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1 INTRODUCTION

Project background

- 1.1 Scott Cawley Ltd. were commissioned by RSK on behalf of ESB Ireland to undertake habitat surveys at the operational Carnsore Windfarm located at Carnsore Point, County Wexford. Habitat surveys were completed in July and September 2020 and have been undertaken to inform the proposed repowering development of the currently operational Carnsore Windfarm.
- 1.2 This report presents the habitat survey methodology, the habitat survey results, a summary and recommendations to be considered in the proposed development design.

Existing environment

- 1.3 Carnsore Wind Farm (hereafter referred to as 'the site') is located at Carnsore Point, County Wexford. The site contains fourteen turbines located on improved agricultural grassland with a sand dune system to the south. To the east of the site is the Irish Sea and to the south is the Atlantic Ocean.
- 1.4 Habitats within the site include mostly agricultural fields grazed by livestock, hedgerows forming field boundaries and areas of scattered bramble and gorse scrub are found throughout the site, with a larger area dominated by scrub in the west of the site.

Statement of authority

- 1.5 Habitat surveys were carried out by Caroline Kelly Senior Ecologist of Scott Cawley Ltd. The report was authored by Caroline and has been reviewed for quality assurance purposes by Dr. Niamh Burke of Coiscéim Ecology and Maeve Maher-McWilliams Principal Ecologist with Scott Cawley Ltd.
- 1.6 Caroline Kelly holds an honours degree in Environmental Biology, from University College Dublin (UCD) and a Masters in Applied Ecological Assessment from University College Cork (UCC). She is a Senior Ecologist at Scott Cawley, having worked at the company since 2015. Caroline has experience in habitat survey and assessment (including Annex I habitats and legally protected sites) in a range of terrestrial, freshwater and coastal environments.
- 1.7 Niamh Burke is Principal Ecologist with Coiscéim Ecology. She holds a BSc in Natural Sciences with Environmental Science and a PhD in salmonid ecology. She is a Chartered Environmentalist (CEnv) with the Society for the Environment (Soc Env) and a Full Member of the CIEEM. Niamh is a senior scientist with academic research and consulting experience in terrestrial ecology, aquatic ecology and fluvial geomorphology.
- 1.8 Maeve Maher-McWilliams is a Principal Ecologist with Scott Cawley and is an Associate member of CIEEM. She holds a Masters in Evolutionary and Behavioural Ecology from University of Exeter and an honours degree in Biological Sciences from Queens



University Belfast. Maeve has worked in ecological consultancy for over nine years and has worked on a range of large to small scale projects across Ireland and the UK.

2 METHODOLOGY

Habitat survey

- 2.1 A habitat survey was undertaken of the proposed development site on the 21 July and 8 September 2020 by Caroline Kelly of Scott Cawley Ltd. following the methodology described in Best Practice Guidance for Habitat Survey and Mapping¹. All habitat types were classified using the Guide to Habitats in Ireland², recording the indicator species and abundance using the DAFOR scale³ and recording any species of conservation interest. Vascular and bryophyte plant nomenclature generally follow that of The National Vegetation Database⁴, having regard to more recent taxonomic changes to species names after the New Flora of the British Isles⁵ and the British Bryological Society's Mosses and Liverworts of Britain and Ireland: A Field Guide⁶. Annex I habitat types were classified after the Interpretation manual of European Union Habitats EUR28⁷ with reference to the corresponding national habitat survey reports and NPWS wildlife manuals, as applicable. The nomenclature for Annex I habitats follows that of the Interpretation manual of European Union Habitats EUR28 with abbreviated names after those used in The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview⁸.

Ecological Evaluation

- 2.2 Ecological receptors (including identified sites of ecological importance) are valued with regard to the ecological valuation examples set out in *Guidelines for Assessment of Ecological Impacts of National Roads Schemes: Revision 2*⁹ and the guidance provided in *Guidelines for Ecological Impact Assessment in the UK and Ireland*¹⁰ – refer to

¹ Smith, G.F., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council Church Lane, Kilkenny, Ireland.

² Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. Heritage Council, Kilkenny.

³ The DAFOR scale is an ordinal or semi-quantitative scale for recording the relative abundance of plant species. The name DAFOR is an acronym for the abundance levels recorded: Dominant, Abundant, Frequent, Occasional and Rare.

⁴ Weekes, L.C. & FitzPatrick, Ú. (2010) *The National Vegetation Database: Guidelines and Standards for the Collection and Storage of Vegetation Data in Ireland*. Version 1.0. Irish Wildlife Manuals, No. 49. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

⁵ Stace, C. (2019) *New Flora of the British Isles*. 4th Edition. C&M Floristics.

⁶ Atherton, I., Bosanquet, S. & Lawley, M. (2010) *Mosses and Liverworts of Britain and Ireland: A Field Guide*. Latimer Trend & Co., Plymouth.

⁷ CEC. (Commission of the European Communities) (2013) *Interpretation manual of European Union Habitats EUR28*. European Commission, DG Environment.

⁸ NPWS (2019). *The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview*. Unpublished NPWS report.

⁹ NRA (2009) *Guidelines for Assessment of Ecological Impacts of National Roads Schemes: Revision 2*. National Roads Authority.

¹⁰ CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland*. Chartered Institute of Ecology and Environmental Management, Winchester, UK.

Appendix 1 for examples of how ecological importance is assigned. In accordance with these guidelines, important ecological features within what is referred to as the Zone of Influence (Zoi) of the proposed development which are “both of sufficient value to be material in decision making and likely to be affected significantly” are deemed to be ‘Key Ecological Receptors’ (KERs). These are the ecological receptors which may be subject to significant effects from the proposed development, either directly or indirectly. KERs are those biodiversity receptors with an ecological value of local importance (higher value) or greater.

3 RESULTS

Habitat survey

3.1 The following habitat types, and mosaics of same, as described in Fossitt (2000) were identified within the proposed development site boundary:

- Arable crops (BC1);
- Stonewalls and other stonework (BL1);
- Earth banks (BL2);
- Buildings and artificial surfaces (BL3);
- Rocky sea cliffs (CS1);
- Spoil and bare ground (ED2);
- Recolonising bare ground (ED3);
- Reed and large sedge swamps (FS1);
- Improved agricultural grassland (GA1);
- Dry calcareous and neutral grassland (GS1);
- Dry meadows and grassy verges (GS2);
- Wet grassland (GS4);
- Dense bracken (HD1);
- Shingle and gravel shores (LS1);
- Moderately exposed rocky shores (LR2);
- Mixed substrata shores (LR4);
- Hedgerow (WL1); and;
- Scrub (WS1).

3.2 See Figure 1 for the habitat map in the separate Figures Appendix. Detailed habitat descriptions are provided in the sections below.

Arable crops (BC1)

3.3 Two fields of potato crop, sown in drills, were classified as this habitat type. These fields were located in close proximity to the entrance to the windfarm and the soil in these fields was light and sandy. Subordinate vegetation recorded included Redshank *Persicaria maculosa*, Scarlet pimpernel *Anagallis arvensis*, Creeping thistle *Cirsium arvense*, Field speedwell *Veronica persica*, Pineappleweed *Matricaria discoidea* and Greater plantain *Plantago major*. Grasses such as Cock's-foot *Dactylis glomerata* and Perennial ryegrass *Lolium perenne* were found towards the field margins. See Plate 1 in Appendix 2 for photographic evidence of this habitat type within the site.

3.4 Due to the cultivated nature of this habitat type, and the fact that it is relatively species poor in terms of composition, it is valued as being of local importance (lower value).

Stonewalls and other stonework (BL1)

- 3.5 The ruins of St. Vogue's Church, which occurs in the southern half of the site, was categorised under this habitat type. The structure was composed of natural stone and vegetation present included Bramble *Rubus fruticosus*, lichens and bryophytes. *Rubus fruticosus* was the most abundant vegetation, occurring on the side walls of the ruins.
- 3.6 Field boundaries, which were composed of large boulders, although not typical walls in terms of structure, were also included under this habitat type. Boulders here often occurred alongside dense patches of *Rubus fruticosus*. Other species occasionally found in this habitat type included Fuchsia *Fuchsia magellanica*, Common Ragwort *Jacobaea vulgaris*, and tussocky grasses such as False oat-grass *Arrhenatherum elatius* and *Dactylis glomerata*. See Plate 2 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.7 Due to the low species diversity associated with this habitat type it is considered to be of local importance (lower value).

Earth banks (BL2)

- 3.8 Earth banks formed the field boundaries in certain locations across the site. These were most commonly vegetated with dense *Rubus fruticosus*, Bracken *Pteridium aquilinum* or grassland species such as *Arrhenatherum elatius*, *Dactylis glomerata*, Common nettle *Urtica dioica*, *Jacobaea vulgaris* and *Lolium perenne*.
- 3.9 Due to the low species diversity associated with this habitat type it is considered to be of local importance (lower value).

Buildings and artificial surfaces (BL3)

- 3.10 Existing buildings present on site were classified under this habitat type. Such buildings included the control centre for the windfarm, an old building in the southern portion of the site, existing containers and red-brick building in the south-west of the site. Some roads around the perimeter of the site were also classified under this habitat type due to their composition (tarmacadam). See Plate 3 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.11 Areas of buildings and artificial surfaces recorded within the site boundary were largely devoid of vegetation and are therefore considered to be of local importance (lower value).

Rocky sea cliffs (CS1)

- 3.12 A small area of rocky sea cliffs was recorded in the southernmost portion of the site. The area was composed of exposed bedrock and accumulations of large loose rocks. Vegetation recorded here included Sea thrift *Armeria maritima* and Buck's-horn plantain *Plantago coronopus*.
- 3.13 This habitat type is considered to be of local importance (higher value) due to its sensitive nature.

Spoil and bare ground (ED2)

- 3.14 The access roads throughout the site and most of the gravelled areas immediately below the wind turbines were categorised under this habitat type. These areas were composed of unconsolidated gravel material and are routinely disturbed by vehicles driving around the site (e.g. for maintenance works). These habitat types also occurred in mosaics with the following habitats; recolonising bare ground (ED3); scrub (WS1); and; dry meadows and grassy verges (GS2). See Plate 4 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.15 These areas are largely devoid of any significant vegetation and are therefore of local importance (lower value).

Recolonising bare ground (ED3)

- 3.16 Some areas immediately below the wind turbines were more vegetated (i.e. >50%) than that which would be expected in a spoil and bare ground habitat (ED2) (see above). These areas were categorised as recolonising bare ground, in accordance with Fossitt (2000), and consisted of a gravel base which has been colonised by opportunistic plant species. Silverweed *Potentilla anserina* was frequently encountered in these areas, while *Rubus fruticosus*, Yorkshire fog *Holcus lanatus*, *Persicaria maculosa* and Cat's-ear *Hypochaeris radicata* occurred occasionally. Species which were recorded only rarely, included Smooth sowthistle *Sonchus oleraceus*, Creeping buttercup *Ranunculus repens* and Broad-leaved dock *Rumex obtusifolius*. This habitat type also occurred in mosaics with the following habitats; spoil and bare ground (ED2); and dry calcareous and neutral grassland (GS1). See Plate 5 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.17 As this is a transient habitat that has developed as a result of disturbance, and is relatively species poor, this habitat is valued as being of a local importance (lower value).

Reed and large sedge swamps (FS1)

- 3.18 A large reed bed in the northernmost portion of the site was classified under this habitat type. Vegetation here was very dense and was dominated by Common reed *Phragmites australis*. More open areas occurred towards the east, as the reed beds grade to the beach. Here, species such as Red fescue *Festuca rubra*, *Potentilla anserina*, Ribwort plantain *Plantago lanceolata* and Bush vetch *Vicia sepium* occurred, with *Phragmites australis* being less dominant. Field bindweed *Convolvulus arvensis* was present creeping along the field layer. Towards the shore Wild carrot *Daucus carota* and Scented mayweed *Matricaria chamomilla* occurred frequently. A localised stand of the non-native Montbretia *Crocasmia x crocosmiiflora* was also present. A stand of Bulrush *Typha latifolia* was present along the southern border of this habitat type, occurring alongside willow scrub (WS1). See Plate 6 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.19 Despite the largely homogenous composition of this habitat, being mainly comprised of *Phragmites australis*, wetland habitats are valuable to biodiversity and this habitat type is therefore valued as being of local importance (higher value).

Improved agricultural grassland (GA1)

- 3.20 The majority of the proposed development site consists of improved agricultural grassland fields. These fields are grazed by cattle and managed accordingly. *Lolium perenne* dominated the sward, while White clover *Trifolium repens* was abundant. *Holcus lanatus* and *Festuca rubra* occurred occasionally as did localised stands of Spear thistle *Cirsium vulgare* and *Jacobaea vulgaris*. Species which were only encountered rarely included *Rumex obtusifolius*, *Plantago major*, *Ranunculus repens* and Daisy *Bellis perennis*. *Matricaria discoidea* and Crested dogs-tail *Cynosurus cristatus* occurred in localised patches. This habitat type also occurred in mosaics with the following habitat types; dry calcareous and neutral grassland (GS1); wet grassland (GS4); and; scrub (WS1). See Plates 7 and 8 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.21 Due to the monotypic composition of this habitat type, along with its managed and improved nature, this habitat type is considered to be of local importance (lower value).

Dry calcareous and neutral grassland (GS1)

- 3.22 This type of grassland habitat is generally associated with low intensity agriculture and occurs on free draining soils. One such area occurred to the rear of turbine G002 in the southern half of the site. Here no one species dominated but *Daucus carota*, *Plantago lanceolata* and Sweet vernal-grass *Anthoxanthum odoratum* were abundant. *Trifolium repens*, *Festuca rubra* and *Holcus lanatus* occurred frequently. *Dactylis glomerata* occurred occasionally, along with Red clover *Trifolium pratense*, Common bird's-foot-trefoil *Lotus corniculatus*, Common chickweed *Stellaria media*, *Rumex obtusifolius*, *Hypochaeris radicata* and *Anagallis arvensis*. Less commonly occurring species included *Jacobaea vulgaris*, Common hogweed *Heracleum sphondylium*, Kidney vetch *Anthyllis vulneraria* and Sea mayweed *Tripleurospermum maritimum*. A localised patch of Common centaury *Centaureum erythraea* was also present.
- 3.23 Another area of dry calcareous and neutral grassland occurred in a small field near the Met Mast on site. Here, grass species consisted of *Cynosurus cristatus* and *Holcus lanatus*. Devil's-bit scabious *Succisa pratensis* was abundant and Tormentil *Potentilla erecta*, *Trifolium pratense* and *Hypochaeris radicata* were frequently recorded. *Stellaria media*, *Trifolium repens* and *Jacobaea vulgaris* occurred to a lesser extent.
- 3.24 This habitat type often occurred in a mosaic with improved agricultural grassland (GS1), particularly in fields close to the coast. These areas were grazed by cattle. Here *Cynosurus cristatus* dominates the sward, with *Trifolium repens* being abundant. Several other grass species occurred frequently including *Holcus lanatus*, *Lolium perenne* and *Anthoxanthum odoratum*. Herbaceous species frequently recorded included *Bellis perennis*, *Ranunculus repens* and *Jacobaea vulgaris*. Meadow fox-tail *Alopecurus pratensis*, *Dactylis glomerata* and *Festuca rubra* occurred occasionally along with a broad range of herbaceous species such as Yarrow *Achillea millefolium*, *Potentilla anserina*, *Cirsium arvense*, *Plantago lanceolata*, *Hypochaeris radicata* and Dandelion *Taraxacum officinale* agg. Less commonly encountered species included *Daucus carota*, *Trifolium pratense*, Selfheal *Prunella vulgaris*, *Lotus corniculatus*, *Stellaria media*, sedge species *Carex* spp. and *Convolvulus arvensis*.

- 3.25 The field at the southernmost point of the site was categorised as a mosaic of improved agricultural grassland (GA1) and dry calcareous and neutral grassland (GS1). Additional species to those listed above, which were recorded here, included *Plantago major*, *Matricaria chamomilla* and *Plantago coronopus*. In addition to improved agricultural grassland (GA1), dry calcareous and neutral grassland also occurred in mosaics with the following habitats; scrub (WS1); and; dry meadows and grassy verges (GS2).
- 3.26 See Plates 9 and 10 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.27 Given the high level of species diversity associated with this habitat, it is considered to be of local importance (higher value).

Dry meadows and grassy verges (GS2)

- 3.28 Dry meadows and grassy verges habitat occurred where unmanaged grassland had been left to grow tall and tussocky. These areas were usually dominated by tall grasses such as *Arrhanatherum elatius* and *Dactylis glomerata*, with the shorter *Holcus lanatus* occurring closer to the ground. *Cirsium arvense* and Meadow vetchling *Lathyrus pratensis* were frequently found, while *Daucus carota*, *Trifolium pratense*, *Heracleum sphondylium*, *Ranunculus repens*, *Urtica dioica*, *Festuca rubra*, *Plantago lanceolata*, *Trifolium repens* and Hedge woundwort *Stachys sylvatica* occurred occasionally. More rarely encountered species included *Jacobaea vulgaris*, willowherb species *Epilobium spp.*, Common fumitory *Fumaria officinalis*, Tufted vetch *Vicia cracca*, Common knapweed *Centaurea nigra*, Prickly sowthistle *Sonchus asper*, *Rumex obtusifolius*, Oxeye daisy *Leucanthemum vulgare* and *Stellaria media*. Dry meadows and grassy verges also occurred in mosaics with the following habitat types; scrub (WS1); dry calcareous and neutral grassland (GS1); and; spoil and bare ground (ED2). See Plate 11 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.29 This is a relatively species-rich habitat and therefore is regarded to be of local importance (higher value).

Wet grassland (GS4)

- 3.30 Areas of wet grassland on site typically consisted of grasslands dominated by Soft rush *Juncus effusus* and *Holcus lanatus*. *Potentilla anserina* was often abundant, while *Ranunculus repens*, *Urtica dioica* and *Trifolium repens* occurred frequently. Other species commonly encountered in these areas included Purple loosestrife *Lythrum salicaria*, willowherb species *Epilobium spp.*, Meadow buttercup *Ranunculus acris*, *Potentilla erecta*, sedge species *Carex spp.*, Common bent *Agrostis capillaris* and Jointed rush *Juncus articulatus*. Flag Iris *Iris pseudacorus*, *Succisa pratensis* and *Phragmites australis* sometimes occurred in areas of wet grassland, with *Iris pseudacorus* and *Phragmites australis* occurring in localised stands.
- 3.31 Fields in the northernmost part of the site were composed of wet grassland. They were dominated by *Juncus effusus*, with *Urtica dioica*, Rosebay willowherb *Chamaenerion angustifolium* and *Cirsium arvense* abundant. Marsh woundwort *Stachys palustris* and *Lathyrus pratensis* were occasionally found, while *Phragmites australis* occurred towards the northern portion of the field. *Rubus fruticosus* was present in patches and in two of

the three fields wet grassland (GS4) occurred in a mosaic with scrub (WS1), although the scrub component here was Gorse *Ulex europaeus*.

- 3.32 See Plate 12 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.33 This habitat type also occurred in mosaics with the following habitats; scrub (WS1); and; improved agricultural grassland (GA1). Given the species richness of this habitat type it is considered to be of local importance (higher value).

Dense bracken (HD1)

- 3.34 Areas of dense bracken occurred towards the coast, along the southern boundary of the site. Here, Bracken *Pteridium aquilinum* dominated, with *Rubus fruticosus* and Marram *Ammophila arenaria* occurring occasionally. See Plate 13 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.35 As a relatively species poor habitat, this habitat type is considered to be of local importance (lower value).

Shingle and gravel shores (LS1)

- 3.36 This area marks the transition zone between the beach (LR4) and the reed beds (FS1) in the northern part of the site. It was dominated by pebbles, but with patches of sand occurring occasionally. Vegetation here was sparse, except for washed up seaweed which was in a degraded state. Driftwood was also present. Towards the edge of this habitat, where it grades into the reed beds, *Ammophila arenaria* occurred briefly but did not cover a large enough area to constitute a new habitat type.
- 3.37 This habitat type is considered to be of local importance (higher value) due to its coastal location and the important transition zone it provides between coastal habitats and more inland habitats.

Moderately exposed rocky shores (LR2)

- 3.38 The rocky shore along the east coast of the proposed development site was classified under this habitat type. This habitat was composed of exposed bedrock, boulders and cobbles. Lichens were present on these rock surfaces, and decomposing seaweed was plentiful along the shore. The most commonly encountered seaweed was Bladder wrack *Fucus vesiculosus*. In terms of fauna species present, Limpets *Patella* spp. were common on rock surfaces, and Common mussels *Mytilus edulis* were often found amongst seaweeds. See Plate 14 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.39 This habitat type is considered to be of local importance (higher value) due to its coastal location and the littoral fauna species it supports.

Mixed substrata shores (LR4)

- 3.40 The beach in the northern portion of the proposed development site was classified as a mixed substrata shore. This was due to its composition which consisted of a mixture of rock and sediment (sand). Seaweeds occurred on both the rock surfaces and pools of seawater on the beach. *Fucus vesiculosus*, Spiral wrack *Fucus spiralis* and Serrated wrack *Fucus serratus* were the most frequently recorded seaweed species, while an

unidentified red algae was present in some of the pools of water. *Patella spp.* and *Mytilus edulis* were commonly found on rock surfaces. See Plate 15 in Appendix 2 for photographic evidence of this habitat type within the site.

- 3.41 This habitat type is considered to be of local importance (higher value) due to its coastal location and the littoral fauna species it supports.

Hedgerow (WL1)

- 3.42 Many of the field boundaries on site consisted of hedgerows. Most hedgerows were dominated by *Ulex europaeus* and *Rubus fruticosus*. *Pteridium aquilinum*, *Arrhenatherum elatius*, *Cirsium spp.*, *Dactylis glomerata*, *Urtica dioica*, *Jacobaea vulgaris* and Hawthorn *Crataegus monogyna* also occurred in hedgerows on site. A hedgerow composed solely of willow species *Salix spp.* was recorded in the northern portion of the site. In wetter areas, species such as *Phragmites australis* and *Lythrum salicaria* occur alongside *Rubus fruticosus*. Most hedgerows on site were low growing due to their species composition (i.e. absence of tree species) and their exposed location by the coast. See Plate 16 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.43 Hedgerows on site are considered to be of local importance (lower value) given their low species diversity.

Scrub (WS1)

- 3.44 Scrub occurred in many areas of the proposed development site. The most commonly encountered species in areas of scrub on site included *Ulex europaeus*, *Rubus fruticosus*, *Arrhenatherum elatius* and *Pteridium aquilinum*. Scrub dominated by *Ulex europaeus* was the most frequently encountered type of scrub habitat on site. In wetter areas *Phragmites australis* and willow species *Salix spp.* occurred alongside *Ulex europaeus* and in more central areas of the site, and towards the coast, scrub is dominated by *Ulex europaeus* with *Pteridium aquilinum* abundant.
- 3.45 Where scrub occurred in a mosaic with wet grassland (GS4), tussocky grasses such as *Arrhenatherum elatius* and *Dactylis glomerata* occur alongside species such as *Juncus effusus*, *Holcus lanatus*, *Lythrum salicaria*, *Jacobaea vulgaris*, *Urtica dioica*, *Heracleum spondylium*, *Stachys sylvatica*, *Lotus corniculatus*, *Ranunculus acris* and *Potentilla anserina*. Common scrub components included *Ulex europaeus*, *Rubus fruticosus*, *Crataegus monogyna* and *Pteridium aquifolium*. Localised pockets of *Iris pseudacorus*, *Phragmites australis* and Horsetail species *Equisetum spp.* were also present. Willow species *Salix spp.* were often present as part of the scrub component in these areas.
- 3.46 Scrub also occurred in mosaics with dry meadows and grassy verges (GS2). Here species included *Arrhenatherum elatius*, *Dactylis glomerata*, *Holcus lanatus*, *Jacobaea vulgaris*, *Rumex obtusifolius*, *Urtica dioica*, Hoary willowherb *Epilobium parviflorum*, *Daucus carota*, *Plantago lanceolata*, *Lotus corniculatus*, *Hypochaeris radicata* and Hedge bindweed *Calystegia sepium*. Common scrub components included *Ulex europaeus*, *Rubus fruticosus* and *Pteridium aquilinum*.
- 3.47 In addition to the mosaics described above, scrub also occurred in mosaics with the following habitat types; improved agricultural grassland (GA1), dry calcareous and neutral

grassland (GS1), spoil and bare ground (ED2), recolonising bare ground (ED3) and stonewalls and other stonework.

- 3.48 See Plate 17 in Appendix 2 for photographic evidence of this habitat type within the site.
- 3.49 Owing to the fact that the majority of scrub habitat on site was dominated by *Ulex europaeus*, this habitat type is considered to be of local importance (lower value).

4 SUMMARY OF HABITATS

4.1 **Error! Reference source not found.**1 below summarises the ecological evaluation of all habitat types identified within the site, taking into consideration legal protection, conservation status and local abundance, and identifies the Key Ecological Receptors (KERs). KERs are those biodiversity receptors with an ecological value of local importance (higher value) or greater.

Table 1: Summary of Key Ecological Receptors (KERs)

Habitat type	Ecological Valuation	KER?
Arable crops (BC1)	Local importance (lower value)	No
Stonewalls and other stonework (BL1)	Local importance (lower value)	No
Earth banks (BL2)	Local importance (lower value)	No
Buildings and artificial surfaces (BL3)	Local importance (lower value)	No
Rocky sea cliffs (CS1)	Local importance (higher value)	Yes
Spoil and bare ground (ED2)	Local importance (lower value)	No
Recolonising bare ground (ED3)	Local importance (lower value)	No
Reed and large sedge swamps (FS1)	Local importance (higher value)	Yes
Improved agricultural grassland (GA1)	Local importance (lower value)	No
Dry calcareous and neutral grassland (GS1)	Local importance (higher value)	Yes
Dry meadows and grassy verges (GS2)	Local importance (higher value)	Yes
Wet grassland (GS4)	Local importance (higher value)	Yes
Dense bracken (HD1)	Local importance (lower value)	No
Shingle and gravel shores (LS1)	Local importance (higher value)	Yes
Moderately exposed rocky shores (LR2)	Local importance (higher value)	Yes
Mixed substrata shores (LR4)	Local importance (higher value)	Yes
Hedgerow (WL1)	Local importance (lower value)	No
Scrub (WS1)	Local importance (lower value)	No

4.2 Habitats of local importance (higher value) are more ecologically valuable than those of local importance (lower value). Therefore, impacts on habitats of local importance (lower value) will be less significant, from a biodiversity perspective, than those on habitats of local importance (higher value).

4.3 Regarding the proposed repowering project, coastal habitats such as rocky sea cliffs (CS1), shingle and gravel shores (LS1), moderately exposed rocky shores (LR2) and mixed substrata shores (LR4) should be avoided. These are extremely sensitive habitats,

and given their coastal location works in these areas could have subsequent negative effects on surrounding waters.

- 4.4 Wetland habitats are important for biodiversity and are ecologically valuable, as such reed and large sedge swamps (FS1) and wet grassland (GS4) are habitats of local importance (higher value). Where possible, the location of proposed wind turbines and supporting infrastructure (e.g. access roads) should avoid these habitats, particularly the wet grassland and reed swamp area in the north-eastern section of the site.
- 4.5 Semi-natural grassland habitats such as dry calcareous and neutral grasslands (GS1) and dry meadows and grassy verges (GS2) are of local ecological importance (higher value). From a biodiversity perspective these offer more potential to local wildlife (e.g. pollinators, invertebrates etc.) than improved agricultural grasslands (GA1). Likewise, agricultural grassland which have a calcareous element (GA1/ GS1) are more ecologically valuable than the monocultures typically associated with improved agricultural grasslands (GA1). Therefore, where possible the location of proposed wind turbines and supporting infrastructure (e.g. access roads) should avoid more sensitive grassland habitats and, from a biodiversity perspective, it would be preferable to position proposed wind turbines in areas of the less ecologically valuable improved agricultural grassland (GA1) habitat.
- 4.6 Regarding the proposed development footprint, the least damaging approach, with respect to the sites existing habitats, would be to retain, in so far as possible, the existing footprint and infrastructure. The creation of new access roads or new turbine locations through previously undisturbed habitats, regardless of the ecological value of the habitats directly affected, would have a greater cumulative effect on biodiversity across the site than utilising the existing infrastructure. Habitat loss cannot be mitigated against however biodiversity enhancement measures could be applied to reach an overall no net loss of biodiversity across the site. Where the proposed development footprint does not overlap with the existing footprint and infrastructure, reinstatement of habitats could be undertaken.
- 4.7 Decommissioning of existing wind turbines has the potential to result in direct and indirect effects on habitats on site. Direct impacts would occur at the existing location of the wind turbine through the removal of the existing turbine and all associated movements of construction machinery etc. Indirect effects may occur as a result of dust pollution, generated through decommissioning works, or potentially, works to existing foundations if new turbines are proposed in the same locations as the existing but foundation loading requirements differ. Mitigation measures can be employed to minimise these impacts.
- 4.8 At this stage and without seeing any proposed design for the repowering development, it is difficult to provide detail on potential impacts and potential mitigation measures. However, overall it is recommended that where possible, works are confined to either existing disturbed ground (ED2, ED3 habitats) or to habitats of local ecological importance (lower value) (refer to Table 1).
- 4.9 As part of the Ecological Impact Assessment, where any likely significant effects are expected as a result of the proposed repowering development, recommendations to avoid, reduce or remedy likely significant effects (where necessary and appropriate) will be identified and provided to the design team. If appropriate, recommendations will also

be made for the amelioration and enhancement of the site's biodiversity through the appropriate design of the proposed repowering development.

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FIGURES

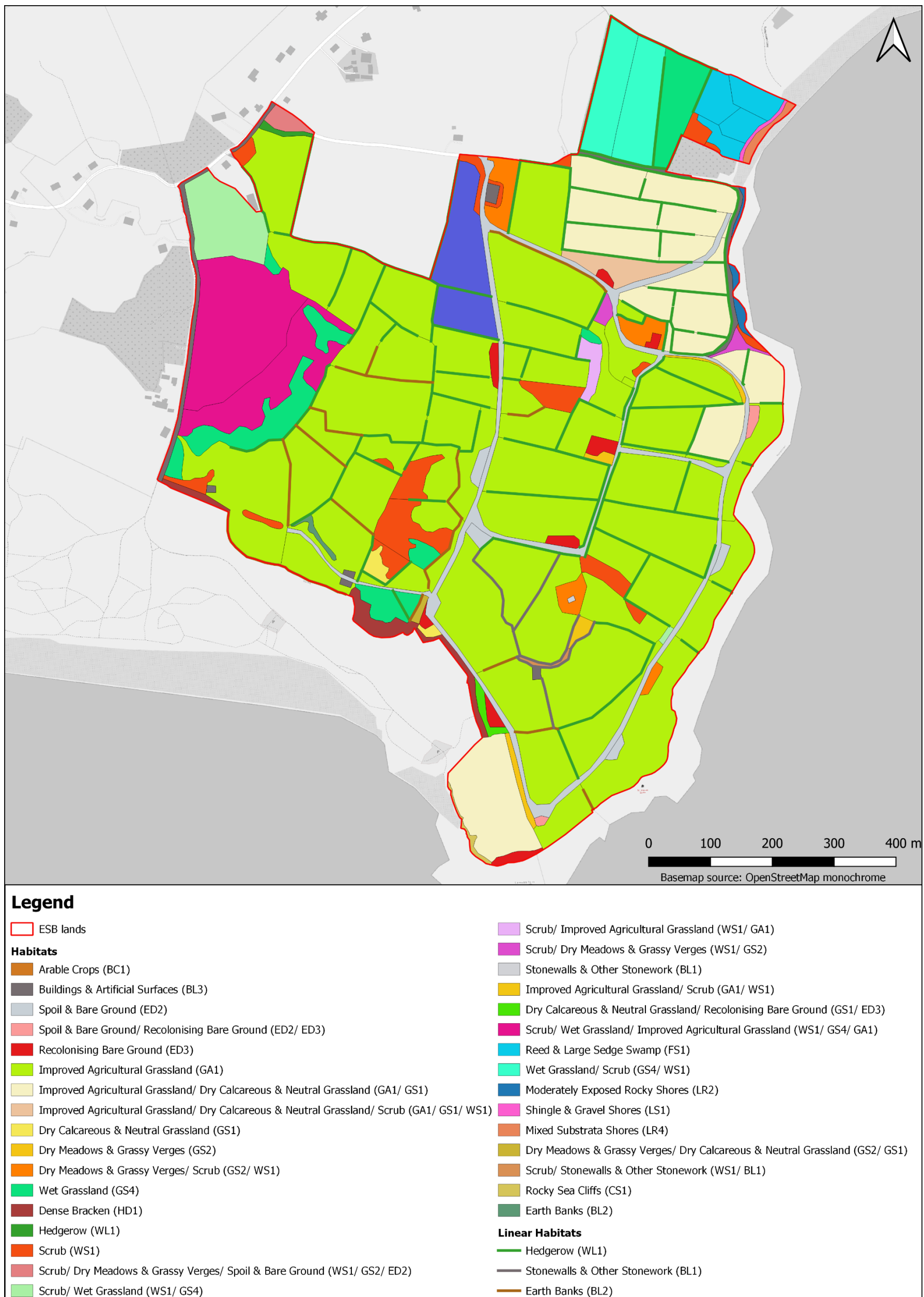


Figure 1: Habitat Map

APPENDIX 1 - EXAMPLES OF VALUING IMPORTANT ECOLOGICAL FEATURES

International Importance:

- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
- Proposed Special Protection Area (pSPA).
- Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
- Features essential to maintaining the coherence of the Natura 2000 Network.¹¹
- Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
- Resident or regularly occurring populations (assessed to be important at the national level)¹² of the following:
 - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
 - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
- Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
- World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
- Biosphere Reserve (UNESCO Man & The Biosphere Programme).
- Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
- Biogenetic Reserve under the Council of Europe.
- European Diploma Site under the Council of Europe.
- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 1988).¹³

National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.

¹¹ See Articles 3 and 10 of the Habitats Directive

¹² It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

¹³ Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*)

- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level)¹⁴ of the following:
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Site containing ‘viable areas’¹⁵ of the habitat types listed in Annex I of the Habitats Directive

County Importance:

- Area of Special Amenity.¹⁶
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level)¹⁷ of the following:
 - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
 - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan, if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

¹⁴ It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

¹⁵ A ‘viable area’ is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

¹⁶ It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

¹⁷ It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)¹⁸ of the following:
 - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
 - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

¹⁸ It is suggested that, in general, 1% of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

APPENDIX 2 - HABITAT TYPE PLATES



Plate 1: Arable crops (BC1) (July 2020).



Plate 2: Stonewalls and other stonework (BL1) at ruins of St. Vogue's Church (July 2020).



Plate 3: Buildings and artificial surfaces (BL3) in the southern portion of the site (July 2020).



Plate 4: Spoil and bare ground (ED2) on an access road on site (July 2020).



Plate 5: Recolonising bare ground (ED3) at the base of one of the wind turbines (July 2020).



Plate 6: Reed and large sedge swamps (FS1) located in the northern portion of the site (September 2020).



Plate 7: Improved agricultural grassland (GA1) (July 2020).



Plate 8: Mosaic of improved agricultural grassland (GA1) and dry calcareous and neutral grassland (GS1) (July 2020).



Plate 9: Dry calcareous and neutral grassland (GS1) habitat in the south of the site (July 2020).



Plate 10: *Centaurium erythraea* as recorded in an area of dry calcareous and neutral grassland (GS1) habitat (July 2020).



Plate 11: Dry meadows and grassy verges (GS2) (July 2020).



Plate 12: Wet grassland (GS4) (July 2020).



Plate 13: Dense bracken (HD1) habitat towards the coast in the south of the site (July 2020).



Plate 14: Moderately exposed rocky shores (LR2) (September 2020).



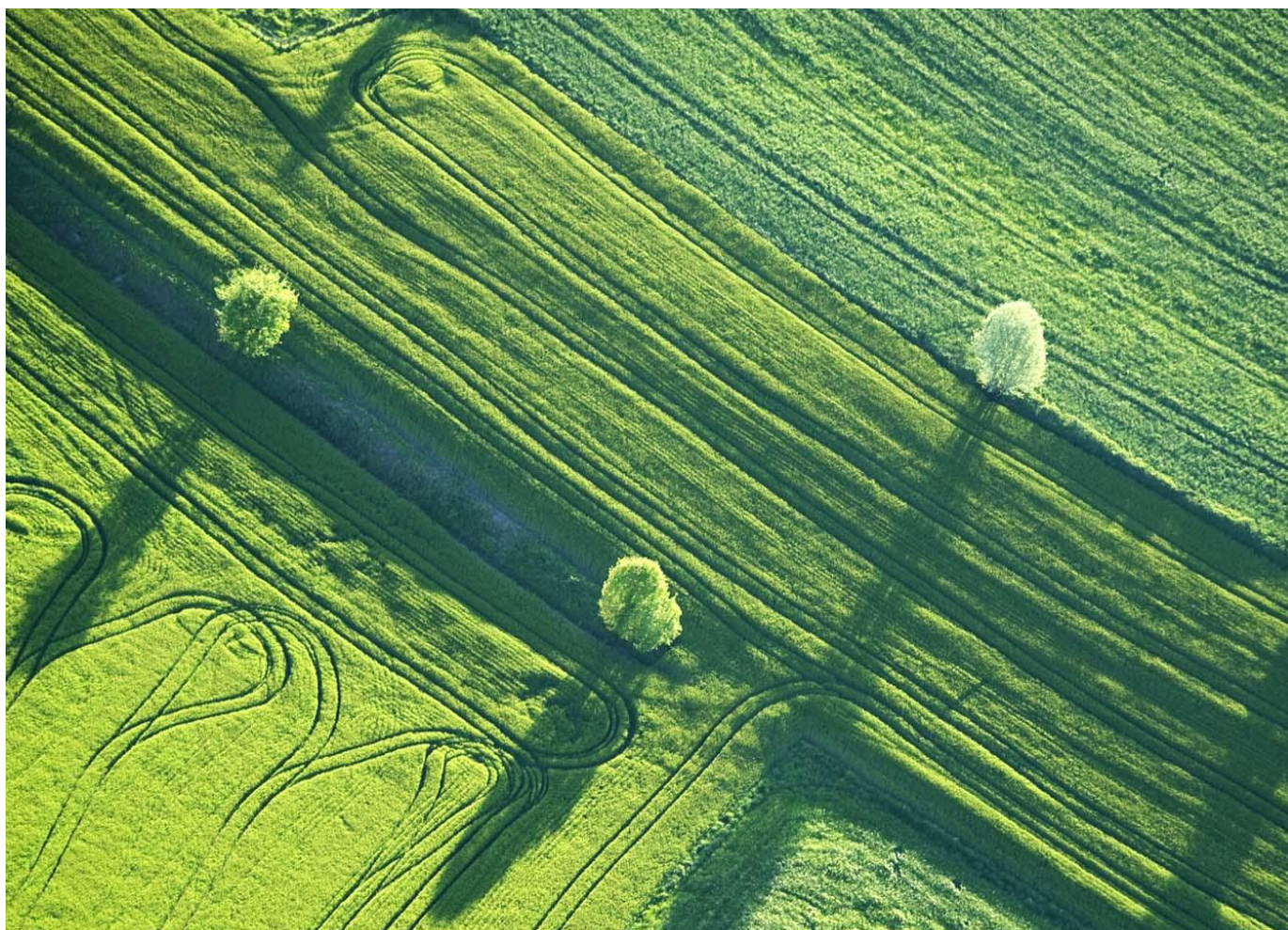
Plate 15: Mixed substrata shores (LR4) (September 2020).



Plate 16: Typical hedgerow (WL1) habitat on site dominated by gorse and bramble (July 2020).



Plate 17: Mosaic of gorse scrub (WS1) and wet grassland (GS4) habitat (September 2020).



ESB

Carnsore Windfarm Bat and Terrestrial Mammal Report 2020/2021

602677 (01)

MAY 2021

RSK



RSK GENERAL NOTES

Project No.: 602677 (01)

Title: Carnsore Windfarm Bat and Terrestrial Mammal Report 2020/2021


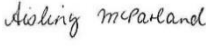
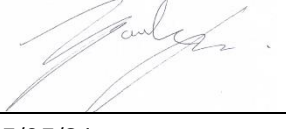
Client: ESB

Date: 28 May 2021

Office: Dublin

Status: FINAL

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1 INTRODUCTION

Project background

- 1.1 Scott Cawley were commissioned by RSK on behalf of ESB Ireland to undertake bat surveys and terrestrial mammal surveys at the operational Carnsore Windfarm located at Carnsore Point, County Wexford. Bat surveys completed between July and October 2020 and May 2021, and terrestrial mammal surveys completed in April 2021, were undertaken to inform the proposed future life extension of the currently operational Carnsore Windfarm.
- 1.2 This report presents the survey methodology, survey results, a summary and recommendations to be considered in the proposed development design.

Existing environment

- 1.3 Carnsore Windfarm (hereafter referred to as ‘the site’) is located at Carnsore Point, County Wexford. The site contains fourteen turbines located on improved agricultural grassland with a sand dune system to the south. To the east of the site is the Irish Sea and to the south is the Atlantic Ocean.
- 1.4 Habitats within the site include mostly agricultural fields grazed by livestock, hedgerows forming field boundaries and areas of scattered bramble and gorse scrub throughout the site, with a larger area dominated by scrub in the west of the site.

Statement of authority

- 1.5 Bat surveys were carried out by Nicholas Fettes and Niall McHugh of Scott Cawley Ltd. and John Curtin of Eire Ecology. Terrestrial mammal surveys were undertaken by Emmi Virkki of Scott Cawley Ltd. The report was authored by Criostoir Mac Cuirc and Maeve Maher-McWilliams of Scott Cawley Ltd. The report has been reviewed for quality assurance purposes by Maeve Maher-McWilliams Principal Ecologist and Ashling Cronin Technical Director of Scott Cawley Ltd.
- 1.6 John Curtin is the Founding Ecologist of Eire Ecology and has over 10 years’ experience in ecological consultancy. John is responsible for coordinating bat surveys and mitigation required on major infrastructural projects has extensive experience in ecological assessment and is a member of Bat Conservation Ireland.
- 1.7 Nicholas Fettes, Consultant Ecologist at Scott Cawley Ltd, holds an honours degree in Zoology and a Master’s in Environmental Policy, both acquired at University College Dublin. He has obtained experience working in a diverse set of environmental roles in the public, private, and charity/NGO sectors. Nicholas is proficient in habitat and protected species surveys, particularly bats.
- 1.8 Niall McHugh, Consultant Ecologist at Scott Cawley Ltd, holds an honours degree in Applied Freshwater and Marine Biology from Galway-Mayo Institute of Technology. Niall

is a proficient field surveyor and has experience in protected species surveys, particularly bats and birds.

- 1.9 Emmi Virkki, Consultant Ecologist with Scott Cawley Ltd, holds an honours degree in Environmental Biology, and a Master's in Environmental Science, both from University College Dublin. She has over four year's professional experience working in ecology in Ireland and has worked with clients at both government and private levels. Emmi's specialism is ornithology, but she is also skilled in protected flora and fauna, invasive species and habitat surveys.
- 1.10 Criostoir Mac Cuirc, Consultant Ecologist at Scott Cawley Ltd, holds an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin. Criostoir is a Qualifying Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He has experience in habitat and mammal surveys and has been involved in data collection and analysis.
- 1.11 Maeve Maher-McWilliams is a Principal Ecologist with Scott Cawley and is an Associate member of CIEEM. She holds a Masters in Evolutionary and Behavioural Ecology from University of Exeter and an honours degree in Biological Sciences from Queens University Belfast. Maeve has worked in ecological consultancy for over nine years and has worked on a range of large to small scale projects across Ireland and the UK. Maeve's primary technical specialism is ornithology; however, her skills extend to protected mammal and habitat surveys.
- 1.12 Ashling Cronin is a Technical Director with Scott Cawley. She holds a Masters in Ecological Assessment, an honours degree in Applied Ecology from University College Cork and an Advanced Diploma in Planning and Environmental Law from Kings Inns. She has over ten years' experience in environmental management and environmental / ecological assessment across both the private and public sector. Ashling has provided environmental and ecological support on a variety of planning applications including Strategic Infrastructure Developments (ports and roads), windfarm developments, utilities infrastructure, small to large scale industrial, commercial, residential and mixed use developments.

2 METHODOLOGY

Bats

- 2.1 The bat survey methodology where possible follows that set out for lifetime extension and repowering developments as detailed in Scottish Natural Heritage (SNH) guidance: *Bats and onshore wind turbines: survey, assessment and mitigation (Version: January 2019)* (SNH 2019). Bat surveys were also, where possible undertaken in accordance with *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016)
- 2.2 In the case of Carnsore Windfarm, as no ongoing operational monitoring surveys have been undertaken at the site and therefore no baseline data available, the survey methodology undertaken for the site follows guidelines set out for new developments. This is to ensure that an adequate, robust baseline is available against which to assess the potential impacts of the proposals.
- 2.3 In addition, bat casualty searches around existing turbines were undertaken to supplement the data and evidence base for the existing operational turbines.
- 2.4 Limitations to the survey methodology are set out at the end of this section.

Desk study

- 2.5 The National Bat data base for Ireland was consulted for records of bat species and also for the results of the national bat habitat assessment (Lundy *et. al*, 2011).

Activity transect surveys

- 2.6 Three dusk and one dawn bat activity transect surveys were undertaken within the site. Dusk surveys commenced 15 minutes before sunset and lasted for approximately two hours. The dawn survey commenced approximately two hours before sunrise and ended at approximately sunrise. Details of dates, timings, weather, and other details are shown in Table 1 below. Two routes were walked by a surveyor on each visit, the routes are illustrated on Figure 1. The focus of the routes was to survey linear vegetation features and field boundaries; however this was also dependent on access between fields. Direct observations of how bats used the landscape was recorded, and handheld ultrasound detectors (Elekon Batlogger M) were used to identify the bat species by their calls. Data generated from the transect surveys was analysed using Elekon BatExplorer software, whereby calls were identified to species level (where this was possible), through professional judgement and with reference *British Bat Calls: A Guide to Species Identification* (Russ, 2012).

Table 1: Details of transect surveys undertaken within the site

Date	Survey type	Transect routes	Survey time	Sunset/Sunrise times	Weather conditions
16/07/2020	Dusk transect survey	T1 & T2	21:32 – 00:10	21:39	Mild, clear skies, no wind or rain. Temperature 14 -15°C
27/08/2020	Dawn transect survey	T1 & T2	04:43 – 06:34	06:30	Windy, overcast, wind chill, mild raining. Temperature 14 -16°C
15/10/2020	Dusk transect Survey	T1 & T2	18:30 – 20:18	18:32	North-westerly wind, scattered clouds, no rain. Temperature 9 - 12°C
24/05/2021	Dusk transect Survey	T1	21:29 – 23:30	21:27	30% cloud cover, light westerly wind with wind speed increasing during the survey, no rain. Temperature 9.5°C
25/05/2021	Dusk transect Survey	T2	21:15 – 23:23	21:28	70% cloud cover, light westerly wind throughout and no rain. Temperature 10°C

Automated ground-level static surveys

- 2.7 The activity transect surveys were supplemented by automated static bat detectors (Song Meter SM4). Detectors were deployed for a minimum period of 15 nights at 10 different locations within the site on separate occasions between the 16 July and 16 October 2020. Locations of these deployments were chosen with an emphasis on areas identified as being potentially suitable for commuting and/or foraging bats, whilst also ensuring the footprint of the site was covered as best as possible.
- 2.8 Once the detectors had been deployed for a minimum period of 15 nights, they were collected, and the data was analysed using Kaleidoscope bat analysis software. This software identifies each individual bat call picked up by the detectors, which can then be used to identify the species. Table 2 and 3 below details the locations and dates of the automated static bat detector deployment.
- 2.9 Locations of the deployed statics can be found in Figure 1.

Table 2: Details of ground-level static surveys undertaken within the site during July 2020 (summer season)

Static number	Static location	Static deployment date	Static collection date	Total nights recording
1	52.183839, -6.3602843	16/07/2020	06/08/2020	21
2	52.182516, -6.3625455	16/07/2020	06/08/2020	21
3	52.181409, -6.3588314	16/07/2020	06/08/2020	21
4	52.179833, -6.3600099	16/07/2020	06/08/2020	21
5	52.180182, -6.3637810	16/07/2020	06/08/2020	21
6	52.177091, -6.3625680	16/07/2020	06/08/2020	21
7	52.175198, -6.3634991	16/07/2020	06/08/2020	21
8	52.177469, -6.3679752	16/07/2020	06/08/2020	Damaged
9	52.179448, -6.3697307	16/07/2020	06/08/2020	21
10	52.181477, -6.3671934	16/07/2020	06/08/2020	Damaged

Table 3: Details of ground-level static surveys undertaken within the site during October 2020 (autumn season)

Static number	Static location	Static deployment date	Static collection date	Total nights recording
1	52.183839, -6.3602843	01/10/2020	16/10/2020	15
2	52.182516, -6.3625455	N/A	N/A	Static redeployed to site 8
3	52.181409, -6.3588314	N/A	N/A	Static redeployed to site 10
4	52.179833, -6.3600099	01/10/2020	16/10/2020	15

Static number	Static location	Static deployment date	Static collection date	Total nights recording
5	52.180182, -6.3637810	01/10/2020	16/10/2020	15
6	52.177091, -6.3625680	01/10/2020	16/10/2020	15
7	52.175198, -6.3634991	01/10/2020	16/10/2020	15
8	52.177469, -6.3679752	01/10/2020	16/10/2020	15
9	52.179448, -6.3697307	01/10/2020	16/10/2020	15
10	52.181477, -6.3671934	01/10/2020	16/10/2020	15

Bat casualty searches

- 2.10 Bat casualty searches were undertaken at the base of each turbine location. A radius of 30m under each turbine within the site was diligently searched by surveyors walking a tight grid over the area and using sticks to search in the vegetation for any bat casualties. Bat casualty searches were undertaken monthly between July and October 2020 on the dates shown in Table 4 below.

Table 4: Dates of carcass searches undertaken within the site

Date	Survey type
17/07/2020	Carcass searches
07/08/2020	Carcass searches
30/09/2020	Carcass searches
15/10/2020	Carcass searches

Potential Roost Feature (PRF) Surveys

- 2.11 During the site survey on 28 and 29 April 2021, any suitable built structures and trees within the proposed development site were assessed for their potential to support roosting bats, having regard to the following guidelines: Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016); Bat Mitigation Guidelines for Ireland (Kelleher & Marnell, 2006); and, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006a).
- 2.12 A small number of trees located in hedgerows across the site were examined from ground level for potential to support roosting bats. They were assessed for the presence of potential roost features (PRFs) based on the presence of features commonly used by

bats. Examples of such features include: natural holes; cracks/splits in major limbs; loose bark; and, hollows/cavities.

2.13 Trees were assessed against suitability categories listed in Table 5 below.

Table 5: Assessment criteria for potential suitability of proposed development sites for bats, derived from similar criteria in Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016).

Suitability	Description of Roosting Habitat	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions¹ and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).</p> <p>A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.</p>	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.</p>
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions ² and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.</p>

¹ For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

Suitability	Description of Roosting Habitat	Commuting and foraging habitats
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats in a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	<p>Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to and connected to a known roost.</p>

Terrestrial Mammals

- 2.14 A terrestrial fauna survey was undertaken on 28 and 29 April 2021 by Emmi Virkki of Scott Cawley Ltd. The presence/absence of terrestrial fauna species were surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The survey area covered the entire lands within the site and the adjacent coastline habitats. The habitats on site were assessed for signs of usage by protected/red-listed fauna species, and their potential to support these species. The terrestrial mammal surveys included checks for the presence of badger setts and otter holts (e.g. resting places of these protected species).

Ecological Evaluation

- 2.15 Ecological receptors (including identified sites of ecological importance) are valued with regard to the ecological valuation examples set out in *Guidelines for Assessment of Ecological Impacts of National Roads Schemes: Revision 2*² and the guidance provided in *Guidelines for Ecological Impact Assessment in the UK and Ireland*³ – refer to Appendix 1 for examples of how ecological importance is assigned. In accordance with these guidelines, important ecological features within what is referred to as the Zone of Influence (Zoi) of the proposed development which are “both of sufficient value to be material in decision making and likely to be affected significantly” are deemed to be ‘Key Ecological Receptors’ (KERs). These are the ecological receptors which may be subject to significant effects from the proposed development, either directly or indirectly. KERs are those biodiversity receptors with an ecological value of local importance (higher value) or greater.

² NRA (2009) Guidelines for Assessment of Ecological Impacts of National Roads Schemes: Revision 2. National Roads Authority.

³ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland. Chartered Institute of Ecology and Environmental Management, Winchester, UK.

Limitations

A number of survey limitations have been identified:

- Due to Covid 19 restrictions in Spring 2020⁴ it was not possible to mobilise to deploy static detectors for the spring period. Given that the summer and autumn deployments were for 15 consecutive nights (the guidance states 10) it is considered sufficient coverage of the bat assemblage present has been undertaken to inform the assessment.
- Two static detectors failed during the summer deployment but given that the other 8 detectors had a full deployment for 15 consecutive nights for the summer season it is considered sufficient coverage of the bat assemblage present has been undertaken.
- Static detectors were positioned in the areas of the site considered to support the most optimal foraging habitat rather than at the base of each turbine. In this way the maximum coverage of the foraging bat assemblage is likely to have been recorded.
- Given the general low habitat suitability for foraging bats, low level of bat activity, the lack of tree coverage and no roosting opportunities it was considered that surveys at height would be unlikely to deliver any additional survey benefit, so these were not undertaken.
- Also given the low level of bat activity an assessment of bat activity using the online data base tool Eco bat has not been undertaken.

Overall, it is considered that the level of survey coverage undertaken has been sufficiently robust to characterise the foraging bat assemblage using the site and to assess the potential impacts from the future life extension.

⁴ <https://cieem.net/i-am/covid-19/>

3 RESULTS

Bats

Desk Study

- 3.1 Records of bat species recorded within 2km of the Proposed Development were obtained from the NBDC. The data search returned three records of three species all located 1.9km northwest of the site; Leisler’s bat (*Nyctalus leisleri*), soprano pipistrelle (*Pipistrellus pygmaeus*) and Natterer’s bat (*Myotis nattereri*). Both Leisler’s bat and soprano pipistrelle were also recorded during the bat surveys, as detailed below.
- 3.2 A bat landscape assessment provided by the Irish National Bat Database (Lundy *et. al*, 2011) has indicated that the majority of the Carnsore windfarm is of low suitability for bats (14 on a scale of 0 to 100 with 0 being least favourable and 100 most favourable for bats) and aerial photographs show this as being open windswept fields with no trees and no bat roost potentials. Although the western edge of the site has a slightly higher suitability (29.56) with more coverage of gorse scrub but still open windswept fields. Overall, the landscape in which the proposed life extension will occur is of low suitability for foraging bats.

Activity transect surveys

- 3.3 Bat activity transects were undertaken on 16 July, 27 August and 15 October 2020, and 24 and 25 May 2021, using Batlogger M series handheld recorders. BatExplorer software was used to analyse this data. Bat species recorded during the bat activity transects included, common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and Leisler’s bat (*Nyctalus leisleri*). The results of these survey are outlined in Tables 6, 7 and 8 below and Figures 2, 3, 4 and 5 at the end of this report.

Table 6: Activity transect results for common pipistrelle

Date	Survey type	Bat species recorded	Comments
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)			
16/07/2020, 27/08/2020, 15/10/2020, 24- 25/05/2021	Dusk, Dawn, Dusk and Dusk	Common pipistrelle bat	Common pipistrelle bat was the most common species recorded throughout the transect surveys, recorded on all three survey occasions. Common pipistrelle was recorded along linear habitats such as hedgerows that formed boundaries between improved agricultural grassland. Activity was greatest in July along St. Vauk’s lane and Aeroplane Field. Clusters of activity were recorded on 16 July 2020 adjacent to St. Vauk’s Stone, turbine 2 and adjacent to The Black Gate. Bat activity on 27 August 2020 was focused in the north of the site, with clusters of activity

			<p>recorded along Netherstown lane, and adjacent to The Quay Field. Other notable activity was recorded in the northwest of the site, adjacent to The Lane of Stone.</p> <p>During the transect survey undertaken on the 15 October 2020, fewer bats were recorded in comparison to previous surveys in July and August. A cluster of bat activity was identified in the west of the site adjacent to The Lane of Stone over wet grassland habitat.</p> <p>In May 2021, during the spring bat season surveys, common pipistrelle were recorded in the central and eastern portion of the site. Two bats were observed foraging along a hedgerow in the southeast of the site and single bats observed at other recorded locations largely associated with linear landscape features. Common pipistrelle bat activity over the three surveys is illustrated in Figure 2 and 5.</p>
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Table 7: Activity transect results for soprano pipistrelle

Date	Survey type	Bat species recorded	Comments
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)			
16/07/2020, 25/05/2021	Dusk and Dusk	Soprano pipistrelle bat	<p>Soprano pipistrelle bat was recorded during the 16 July 2020 transect survey with activity predominantly located to the west of turbine 1, 2 and 11. Clusters of soprano pipistrelle bat activity were recorded at the intersection of Bush, Burrow and Saint Vogues fields. A further two clusters were recorded within Burnarge field, which was comprised of improved agricultural grassland and wet grassland habitats. Individual bat activity was recorded at St. Vauk's Lane and The Point of Carne.</p> <p>In May 2021, during the spring bat season surveys, three soprano pipistrelle recordings were made in the central area of the site. All recordings were made in close proximity to linear hedgerow features and relate to single bats. Soprano pipistrelle bat activity is illustrated in Figure 3 and 5.</p>

Table 8: Activity transect results for Leisler's bat

Date	Survey type	Bat species recorded	Comments
Leisler's bat (<i>Nyctalus leisleri</i>)			
16/07/2020, 27/08/2020, 15/10/2020, 25/05/2021	Dusk, Dawn, Dusk and Dusk	Leisler's bat	<p>Leisler's bat was recorded on all three survey occasions with activity predominantly located in the south and west of the site. The highest activity was recorded during the 16 July 2020 transect survey, with clusters of bat activity recorded at turbines 2, 3, 6 and 7, and further localised activity along St. Vauk's Lane. A single Leisler's bat was recorded on 27 August 2020 at turbine 11, with no further recording on that night.</p> <p>A cluster of bat activity was recorded over wet grassland habitat adjacent to The Lane of Stones on the western edge of the site during the 15 October 2020 transect survey.</p> <p>In May 2021, during the spring bat season surveys, Leisler's bat activity was concentrated in the eastern portion of the site with activity largely associated with linear hedgerow features. A cluster of activity was recorded along a hedgerow in the southeast of the site. All recordings relate to single bats. Leisler's bat activity is illustrated in Figure 4 and 5.</p>

3.4 The most common species recorded throughout the activity transect surveys was common pipistrelle. Bat transect data suggests that common pipistrelle bats activity is widespread across the site and across all transect surveys. This activity appears to be concentrated along linear habitats such as hedgerows. Soprano pipistrelle bat activity was limited to the survey in July 2020 and May 2021, recordings were localised in the western and central areas of the survey area. Leisler bat activity was mainly focused in the south and west of the site with few recordings in the north of the survey site during July and August 2020 surveys and in the east of the site during May 2021 surveys. A marked decrease in bat activity was observed between spring/summer survey data and autumn survey data. This is likely to be attributable to more favourable weather conditions for bats earlier in the year, October is considered a shoulder month of the bat activity season (i.e. the end of the bat activity survey season), with the core bat survey season typically being May to August (Collins, 2016).

Automated ground-level static surveys

3.5 Automated ground-level static bat detectors were used to supplement the transect data outlined above. Automated static detectors were deployed for a period in the summer season (June to August) and a period in the autumn season (September to October). Bat species recorded during static detector deployment included common pipistrelle

(*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), Leisler's bat (*Nyctalus leisleri*), *Myotis* spp., and brown long-eared bat (*Plecotus auritus*). This data is presented in the tables below. The numbers in Table 9 and 10 below represent the total number of calls for each species recorded per night.

Table 9: Automated bat survey data recorded in July 2020 (summer season)

Location	Habitat description	Deployment date	Number of nights recording	Species recorded (with number of call registrations ⁵)
1	Automated detector placed in hedgerow adjacent to gorse scrub	16/07/2020	21	Soprano pipistrelle (448) Common pipistrelle (3526) <i>Myotis</i> sp. (12) Leislers' bat (91) <i>Pipistrellus</i> spp. (344) Brown long-eared bat (8)
2	Automated detector placed in hedgerow adjacent to improved agricultural grassland	16/07/2020	21	Soprano pipistrelle (115) Common pipistrelle (1707) <i>Myotis</i> sp. (1) Leislers' bat (79) <i>Pipistrellus</i> spp. (21) Brown long-eared bat (4)
3	Automated detector placed in hedgerow adjacent to seashore	16/07/2020	21	Soprano pipistrelle (182) Common pipistrelle (1341) <i>Myotis</i> sp. (1) Leislers' bat (365) <i>Pipistrellus</i> spp. (15) Nathusius' pipistrelle (1) Brown long-eared bat (1)
4	Automated detector placed in hedgerow adjacent to improved agricultural grassland	16/07/2020	21	Soprano pipistrelle (19) Common pipistrelle (315) <i>Myotis</i> sp. (1) Leislers' bat (328) <i>Pipistrellus</i> spp. (15) Brown long-eared bat (7)
5	Automated detector placed in hedgerow	16/07/2020	21	Soprano pipistrelle (83) Common pipistrelle (846) <i>Myotis</i> sp. (2)

⁵ Note this is the number of times a bat call is registered - it does not differentiate between individual bats so the number of calls is an indication of relative bat activity not the actual number of bats present as a single foraging bat can have been registered on multiple occasions.

Location	Habitat description	Deployment date	Number of nights recording	Species recorded (with number of call registrations ⁵)
	adjacent to improved agricultural grassland at central track road			Leislers' bat (218) <i>Pipistrellus spp.</i> (45) Nathusius' pipistrelle (21) Brown long-eared bat (2)
6	Automated detector placed at building adjacent to improved agricultural grassland	16/07/2020	21	Soprano pipistrelle (16) Common pipistrelle (279) <i>Myotis sp.</i> (2) Leislers' bat (485) <i>Pipistrellus spp.</i> (14) Nathusius' pipistrelle (11) Brown long-eared bat (2)
7	Automated detector placed in hedgerow adjacent to improved agricultural grassland	16/07/2020	21	Soprano pipistrelle (7) Common pipistrelle (104) <i>Myotis sp.</i> (8) Leislers' bat (392) Nathusius' pipistrelle (1) Brown long-eared bat (3)
8	Automated detector placed at building adjacent to improved agricultural grassland	16/07/2020	Damaged	No data
9	Automated detector placed in hedgerow adjacent to wet grassland	16/07/2020	21	Soprano pipistrelle (48) Common pipistrelle (186) <i>Myotis sp.</i> (1) Leislers' bat (139) Nathusius' pipistrelle (6) Brown long-eared bat (1)
10	Automated detector placed in hedgerow adjacent to improved agricultural grassland	16/07/2020	Damaged	No data

Table 10: Automated bat survey data recorded in October 2020 (autumn season)

Location	Habitat description	Deployment date	Number of nights recording	Species recorded (with number of calls)
1	Automated detector placed in hedgerow adjacent to gorse scrub	01/10/2020	15	Soprano pipistrelle (27) Common pipistrelle (254) <i>Myotis</i> sp. (4) Leislars' bat (6) Nathusius' pipistrelle (1) <i>Pipistrellus</i> sp. (29) Brown long-eared bat (1)
2	Automated detector placed in hedgerow adjacent to improved agricultural grassland	N/A	N/A	No data
3	Automated detector placed in hedgerow adjacent to seashore	N/A	N/A	No data
4	Automated detector placed in hedgerow adjacent to improved agricultural grassland	01/10/2020	15	Soprano pipistrelle (7) Common pipistrelle (90) <i>Myotis</i> sp. (1) Leislars' bat (45) Nathusius' pipistrelle (8) <i>Pipistrellus</i> sp. (6) Brown long-eared bat (3)
5	Automated detector placed in hedgerow adjacent to improved agricultural grassland at central track road	01/10/2020	15	Soprano pipistrelle (7) Common pipistrelle (62) <i>Myotis</i> sp. (1) Leislars' bat (8) <i>Pipistrellus</i> sp. (4)
6	Automated detector placed at	01/10/2020	15	Soprano pipistrelle (5) Common pipistrelle (36) Leislars' bat (53)

Location	Habitat description	Deployment date	Number of nights recording	Species recorded (with number of calls)
	building adjacent to improved agricultural grassland			<i>Pipistrellus</i> sp. (4) Brown long-eared bat (1)
7	Automated detector placed in hedgerow adjacent to improved agricultural grassland	01/10/2020	15	Soprano pipistrelle (13) Common pipistrelle (135) <i>Myotis</i> sp. (1) Leislars' bat (60) Nathusius' pipistrelle (1) <i>Pipistrellus</i> sp. (6) Brown long-eared bat (3)
8	Automated detector placed at building adjacent to improved agricultural grassland	01/10/2020	15	Soprano pipistrelle (13) Common pipistrelle (33) <i>Myotis</i> sp. (1) Leislars' bat (31) Nathusius' pipistrelle (2) <i>Pipistrellus</i> sp. (5)
9	Automated detector placed in hedgerow adjacent to wet grassland	01/10/2020	15	Soprano pipistrelle (28) Common pipistrelle (66) <i>Myotis</i> sp. (2) Leislars' bat (38) <i>Pipistrellus</i> sp. (8) Brown long-eared bat (11)
10	Automated detector placed in hedgerow adjacent to improved agricultural grassland	01/10/2020	15	Soprano pipistrelle (22) Common pipistrelle (939) <i>Myotis</i> sp. (2) Leislars' bat (16) Nathusius' pipistrelle (2) <i>Pipistrellus</i> sp. (60)

3.6 Data from the automated ground-level static bat recorders shows a similar trend to that shown in the transect data. Common pipistrelle are the most represented species of bat across the site with greatest levels of activity throughout the site. In July 2020, common pipistrelle activity was more prevalent in the northern section of the site, while in October there appeared to be greater levels of activity in the north-western section of the site.

3.7 Soprano pipistrelle and Leisler's bats are the next highest number of recordings with activity levels greatest in July but with no apparent area of the site being favoured by these species. Activity across the July and October 2020 automated surveys appeared widespread across the site.

- 3.8 Nathusius' pipistrelle, *Myotis* spp., and brown long-eared bats were recorded in low numbers and sporadically across the site. This may be due to a lack of suitable foraging habitats for these species and much smaller national population size compared to more common bat species discussed above.
- 3.9 In comparison to transect data, the northern section of the site returned the highest bat activity for the ground-level static detectors during the summer season i.e. the July period. Statics 1, 2 and 3 were deployed in the northeast of the site and recorded the highest activity on site in comparison to other statics across the site. This may indicate a higher density of preferred foraging habitats within this area, or a more sheltered location which would be favourable for bat foraging activity.

Bat carcass searches

- 3.10 No bat carcasses were retrieved during the bat carcass searches undertaken under each turbine.

Potential Roost Feature (PRF) Surveys

- 3.11 No trees that were examined for the presence of PRFs were considered to have any suitable features for roosting bats. Trees within the site were therefore assessed as having negligible suitability for roosting bats.

Ecological valuation

- 3.12 Overall, the site has been valued as local (higher) value for bats given the level of activity and use of the site by foraging and commuting bats, the range of species recorded during surveys with common species (common pipistrelle, soprano pipistrelle and Leisler's bat) being recorded in greatest numbers.

Terrestrial Mammals

- 3.13 Evidence of four protected mammal species, protected under the Wildlife Acts, was recorded on site and included signs of badger *Meles meles*, pygmy shrew *Sorex minutus*, Irish stoat *Mustela erminea Hibernica* and Irish hare *Lepus timidus hibernicus*.
- 3.14 Badger prints were recorded in four locations within the site, mostly in the western and southern sections of the site. A mammal path was also recorded in the north of the site and was considered to be used by badger. No setts, latrines or snuffle holes were recorded during surveys, however badger are considered to traverse the site and likely use it as a foraging ground given the suitability of the habitats for foraging badger.
- 3.15 Pygmy shrew were heard calling in the north section of the site, close to the eastern coastline. Hedgerows, scrub and grassland habitats within the site are all suitable habitat for small mammals such as pygmy shrew which are likely to breed and forage within the site.
- 3.16 Irish stoat prints were located in one location within the western section of the site. No other signs, including a potential den or breeding place, were recorded during surveys. Habitats within the site are suitable for feeding and breeding Irish stoat.

- 3.17 Irish hare were sighted on three occasions during the terrestrial mammal survey. Habitats within the site are suitable for feeding and breeding Irish hare. Given the frequency of sightings during the terrestrial mammal surveys, Irish hare are likely to breed within or in close proximity to the site.
- 3.18 Otter *Lutra lutra*, and their breeding and resting places, are protected under the Wildlife Acts. Otter are also listed on Annex II and Annex IV of the EU Habitats Directive and are afforded strict protection under the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011. Signs of otter were not detected during surveys within the site or along the adjacent shoreline.
- 3.19 Locations of the protected mammal signs recorded within the site, and described above, are shown on Figure 6 at the end of this report.

Ecological valuation

- 3.20 Overall, the site has been valued as local (higher) value for terrestrial mammals given that evidence of four protected mammal species (badger, pygmy shrew, Irish stoat and Irish hare) was recorded on site and the suitability of habitats within the site for breeding and foraging by all four protected species. Although protected these species are widespread across Ireland and therefore are not being valued higher than local (higher) importance.

4 SUMMARY

- 4.1 Table 11 below summarises the ecological evaluation of bats and terrestrial mammals identified within the site, taking into consideration legal protection, conservation status and local abundance, and identifies the Key Ecological Receptors (KERs). KERs are those biodiversity receptors with an ecological value of local importance (higher value) or greater.

Table 11: Summary of Key Ecological Receptors (KERs)

Habitat type	Ecological Valuation	KER?
Bats (foraging and commuting)	Local importance (higher value)	Yes
Terrestrial mammals	Local importance (higher value)	Yes

- 4.2 Bats and terrestrial mammals recorded on site have been valued as local importance (higher value) and are ecologically valuable, therefore, impacts on these KERs from any proposed development at the operational Carnsore Windfarm could result in a significant effect at a local geographical scale.
- 4.3 In total six bat species were recorded during surveys and included common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Leisler's bat, *Myotis spp.*, and brown long-eared bat, with the greatest activity pertaining to common species such as pipistrelle species and Leisler's bat. Activity related to foraging and commuting bats. No features suitable for roosting bats were observed on site. Bat surveys undertaken at the site have shown that the presence of an operational windfarm on the site has not deterred bats from utilising the lands surrounding the turbines for foraging and commuting.
- 4.4 Four protected terrestrial mammal species were recorded on site during surveys and included badger, pygmy shrew, Irish stoat and Irish hare. Habitat suitability for breeding and foraging for each species is present within the site, however no evidence of a badger sett or Irish stoat den was observed.

5 REFERENCES

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FIGURES

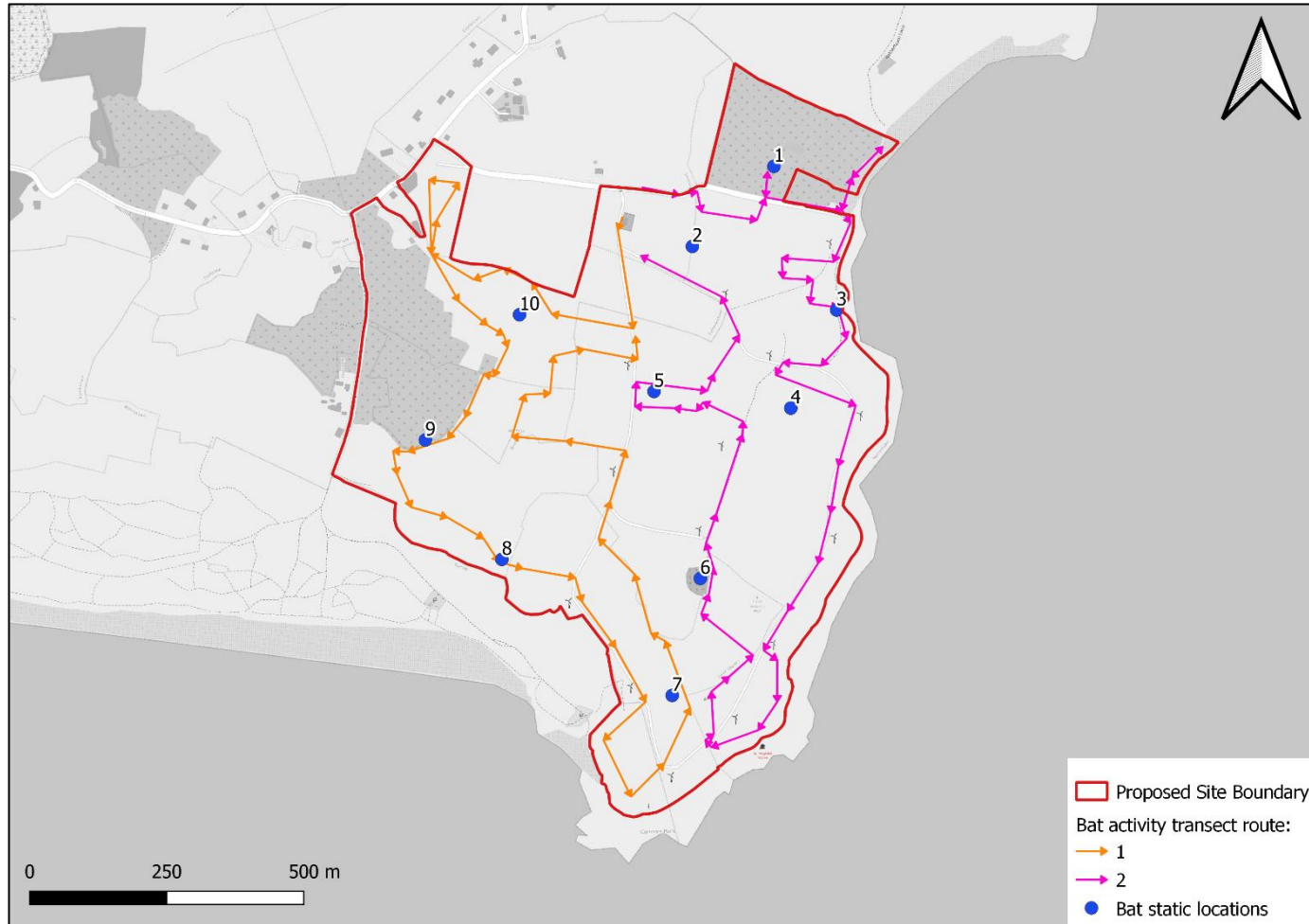


Figure 1: Bat survey area

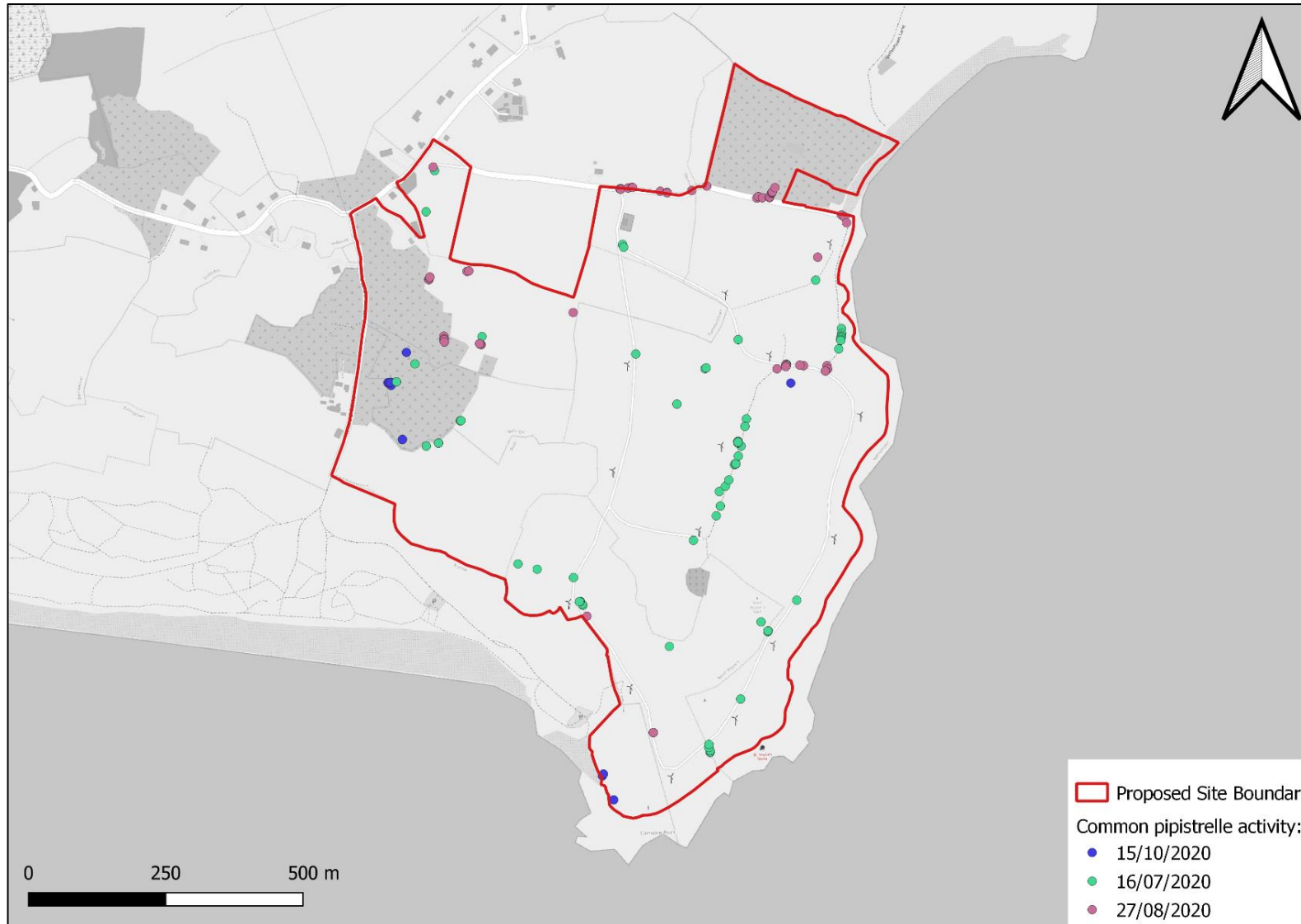


Figure 2: Bat activity transect survey results for common pipistrelle

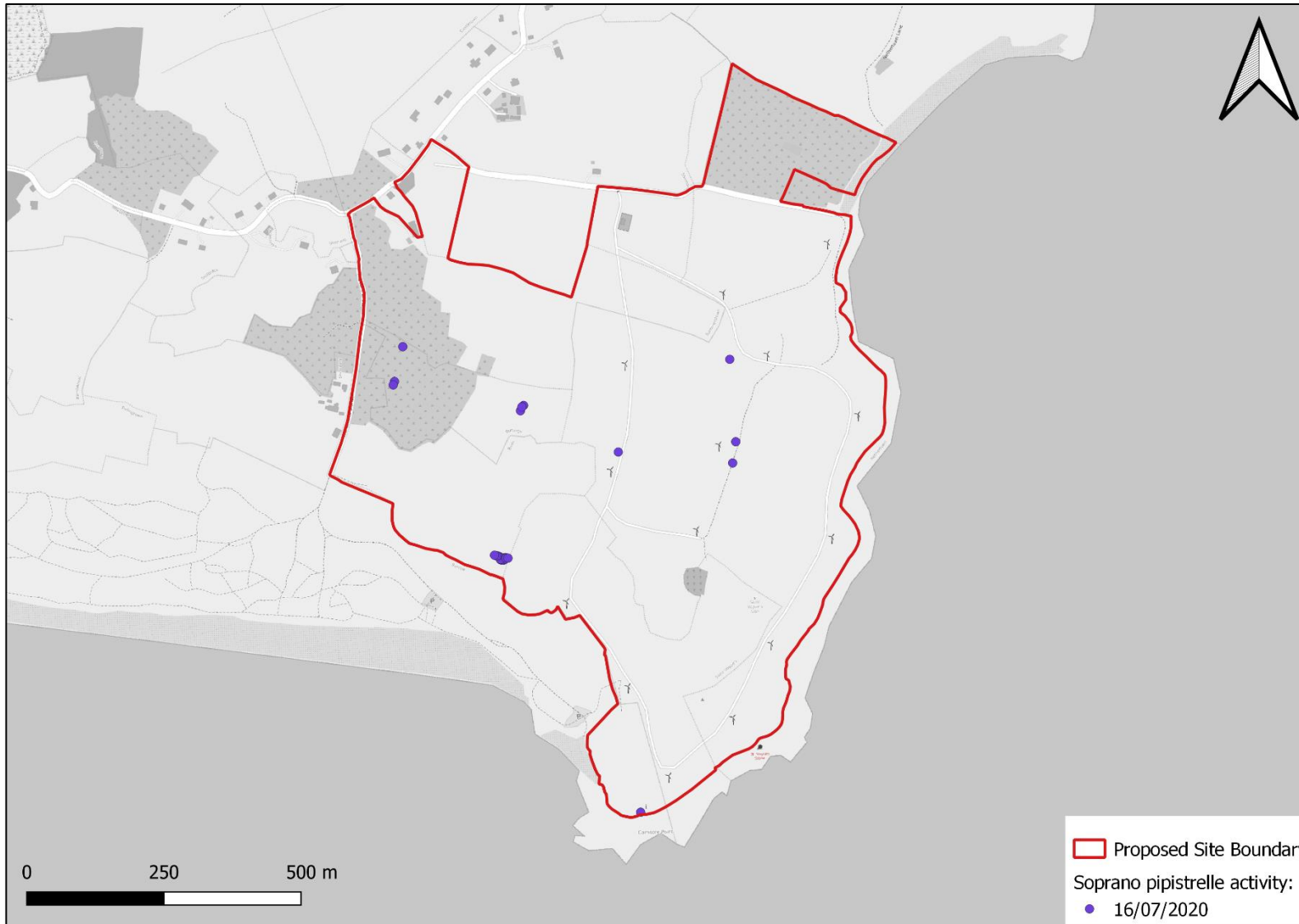


Figure 3: Bat activity transect survey results for soprano pipistrelle

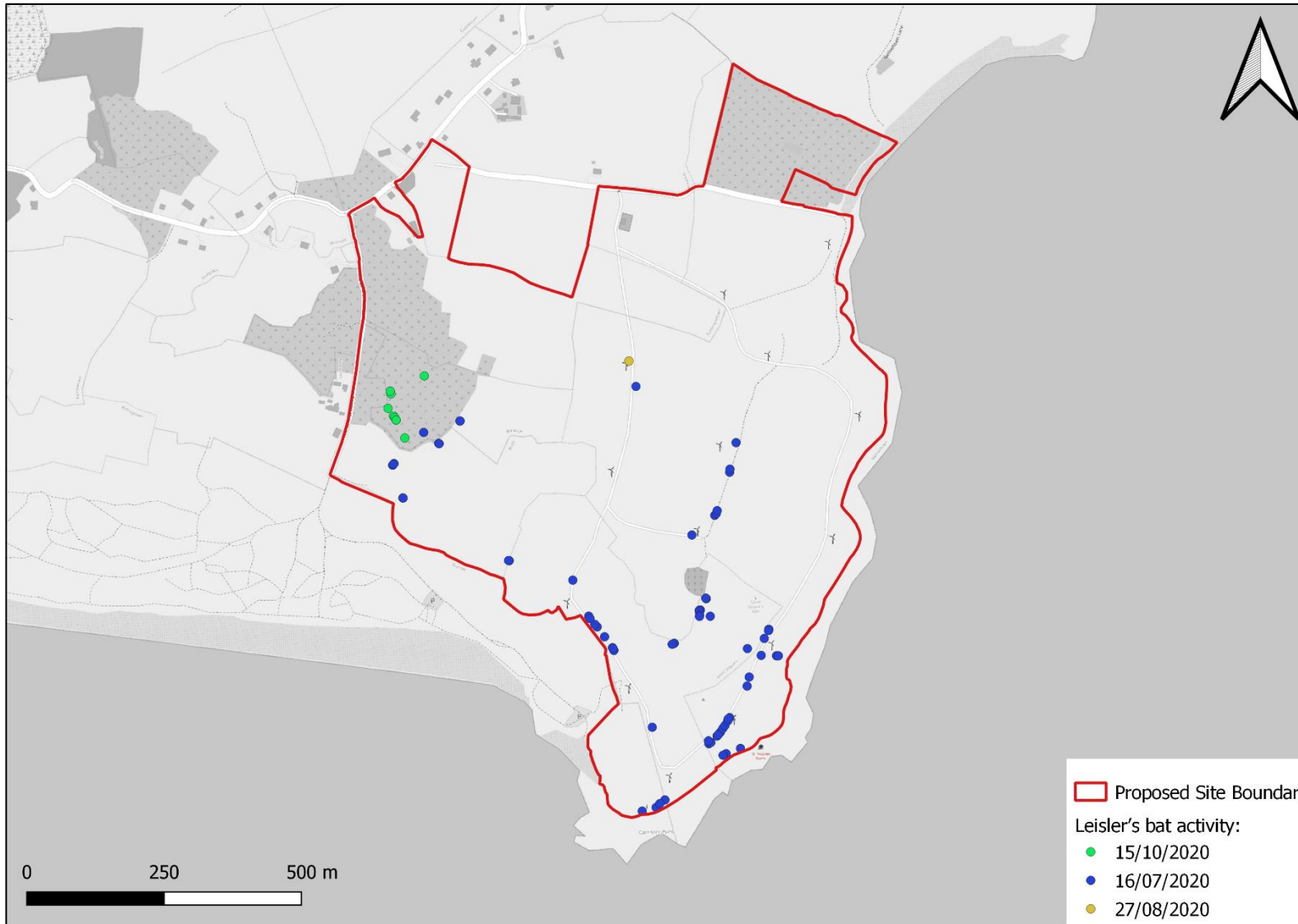


Figure 4: Bat activity transect survey results for Leisler's bat

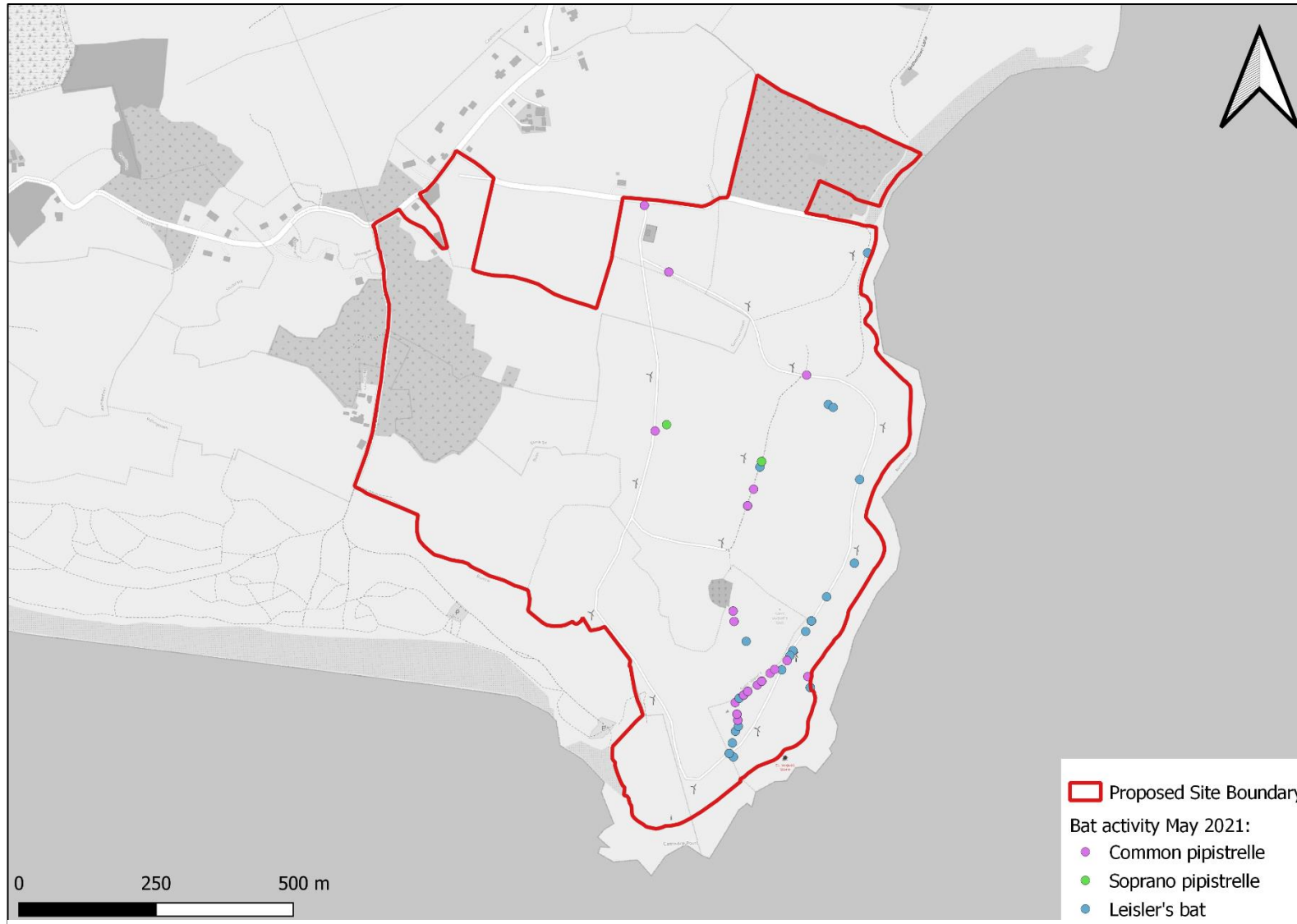


Figure 5: Bat activity transect survey results for May 2021

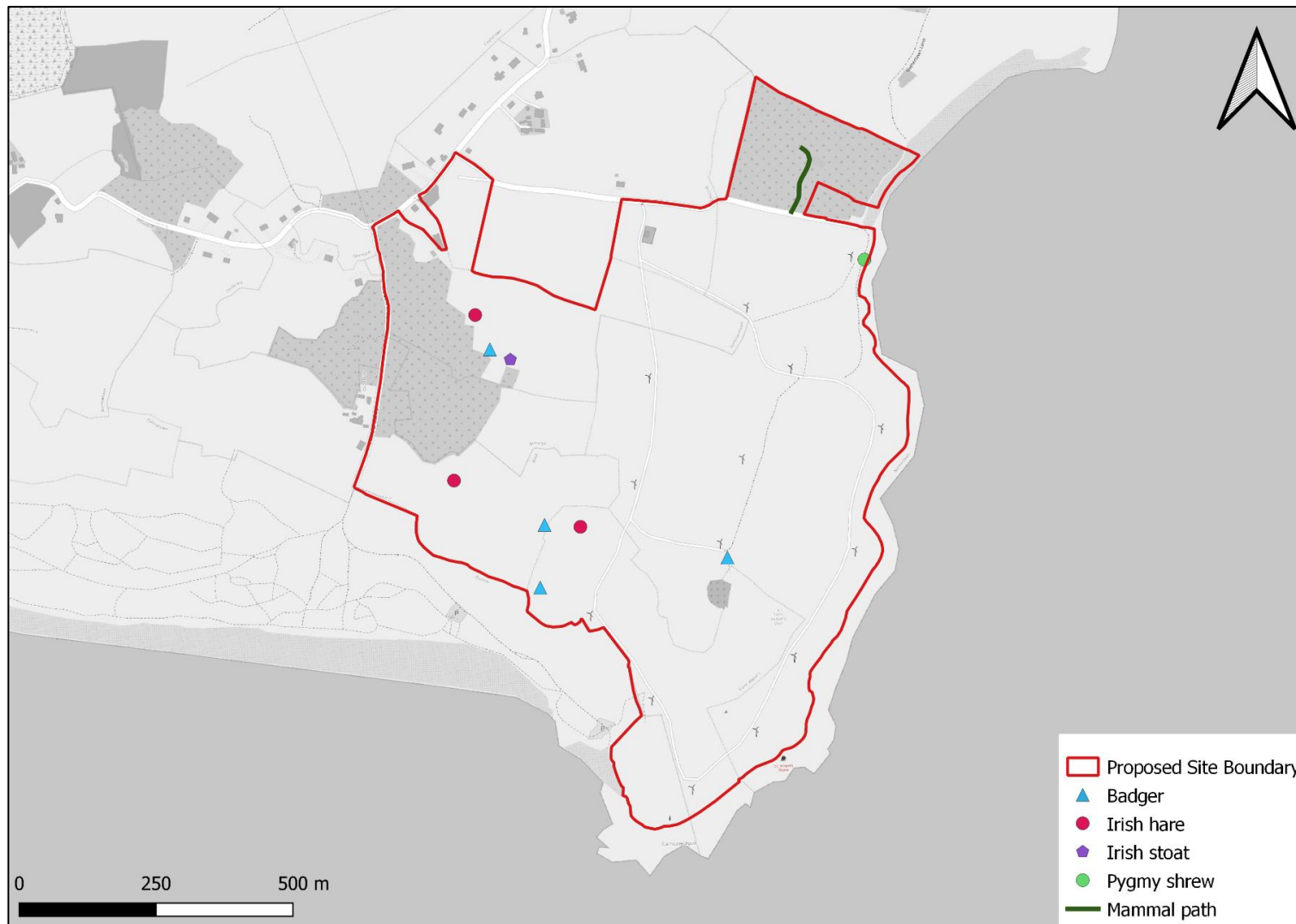


Figure 6: Terrestrial mammal survey results

APPENDIX 1 - EXAMPLES OF VALUING IMPORTANT ECOLOGICAL FEATURES

International Importance:
<ul style="list-style-type: none"> • 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (pSPA). • Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). • Features essential to maintaining the coherence of the Natura 2000 Network.⁶ • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level)⁷ of the following: <ul style="list-style-type: none"> – Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or – Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & The Biosphere Programme). • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • Biogenetic Reserve under the Council of Europe. • European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 1988).⁸
National Importance:
<ul style="list-style-type: none"> • Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts.

⁶ See Articles 3 and 10 of the Habitats Directive

⁷ It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

⁸ Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*)

- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level)⁹ of the following:
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Site containing ‘viable areas’¹⁰ of the habitat types listed in Annex I of the Habitats Directive

County Importance:

- Area of Special Amenity.¹¹
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level)¹² of the following:
 - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
 - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan, if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

⁹ It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

¹⁰ A ‘viable area’ is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

¹¹ It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

¹² It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)¹³ of the following:
 - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
 - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

¹³ It is suggested that, in general, 1% of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.