considered to be 'favourable' when:
    - population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats;
    - the natural range of the species is not being reduced, nor is it likely to be reduced for the foreseeable future; and,

- there is (and probably will continue to be) a sufficiently large habitat to maintain its population on a long-term basis.

48. The scale of the significance of an effect is assessed by determining whether the ecological integrity of a site or ecosystem, or the conservation status of a species, will be affected at the geographic levels described in Table 4-1, which in other words means effects on the conservation status of a feature will be significant at the following levels:
    - International, which would extend beyond Scotland;
    - National, which in this chapter is taken to be Scotland;
    - Regional, which means the Eastern Lowlands Natural Heritage Zone (NHZ 16);
    - County, which is the combined Fife and Clackmannanshire Local Authority Areas;
    - Local, which is the area within 10 km of the Proposed Development; and,
    - Negligible, which means effects will not be significant on conservation status of a feature even within restricted area of up to 10 km of the Proposed Development.

49. An effect could occur at a lower geographic level than the importance assigned to that particular ecological feature (for example, an effect on a habitat or population assigned national importance may be slight and not consequential at the national level). These assessments are based on quantitative evidence where possible, and as necessary through the professional judgement of experienced ecologists.

50. Initially, the assessment of effects does not consider mitigation (avoidance or reduction) or compensation measures, except where these are explicitly embedded into the design of the Proposed Development or where they are industry-standard good practice measures required to comply with other non-ecological legislation. The assessment of residual effects takes into account additional mitigation, with the aim that, wherever possible, residual effects are not significant or are significant at a lower geographic level than the unmitigated effects.

51. Consideration is given to cumulative effects, since effects acting in-combination may have a cumulative effect exceeding that of the separate effects. Cumulative effects may arise from a combination of effects from the Proposed Development itself (e.g., effects at the construction and operation stages), or the combined effects from different committed developments.

52. In the broader context of the EIA for the Proposed Development, effects on an ecological feature predicted to be significant at the Regional, National or International levels are considered to be ‘Significant’, whereas those predicted to be significant only at the Local or Negligible levels are considered to be ‘Not Significant’.

4.5 The Mitigation Hierarchy

53. The identification and specification of mitigation proposals in this assessment have been conducted with regard to the principles of the mitigation hierarchy:
    - avoid ecological features where possible;
    - reduce (minimise) the magnitude of the potential impact (e.g., through iterative design and/or advance commitment to sensitive methods or timing of working (sometimes termed as embedded mitigation or mitigation by design));

- mitigate the potential effect through the application of additional proven measures, such that the residual effect realised is reduced in magnitude (non-embedded mitigation); and
- compensate for significant residual effects (e.g., by providing suitable habitats elsewhere). Proposals should achieve appropriate compensation in a reasonable timeframe and be legally enforceable.

54. This hierarchy requires the highest level to be applied where possible. Only where this cannot reasonably be adopted should lower levels be considered. Where it is reasonably practicable to do so then attempts have been made to avoid potential impacts. Where impacts cannot be avoided then efforts have been made to limit the magnitude of the potential impact and to mitigate the resultant effects through the provision of appropriate measures. Where effects cannot be mitigated to a level where they are not significant, then compensatory measures can be employed to (as far as is reasonably possible) offset any remaining adverse residual effects.

5. Limitations and Assumptions

55. The aim of the desk study is to help characterise the baseline context of the Proposed Development and provide valuable background information that may not be captured by field survey alone. Information obtained during the desk study is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for particular species does not necessarily mean they do not occur in the study area. Likewise, the presence of records for a particular species does not automatically mean that these still occur within the area of interest or are relevant to the Proposed Development.

56. The desk study was carried out when initially writing up the results of field surveys in 2024. There have been no changes to statutory or non-statutory designated sites in the intervening period, however, it is possible additional records of protected and important species have been made in that time. Since desk study data only provides ecological context to the Proposed Development and is generally not detailed enough to inform presence/absence within the ZoI, lacking more recently made records does not pose a limitation to the assessment. Limitations as a result of lapsing time since field surveys were carried out is discussed in paragraph 70 below.

57. Where habitat edges are sharp and coincide with features on base-mapping or aerial photography that are considered correct, their placement is based on the accuracy of that data in GIS. Otherwise, habitat edges are best estimates as judged in the field. Note also that habitat transitions can be gradual without sharp boundaries. Consequently, habitat mapping and any stated habitat areas are approximate and should be verified by measurement on Site where required for design or construction.

58. Similarly, the location of recorded field signs is aligned with features on base-mapping or aerial photography where possible. Where the positioning is not clear, the accuracy of their positioning is dependent on GPS accuracy. Consequently, mapping and any stated distances of features from the Proposed Development are approximate and should be verified by measurement on Site where required for design or construction.

59. A large proportion of the survey area beyond the original KINN boundary, particularly that to the south (around Norris Knowe), could not be surveyed due to land access issues. This limited the protected species surveys by preventing access to pond KINN04 and to suitable badger and pine marten habitat. However, this is not a major constraint to the habitat survey,

given that the habitats in this area were broadly visible from adjacent accessible land, and that all land within the original KINN boundary was successfully surveyed.

60. The strip of woodland immediately adjacent to the railway in the east side of the Site could not be accessed for some of its length due to the presence of Network Rail safety fencing and signage. This is not considered a significant limitation as the sloping nature of this woodland meant that the majority of it could be visually inspected from the adjacent field and the ground is routinely disturbed by passing trains at baseline.

61. Land to the east of the railway was not accessed during the survey, including the aligning scrub/trees and unnamed tributary of Canal Burn, upstream of the brick culvert. The railway embankment would screen these habitats from the majority of works (from both visual and audible stimuli). Works associated with the existing tower and temporary mast at this location would be minimal and/or temporary. Additionally, it is clear from aerial imagery that habitats are mostly arable fields. There, the watercourse flows through an agricultural ditch with only two trees providing cover, therefore, it is unlikely to have opportunities for otter to take refuge. Trees and vegetation are routinely cleared from the area immediately next to the track as part of railway maintenance so no trees suitable to support roosting bats are likely to be present. There may be suitability for mammals such as badger to utilise the area adjacent to the railway as a corridor. This limitation is considered throughout the impact assessment.

62. The unnamed watercourse which flows along the southern edge of the Site was not surveyed for protected species west of where it is culverted under the road. There, the watercourse flows under dense bramble scrub, and any possible disturbance impact would be dampened by the main road.

63. Desk study search areas and field survey areas were based on the original KINN Site, and whilst there is a large overlap between that and the EIA boundary, some components of the Proposed Development lie outside. The desk study search areas are large enough that the information obtained is not considered to be limited. Similarly, the survey areas for great crested newt, otter, and wintering waterbirds are sufficiently large that any suitable habitat potentially relevant to the Proposed Development (excluding XL uprating and reconductoring works) that has not been surveyed is distant and isolated from the works (the Proposed Development, excluding XL uprating and reconductoring works, is situated between two major roads – the A876 and the A977 – which isolate it in the wider environment) such that impacts are highly unlikely. Subsequently, the data obtained by field surveys in relation to great crested newt and wintering waterbirds is considered sufficient and the conclusions drawn in this assessment are robust. Habitat, GLTA, water vole, and badger/pine marten surveys were not carried out within the ZoI of the easternmost new towers and westernmost temporary mast (those that are outside of the original KINN boundary), nor around the Hawkhill Road Access Improvements. Where applicable, field survey data was extrapolated, and online resources such as satellite aerial imagery and/or Street View (Google, 2024) were used to inform the assessment, and a precautionary approach was implemented where necessary. The baseline has also been reinforced using independent surveys by Bowland Ecology Ltd and Callophrys Tree Consultancy.

64. Habitat surveys did not extend to 250 m from works that require substantive groundworks (i.e. OHL tower works associated with New Towers, Temporary Masts, and Existing Towers to be removed) as is recommended in SEPA (Ref 21). Incidental notes made during field surveys, alongside a review of aerial imagery was used to determine if Ground Water Dependant Terrestrial Ecosystems (GWDTEs) may be present outside the habitat survey area.

65. Survey buffers were smaller than are typically recommended (100 m for otter and 25 m for habitats, badger, and water vole). This is not considered a limitation since the original KINN boundary is contained between two isolating and screening features (the A876 to the west and the railway to the east) and since the largest component of the Proposed Development (the substation footprint) is situated centrally within the original KINN boundary.

66. Only one survey for water vole was carried out around the Site at the start of the suitable survey season (mid-April-September). This is a deviation from guidance whereby a second survey for water vole is recommended to account for seasonal changes in distribution (Ref 12). This limitation is considered when drawing conclusions about water vole presence.

67. No dedicated red squirrel survey was carried out around the Site since no woodland would be directly impacted by the Proposed Development, and therefore no dreys within such woodland would be destroyed. On a precautionary basis and informed by desk study findings, this assessment assumes red squirrels are present within woodlands around the Site when considering the potential for indirect impacts.

68. It is unclear if surveys for protected species (including mammals, great crested newt, and wintering birds) carried out around XL uprating and reconductoring works were limited to an assessment of habitat suitability and incidental records of evidence, or if comprehensive surveys were carried out (Appendix 6.3: ECU – LWUP XL Route Refurbishment Ecological Walkover DRAFT REPORT (Bowland Ecology Ltd)). The habitat suitability assessment is used alongside aerial imagery and other desk-based resources to consider the likelihood of species being present. This limitation is considered throughout the impact assessment.

69. Ponds KINN04, Pond 1, Pond 2, and Pond 8 were not sampled for eDNA analysis due to access constraints (for KINN04) or scheduling (for Ponds 1, 2, and 8). Great crested newts were confirmed to be absent from all surveyed ponds within the KINN study area. Considering great crested newts live in a metapopulation structure usually comprising a cluster of multiple populated ponds, and that KINN is isolated in the wider environment by two main roads and the Firth of Forth, it is assumed with reasonable confidence that this species is absent from KINN04. In the absence of baseline information for Ponds 1, 2, and 8, a precautionary approach is used in the assessment.

70. The likelihood of deviations from baseline conditions increases with elapsed time since survey. While the baseline is not expected to change sufficiently to alter the impact assessment, the precise situation regarding protected/important species may nevertheless differ (for example, new badger setts may become established). In line with NatureScot guidance, pre-application surveys for protected species should be repeated if the application is delayed more than two years/survey seasons since the date of field survey. Pre-construction surveys should also take place as close to works commencing as possible (including facilitating works such as vegetation clearance) and certainly within the closest survey season (where applicable). Ideally, they should take place no less than six weeks prior to construction to allow time for potential licence applications and thus avoid possible project delays (Ref 22), this is included in the mitigation where appropriate.

6. References

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