KWF Grid Connection EIA Report 2023

Volume C2: EIAR Main Report

Chapter 7: Biodiversity

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Appendices referenced in this topic chapter can be found at the end of the chapter

Glossary of General Terms

KWF Grid Connection (the subject development)	Underground cabling, additional plant and apparatus in the existing Woodhouse Substation, the construction a new link road, the widening of an existing forestry road and the use of the existing entrance and windfarm road network at Woodhouse Windfarm. The underground cabling will link the authorised Knocknamona Windfarm Substation to the National Grid at Woodhouse Substation.
Authorised Knocknamona Windfarm	Not Constructed - Knocknamona Windfarm authorised in 2016 (ABP-PL 93.244006); Amendments to Knocknamona Windfarm to provide for larger turbines authorised in September 2022 (ABP-309412-21) and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower authorised in December 2022 (ABP-314219-22)
Whole Project	KWF Grid Connection with Authorised Knocknamona Windfarm
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.

7 Environmental Factor: Biodiversity

7.1 Introduction to the Biodiversity Chapter

7.1.1 What is Biodiversity?

Biodiversity is the variability among living organisms from all sources, including terrestrial, marine, and aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within and between species and ecosystems.

7.1.2 Overview of Biodiversity in the Local Environment

The KWF Grid Connection is located in the Drumhills area of County Waterford. Lands in the area are intensively farmed and forested. Overall, highly disturbed habitats dominate the KWF Grid Connection site, with habitats in the vicinity of the development generally being of 'Local Importance (lower value)'. The fauna utilising the proposed development site are common in the Irish context, and there are no habitats of particular value to fauna at the site. In relation to aquatic habitats and species, there are no watercourses within 250m of works locations. There are no European Sites or National Sites in close proximity to the KWF Grid Connection development.

Relevant Figures (at the end of this chapter)
Figure 7.1: Location of KWF Grid Connection in relation to Biodiversity
Figure 7.1.1: Location of KWF Grid Connection in relation to Designated Sites

7.1.3 SENSITIVE ASPECTS of Biodiversity

Any receptor in the local environment which could be affected by a development is a Sensitive Aspect.

7.1.3.1 Sensitive Aspects included for detailed evaluation in this Topic Chapter

The following Sensitive Aspects are **included for detailed evaluation in this topic chapter** as it is likely or there is potential, for these Sensitive Aspects to be affected by the KWF Grid Connection:

Sensitive Aspect No. 1	Terrestrial Habitats	Section 7.2
Sensitive Aspect No. 2	Birds	Section 7.3
Sensitive Aspect No. 3	Mammals	Section 7.4
Sensitive Aspect No. 4	Aquatic Habitats & Species	Section 7.5

The above listed Sensitive Aspects are evaluated in Section 7.2 to Section 7.5 of this Chapter.

Relevant Figures (at the end of this chapter)
Figure 7.2: Study Area for Terrestrial Habitats
Figure 7.3: Study Area for Birds
Figure 7.4.1: Study Area for Bats
Figure 7.4.2: Study Area for Other Mammals
Figure 7.5: Study Area for Aquatic Habitats & Species

Figure 7.5.1: Study Area for Aquatic Habitats & Species (zoomed in)

7.1.3.2 Sensitive Aspects excluded from further evaluation

The following Sensitive Aspects are **excluded from further evaluation in this topic chapter** because either there is no potential for effects, no likely effects, or any effects caused by the KWF Grid Connection will be Neutral, whether direct effects, whole project or cumulative effects. A Sensitive Aspect may also be excluded from a topic chapter where effects to the Sensitive Aspect are evaluated in one of the other topic chapters within the EIAR.

The following Sensitive Aspects **are excluded from this topic chapter**:

Habitats in Designated National or European Sites	**Rationale for excluding this Sensitive Aspect: No likely impact/No potential for impact, as per** • There is no potential for direct impacts to any National Heritage Area (NHA), proposed National Heritage Area (pNHA), Special Area of Conservation (SAC) or any Special Protection Area (SPA, for birds) because neither KWF Grid Connection nor Authorised Knocknamona Windfarm are located within, adjacent or in close proximity to any designated site. • There is no potential for indirect habitat loss, degradation, reduction or fragmentation impacts to Lismore Woods pNHA (000667), Comeragh Mountains pNHA, Comeragh Mountains SAC (001952), Ballyeelinan Wood pNHA (001692), Glenanna Wood pNHA (001698), Blackwater Callows SPA (004094), Ardmore Head SAC (002123), or Glendine Wood SAC (002324) due to lack of hydrological connectivity and separation distances to the KWF Grid Connection or the Authorised Knocknamona Windfarm sites. • No likely habitat loss, degradation, reduction or fragmentation impacts to Blackwater River (Cork/Waterford) SAC (002170), Blackwater River and Estuary pNHA (000072), Blackwater Estuary SPA (004028), Dungarvan Harbour pNHA, Dungarvan Harbour SPA (000663) (or Dungarvan Harbour Ramsar Site), Helvic Head SAC (000665) or Helvick Head to Ballyquin SPA (004192) which have hydrological connectivity with the site, but due to the separation distances between the nearest Designated Site (Blackwater River (Cork/Waterford) SAC) and KWF Grid Connection at 2.9km distant and the nearest turbine in Knocknamona Windfarm at 3.8km distant, no impacts to water quality are likely to occur (as per Chapter 9 Water). See also Figure 7.1.1: Location of KWF Grid Connection in relation to Designated Sites**.**
Birds Listed as Qualifying Interest/ Special Conservation Interests of Designated Sites	Rationale for excluding this Sensitive Aspect: **No Likely Impacts** due to: The following bird species are listed as Qualifying Interest/special conservation interests for the **Blackwater Callows SPA** - Whooper Swan, Wigeon, Teal, Black-tailed Godwit and Wetland and Waterbirds; the Blackwater Estuary SPA – Wigeon, Golden Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank and Wetland and Waterbirds; **Dungarvan Harbour SPA** (or Dungarvan Harbour Ramsar Site) - Great Crested Crebe, Light-bellied Brent Goose, Shelduck, Red Breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Turnstone and Wetland and Waterbirds; **Helvic Head to Ballyquin SPA** - Cormorant, Peregrine Falcon, Herring Gull, Kittiwake, Chough. • *In relation to Wigeon, Teal, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Redshank, Wetland and Waterbirds, Great Crested Grebe, Light-bellied Brent Goose,*

Shelduck, Red Breasted Merganser, Oystercatcher, Grey Plover, Knot, Turnstone, Cormorant, Herring Gull, Kittiwake, Chough and Peregrine Falcon: None of these bird species were recorded on site during 2013/2014, 2018 and 2020 breeding and 2020/2021 non-breeding season bird surveys carried out for Authorised Knocknamona Windfarm, nor are there any known populations of these bird species using the site, nor any known migratory routes for these species passing over the KWF Grid Connection location. Therefore it is considered that direct or cumulative impacts to these species as a result of the KWF Grid Connection are unlikely to occur.

- *In relation to Golden Plover and Curlew*: The results of extensive surveys for the project indicate that neither Golden Plover nor Curlew rely on the windfarm site or the surrounding area and are not resident or regularly occurring in the area. Golden plover were not recorded during breeding season surveys in 2020, 2018, 2014 or 2013 or during the winter season surveys in 2010, 2012 and 2013/2014. The only golden plover observations during bird surveys completed between 2010 and 2021 relate to two separate observations during winter season vantage point surveys: in January 2018, when three individual birds were observed in flight; and during early March 2018, when two individual birds were observed. The habitat occurring within the windfarm area is generally of low suitability for this species. No breeding or wintering curlew were recorded using the site or environs during bird surveys between 2010 and 2021, with the exception of one flyover by two birds during 2011. This species does not breed, roost or forage at or within the wider 500m buffer area surrounding the windfarm site. Therefore, it is considered that any impacts to Golden Plover or Curlew as a result of the development of the KWF Grid Connection will be Neutral, either alone or in combination with the Authorised Knocknamona Windfarm works.
- *In relation to Whooper Swan*: No swans, including Whooper Swans were observed within or within a 500m buffer distance of the windfarm site during winter vantage point surveys in 2010/2011, 2013/2014, 2018 of 2020/2021. The closest recorded flock was at Cloghbeg, which is over 2km from the construction works boundary of the KWF Grid Connection. There is no suitable roosting or foraging habitat for whooper swan at the KWF Grid Connection site, or within the windfarm site. No swans were recorded flying over the KWF Grid Connection site, or over the Knocknamona Windfarm site during bird surveys (including during Swan Census surveys). Due to the nature and characteristics of the KWF Grid Connection– with underground cabling and equipment/apparatus and small buildings in an existing fenced compound, it is considered that collision/mortality impacts are unlikely to occur. In relation to the windfarm element of the whole project, the results of the surveys carried out in January and February of 2021 confirm that the windfarm site is not used by this species, is not situated on a regular flight path, and that whooper swan activity is centered on the Lower Blackwater River with foraging activity concentrated to the northwest of the windfarm site. Therefore it is expected that the potential for collision mortality effects as a result of the whole project (turbines) during the operational stage is unlikely to occur and therefore cumulative impact with KWF Grid Connection is unlikely to occur.
- *In relation to indirect effects to bird species (via reduction in water quality)*: Due to the nature and scale of the KWF Grid Connection, the elevated location, the absence of instream works, the absence of large manmade drains with very limited forestry or agricultural drainage in the area of the site, the separation distances and dilution

	factors to downstream designated sites, it is considered that any impacts will be Unlikely/Neutral and therefore will no contribute to cumulative impacts. Figure 7.3: Study Area for Birds
Amphibians	*Rationale for excluding this Sensitive Aspect:* **Neutral Impact** due to the suboptimal value of habitats within the KWF Grid Connection site for Common Frog or Smooth Newt. While frogs may breed in drains downslope of works areas, these habitats will not be affected by KWF Grid Connection works. The study area is of no particular importance to this group: habitats present within and in close proximity to the site are suboptimal for these animals. Figure 7.5 and Figure 7.5.1: Study Area for Aquatic Habitats & Species
Reptiles	*Rationale for excluding this Sensitive Aspect*: **Neutral Impact** due to the suboptimal value of habitats within the KWF Grid Connection site for Viviparous Lizard and Slow Worm, and the short duration of works, with no loss of suitable habitat within construction works areas. Figure 7.2: Study Area for Terrestrial Habitats
Invertebrates	*Rationale for excluding this Sensitive Aspect*: **Neutral Impact** due to the low ecological value to habitats within the KWF Grid Connection site in terms of invertebrate diversity and the small scale of works, with a small number of machines/vehicles at any one location. The reinstatement of the berm alongside the new link road and reseeded with grasses and flower species common to the surrounding vegetation. Local provenance native wildflower seed of flowering plants like Clovers, Vetches and Knapweed will be sown. This will provide habitat for invertebrates, such as bees, flies, spiders, moths and butterflies. Figure 7.2: Study Area for Terrestrial Habitats
Cumulative Impact on Amphibians, Reptiles and Invertebrates	The majority of the windfarm site consists of highly modified habitat planted with non-native conifer plantation growing at varying stages limiting its biodiversity for amphibians, reptiles and invertebrates. This monoculture creates acidic soils, which in turn greatly limits the native floral species that can grow there. The understory of conifer plantations also let very little light through to the forest floor, further limiting the species that these areas can support. As a result, such sites are of low biodiversity and ecological value, and are not capable of supporting even moderate level of native biodiversity in terms of amphibians, reptiles, invertebrates. Recently felled areas of plantation can allow native flora to colonise but again this is of low diversity due to the negatively altered soil composition.

7.1.4 The Authors of this Biodiversity Chapter

The Biodiversity chapter was written by Andrew Whitfield of Inis Environmental Consultants. Andrew Whitfield (BA. MA. C. Ecol. C. Env) has over 30 years experience in ecological consultancy. He is a full member of Chartered Institute of Ecology and Environmental Management (MCIEEM), a Chartered Ecologist and Chartered Environmentalist. Andrew has extensive experience of undertaking Ecological Impact Assessment through the UK and Ireland on a variety of major infrastructure projects including nuclear power stations, road schemes, housing developments, renewable energy developments and new railways. He has particular expertise in habitat, butterfly, bird and mammal survey and assessment. Andrew also has extensive experience of coordinating multi-disciplinary teams for environmental assessment, authoring EIA, EcIA and AA and providing Expert Witness testimony.

Dr Alex Copland BSc PhD MIEnvSc is Technical Director with INIS and reviewed this chapter. He has over 25 years of professional experience working in both statutory and private companies, in third-level research institutions and with environmental NGOs. He is proficient in experimental design and data analysis and has managed several large-scale, multi-disciplinary ecological projects. These have included research and targeted management work for species of conservation concern, the design and delivery of practical conservation actions with a range of stakeholders and end-users, education and interpretation on the interface between people and the environment and the development of coordinated, strategic plans for birds and biodiversity.

He has written numerous scientific papers, developed and contributed to evidence-based position papers, visions and strategies on birds and habitats in Ireland. He has supervised the successful completion of research theses for several post-graduate students, including doctoral candidates. He is a collaborative researcher with both UCD and UCC, and sits on the Editorial Panel of the scientific journal, *Irish Birds*, which publishes original ornithological research relevant to Ireland's avifauna.

7.1.5 Sources of EIAR Information

The following sources of information were used to gather information on the baseline environment and evaluate impacts, including cumulative impacts.

Table 7-1: Sources of Baseline Information for Biodiversity

Type	Information Source
Consultation	No feedback was received from the Development Applications Unit (NPWS) – consulted in February, 2022. Acknowledgement only. See Chapter 3: The Scoping Consultations, and Appendices for further details.
Legislation, Regulation & Policy	• Ireland's 4th National Biodiversity Action Plan, for the period 2023-2027, work in progress commenced in October 2021. Currently in Draft form for Public Consultation. https://assets.gov.ie/233057/f1a92f68-e668-498d-a56c-df777a19b549.pdf
Guidelines	Ecological Evaluation • Guidelines for Assessment of Ecological Impacts of National Road Schemes. Dublin – (National Roads Authority, 2009) • Guidelines for Ecological Impact Assessment in the United Kingdom- (CIEEM, 2016). • Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority). • The Heritage Council (2011) Best Practice Guidance for Habitat Survey and Mapping. • Percival, S.M. Predicting the effects of wind farms on birds in the UK: the development of an objective assessment method. [ed.] M., Janss, F.E., Ferrer, M. De Lucas. Madrid - (Quercus, 7, pp. 137-152).2007 • Collins, J. (ed.) (2016). Bat surveys for professional ecologists: good practice guidelines (3rd edn). The Bat Conservation Trust, London. • A Guide to the Habitats of Ireland. The Heritage Council, Kilkenny. (Fossitt, 2000).
Desktop	• NPWS website • National Biodiversity Data Centre website (NBDC); • Environmental Protection Agency website (EPA);

Type	Information Source
	• Inland Fisheries Ireland (IFI); • Birdwatch Ireland website (BWI); • Bat Conservation Ireland (BCI); • Butterfly Ireland website; • Waterford Heritage Plan 2017-2022 In co-ordination with and by review of the other EIA 2023 Report Chapters as follows: • EIAR 2023 Chapter 5: Description of Development • EIAR 2023 Chapter 9: Water • EIAR 2023 Chapter 10: Air Review of Authorised Knocknamona Windfarm Planning Docs • Knocknamona Windfarm Revised EIS 2015 • Amendment to Knocknamona Windfarm – Larger Turbines Revised EIAR 2021 • Junction & Bend Widening Works Screening for EIA 2022 Available in EIAR 2023 Volume F: Reference Documents
Fieldwork	• Field Walking • Habitat Surveys • Bat Surveys • Other Mammal Surveys • Breeding Season Bird Surveys • Non-Breeding Season Bird Surveys • Breeding Wader Surveys • Whooper Swan Census Survey • Water Sampling

7.1.6 Methodology used to Describe the Baseline Environment and to Evaluate Impacts

A combination of NRA guidance[1] and methodology developed by Steve Percival[2] was used to evaluate the significance of likely or potential effects to relevant aspects of Biodiversity at the proposed KWF Grid Connection development site.

7.1.6.1 Determining the importance of the Biodiversity resource at the proposed KWF Grid Connection site (NRA 2009)

The importance of biodiversity resources at the proposed KWF Grid Connection site has been derived from NRA Guidance (2009), as outlined in the table below.

[1] Guidelines for Assessment of Ecological Impacts of National Road Schemes, 2009
[2] Predicting the effects of wind farms on birds in the UK: the development of an objective assessment method, 2007

Table 7-2: NRA Evaluation Guidance (NRA 2009)

Resource Evaluation	NRA Criteria
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 (SPA). 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. • 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) 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. 293 of 1988).
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. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); • 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) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.
County Importance	• Area of Special Amenity. • 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) 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.

Resource Evaluation	NRA Criteria
	• 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, viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, 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)	• 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) 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 is of some importance in maintaining habitat links.

7.1.6.2 Determining the Sensitivity of Biodiversity Receptors

Guidance from Percival 2007 and NRA 2009 has been used to evaluate the sensitive of bird species to the proposed development. This rating system has also been used as a general guide for magnitude quantification for other biodiversity receptors throughout this report.

Table 7-3: Sensitivity Rating Equivalency (Percival 2007 and NRA 2009 Combined)

Sensitivity	Percival 2007 criteria	NRA Resource Evaluation	NRA Criteria	Combined Criteria
Very High	Species is cited interest of SPA. Species present in Internationally important numbers.	International Importance.	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I	Species is cited interest of SPA. Species present in Internationally important numbers. Resident or regularly occurring populations

Sensitivity	Percival 2007 criteria	NRA Resource Evaluation	NRA Criteria	Combined Criteria
			and/or referred to in Article 4(2) of the Birds Directive	(assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive
High	Other non-cited species which contribute to integrity of SPA. Ecologically sensitive species (<300 breeding pairs in UK) and less common birds of prey. Species listed on Annex 1 of the EU bird's directive. Regularly occurring relevant migratory species which are rare or vulnerable	National Importance	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list	Other non-cited species which contribute to integrity of SPA Ecologically sensitive species (<300 breeding pairs nationally) and less common birds of prey. Species listed on Annex 1 of the EU bird's directive. Regularly occurring relevant migratory species which are rare or vulnerable Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list (in this case BOCCI Red list).
Medium	Species present in regionally important numbers (>1% of regional population). Species occurring within SPA's but not crucial to the integrity of the site. Species listed as priority species in the UK BAP subject to special conservation measures	County Importance	Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; County important populations of species. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.	Species present in regionally important numbers (>1% of regional population). Species occurring within SPA's but not crucial to the integrity of the site. Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; County important populations of species. Species that are rare or are undergoing a decline in quality or extent at a national level.
Low	Species covered above which are present very infrequently or in very low numbers.	Local Importance (High Value)	Locally important populations of priority species or habitats or natural heritage features identified in	Locally important populations of priority species identified in the Local BAP, if this has been prepared;

Sensitivity	Percival 2007 criteria	NRA Resource Evaluation	NRA Criteria	Combined Criteria
	Any other species of conservation interest not covered above, e.g. species listed on the red or amber lists of the BoCCI.		the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.	Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Amber listed species.
Negligible	Species that remain common and widespread	Local Importance (Low Value)	n/a	Species that remain common and widespread Green Listed Species.

7.1.6.3 Determining the Magnitude of Impacts to Biodiversity Receptors (Percival 2007)

A definition of terms in respect of magnitude for bird species evaluations is outlined in the table below. This rating system has also been used as a general guide for magnitude quantification for other biodiversity receptors throughout this report.

Table 7-4: Determining Magnitude of Impacts (Percival 2007)

Magnitude	Description of Magnitude Rating
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. Guide: < 20% of population / habitat remains
High	Major loss or major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/ composition/ attributes will be fundamentally changed. Guide: 20-80% of population/ habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed. Guide: 5-20% of population/ habitat lost
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/ habitat lost

Magnitude	Description of Magnitude Rating
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the "no change" situation. Guide: < 1% population/ habitat lost

7.1.6.4 Determining the Risk of Effect to Biodiversity Receptors (Percival 2007)

The probability rating definitions used to inform bird species evaluations are outlined in the table below. This rating system has also been used as a general guide for determining risk in relation to other biodiversity receptors throughout this report.

Table 7-5: Risk classifications or likelihood that an impact will occur (Percival 2007)

Probability	Description	Comments
High	Impact is likely to occur (>50% likelihood)	Species known to be vulnerable to specific impact
Medium	Impact may occur (5-50% likelihood)	Species may be affected by specific impact
Low	Impact is very unlikely (<5% likelihood)	Species known to be tolerant to specific impact

7.1.6.5 Determining Significance of Impacts to Biodiversity Receptors (Percival 2007 & EPA 2017 combined)

The significance matrix used for bird species evaluations is provided in the table below. This matrix has also been used as a general guide for determining the significance of impacts in relation to other biodiversity receptors throughout this report.

Table 7-6: Determining the Significance of Impacts (Percival 2007 with equivalent EPA Significance Ratings)

Significance		Sensitivity			
		Very High	**High**	**Medium**	**Low**
Magnitude	**Very High**	Very high/ Very significant	Very high/ Very significant	High/ Significant effects	Medium/ Moderate effects
	High	Very high/ Very significant	Very high/ Very significant	Medium/ Moderate effects	Low/ Slight effects
	Medium	Very high/ Very significant	High/ Significant effects	Low/ Slight effects	Very low/ Not Significant
	Low	Medium/ Moderate effects	Low/Slight effects	Low/Slight effects	Very low/ Not Significant
	Negligible	Low/ Slight effects	Very low/ Not Significant	Very low/ Not Significant	Very low/ Not Significant

7.1.7 Certainty and Sufficiency information and evaluations

The biodiversity baseline information was collated from site investigations and field surveys, along with publicly available online resources including Biodiversity Data Centre (NBDC), National Parks & Wildlife Service (NPSWS), Environmental Protection Agency (EPA), and Inland Fisheries Ireland (IFI), which are regularly updated. All field survey work was carried out by qualified and experienced ecologists. Baseline information was also supplemented by the baseline information for Knocknamona Windfarm (Revised EIS 2015); Proposed Larger Turbines and Met Mast at Knocknamona Windfarm Revised EIAR (2021) and Junction & Bend Widening Works Screening for EIA (2022). Sensitivity and magnitude were evaluated using the NRA/Percival combined methodology outlined in Section 7.1.6.

The evaluation of the baseline environment and potential for impacts has been informed by and carried out using best practice guidance, namely *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (Chartered Institute of Ecology and Environmental Management, 2016). The professional judgement of the ecologist has been used in the scoping of surveys, interpretation of data, and assessment of impacts; this approach is consistent with the CIEEM guidelines. A clear documentary trail is provided throughout this section regarding the data and methods used in the evaluation. All documentation used is referenced at the end of this Biodiversity chapter.

No material limitations or difficulties were encountered.

7.2 Sensitive Aspect No.1: Terrestrial Habitats

This Section 7.2 provides a description of the baseline environment and an evaluation of the likely impacts of KWF Grid Connection, both alone and cumulatively, on **Terrestrial Habitats**.

7.2.1 Description of the BASELINE ENVIRONMENT for Terrestrial Habitats

This Section 7.2.1 comprises the identification of the Study Areas for direct or indirect effects and for cumulative effects, and a description of the context, character, importance and sensitivity of the Terrestrial Habitats in the area. Trends or changes in the baseline environment and expected receiving environment are also identified.

7.2.1.1 STUDY AREAS for Terrestrial Habitats

Study areas relate to areas which could be affected by impacts from KWF Grid Connection, whether direct impacts from the KWF Grid Connection on its own or cumulative impacts from KWF Grid Connection and other projects or activities.

The study areas are described in the table below and on relevant figures

Relevant Figures at the end of the chapter
Figure 7.2: Study Area for Terrestrial Habitats

Table 7-7: Study Area for Terrestrial Habitats

KWF Grid Connection Study Area (direct or indirect effects)	Cumulative Study Area
Study Area Extent: Construction works area boundary and access road through Woodhouse Windfarm Entrance plus 50m in all directions.	Study Area Extent: Construction works area boundary and access road through Woodhouse Windfarm Entrance plus 100m in all directions. The KWF Grid Connection cumulative study area includes those parts of other projects or activities which occur within 100m of the construction works area boundary.
Justification for Study Area Extent: Professional judgement and as per Best Practice (CIEEM, 2016), it is considered that there will be no likely direct or indirect effects beyond the construction works area and access road.	Justification for Study Area Extent: Professional judgement and as per Best Practice (CIEEM, 2016). It is considered that there will be no likely direct or indirect effects beyond the construction works area and access road, therefore in relation to the potential for cumulative effects to Terrestrial Habitats - doubling the distance for cumulative study areas, identifies those parts of other projects with potential to cause cumulative impacts with KWF Grid Connection, if any.
Relevant development stage: Construction Stage & early (Year 1) operational stage Justification:	Relevant development stage: Construction Stage & early (Year 1) operational stage Justification:

Effects will only occur during the construction stage and may remain until the site has fully reinstated.	Cumulative effects with the KWF Grid Connection will only occur during its construction stage and may remain until the site has fully reinstated.

7.2.1.2 Description of the BASELINE CONTEXT and CHARACTER of Terrestrial Habitats

The baseline context includes a description of the KWF Grid Connection Study Area and also the wider area which includes the Cumulative Study Area; Knocknamona Windfarm project area; Woodhouse Substation and Woodhouse Windfarm project areas.

7.2.1.2.1 Baseline for KWF Grid Connection Study Areas (Terrestrial Habitats)

A site visit of the KWF Grid Connection Study Areas was conducted on 13th June 2022 and 8/9th June 2023. The habitats identified within the Study Areas and the percentage of each of the habitat are listed in the Table below. The habitats are also delineated on Figure 7.2. Study Area for Terrestrial Habitats.

Table 7-8: Habitats identified within the KWF Grid Connection Study Areas

Identified habitats	Fossitt Code	Evaluation	Habitat Area (ha) and Length (m) within the Study Area (ha)	% habitat within the Study Area	Key ecological receptor?
Buildings and artificial surfaces Spoil and bare ground Recolonising bare ground Dry-humid acid grassland	BL3 ED2 ED3 GS3	Local Importance (lower value)	4.72ha	12.2%	No
Improved Agricultural Grassland	GA1	Local Importance (lower value)	19.67ha	50.1%	No
Wet grassland	GS4	Local Importance (lower value)	0.83ha	2.15%	No
Conifer Plantation	WD4	Local Importance (lower value)	4.1ha	10.56 %	No
Conifer Plantation/Scrub	WD4/ WS1	Local Importance (lower value)	3.64ha	9.43 %	No
Conifer Plantation/Immature Woodland	WD4/ WS2	Local Importance (lower value)	1.31ha	3.4%	No
Semi-natural woodland	WN	Local Importance (higher value)	0.2ha	0.4%	No
Scrub	WS1	Local Importance (lower value)	0.7ha	1.8%	No
Recently felled Woodland/Scrub/Immature Woodland	WS5/ WS1/ WS2	Local Importance (lower value)	3.51ha	9.1%	No
Treelines	WL2	Local Importance (lower value)	2316m		
Hedgerows	WL1	Local Importance (higher value)	61m		

Buildings & Artificial Surfaces: The KWF Grid Connection construction works area is mostly a track comprising

'Buildings and Artificial Surfaces' habitat. This Artificial Surfaces habitat comprises mostly crushed and compacted imported stone. This area also contains 'Spoil and bare ground (ED2); Recolonising bare ground (ED3) occurring as a mosaic alongside and in the centre of tracks at some locations. This habitat mosaic has formed on surfaces where gravel/sand/soil is unconsolidated and sometimes driven over. Natural succession is repeatedly interrupted along these tracks due to vehicular traffic. This activity abrades the substrate and removes or significantly reduces the plant cover. As a result, these tracks support low biodiversity and low levels of naturalness. This habitat is used for vehicular access. A narrow strip of Dry humid Acid Grassland (GS3) occurs along some roadside verges. This habitat grades to 'Recolonising bare ground' associated with the tracks, scrub, and other habitats where free-draining acid soils occur. At the northern extent of the proposed development, there is a building and associated hardstand at Woodhouse Substation that corresponds to 'Buildings and Artificial Surfaces' habitat. These constructed components have little biodiversity value (lower value).

Improved Agricultural Grassland: Intensively managed highly modified agricultural grassland is dominant within the Woodhouse Windfarm area in the western areas of the proposed KWF Grid Connection works area and in the surrounding area outside of those areas dominated by coniferous woodland plantation. This habitat has been re-seeded and fertilised and is heavily grazed. This monoculture grassland is the predominant habitat in the area and has low ecological value (lower value).

Wet grassland: This habitat consisted of areas of semi-improved agricultural farmland that have not been recently improved and have impeded drainage and is located in fields to the north-east of the KWF Grid Connection Works area. This habitat can vary in quality depending on the degree of improvement and is assessed as of Local Importance (lower value) in this instance.

Conifer plantation: The majority of habitat bordering the mid-southern extent of the proposed KWF Grid Connection consists of commercial conifer plantation stands in block formation with Sitka spruce (*Picea sitchensis*) the dominant species. Areas of closed canopy were characterised by no significant cover of ground flora. In the most recently planted areas, floral cover was characterised by poor structural diversity and a ground flora dominated by common shade-tolerant plants. This habitat is assessed as Local Importance (lower value) as it is a habitat that are of some importance for wildlife and in maintaining habitat links.

Conifer plantation/Scrub: This mosaic habitat contained areas of mixed stands of broadleaved trees and conifers where both types have a minimum cover of 25% and a maximum of 75%. The broadleaved trees present comprised birch, rowan and brambles with Sitka spruce. This habitat can be described as Local Importance (lower value) as it is a habitat containing species that are of some importance for wildlife and in maintaining habitat links.

Conifer Plantation/Immature Woodland: This mosaic habitat contained areas of dense stands of planted conifer trees where deciduous trees accounted for less than 25% of trees present and areas of dominated by sapling trees that are between 1-2m in height. This habitat can be described as Local Importance (Lower Value) as it is a habitat containing species that are of some importance for wildlife and in maintaining habitat links.

Semi-natural woodland: This habitat was dominated by trees and had a canopy height greater than 5m. Semi-natural Woodland habitat can be described as Local Importance (higher value) as it is a feature containing semi-natural habitat types with high biodiversity and a high degree of naturalness although the area represents just 0.4% of the construction works area.

Scrub: This habitat occurs as a linear feature in some areas along the track-side margins of the site. An area of scrub also occurs ca. 250m south-east of the existing Woodhouse Substation between two forestry tracks,

at the location of the proposed new Link Road. The floral community was dominated by Bramble (*Rubus fruticosus*), with Gorse (*Ulex* spp.), Hawthorn (*Crataegus monogyna*) and Bilberry (*Vaccinium myrtillus*) also recorded. Scrub habitat is identified as Local Importance (Lower Value) as although it is a feature containing semi-natural habitat types with high biodiversity and a high degree of naturalness, in this instance it reflects recent disturbance and recolonisation.

Recently-felled Woodland/Scrub/Immature Woodland: This habitat mosaic contained stumps and brash with areas of scrub and areas dominated by sapling trees that are between 1-2m in height. Plants observed in this habitat include Field Sorrel, Foxglove, Briers and Spruce. This habitat can be described as Local Importance (lower value) as it is a habitat containing species that are of some importance for wildlife and in maintaining habitat links.

Plate 1: 'Recently felled woodland' at the Authorised Knocknamona Substation location. The KWF Grid Connection underground cabling will connect into the Windfarm Substation.

Plate 2: 'Artificial surfaces' habitat along existing forestry access roads showing spoil and bare ground/recolonising bare ground and dry-humid acid grassland - 'on-track' section of the underground cabling for KWF Grid Connection.

Plate 3: 'Scrub' habitat between forestry roads and windfarm roads – 'off-track' section of the underground cabling for KWF Grid Connection and the new Link Road.

Plate 4: 'improved agricultural grassland' next to Woodhouse substation - 'grassland' section of the underground cabling for KWF Grid Connection.

Rare flora, protected flora and species of conservation interest

The site for the proposed development lies within Ordnance Survey Ireland (OSI) National grid 10km square X19. **Table 7-9** presents details of the rare and protected plant species found within X19.

Table 7-9: Rare / Protected Plant Species recorded from 10km square X19 (NBDC and NPWS records)

Species	Notes
Opposite-leaved Pondweed (*Groenlandia densa*)	Threatened Species: Endangered
Green-winged Orchid (*Orchis morio*)	Classed as 'Vulnerable' in the 2016 Red Data List of Vascular plants

There are records of the Flora (Protection) Order species Opposite-leaved Pondweed (*Groenlandia densa*) within the 10km grid square X19. Opposite-leaved Pondweed is a perennial herb of shallow, clear, base-rich water which is frequent in smaller waters such as streams, canals, ditches and ponds, is generally lowland in its distribution (Preston *et al*., 2002) and is considered to be very rare in Ireland (Parnell and Curtis, 2012). This plant grows in clear base-rich waters, which do not occur at or in the environs of the proposed development site. This species will not be considered further.

NPWS records indicate that Green-winged Orchid (*Orchis morio*) was recorded, on a date not specified, within grid Square X19. This plant is included in the Checklist of protected & rare species in Ireland (Kingston, 2012) and is Red listed in Curtis and McGough (1988) as Vulnerable. It grows on base-rich to slightly acidic soils and is associated with meadows, pastures and sand hills. It is frequent in the centre and parts of the east of Ireland but rare elsewhere in the country (Parnell and Curtis, 2012). On the basis of the habitat associations described and bearing in mind the modified habitats that dominate at the site, and the agricultural grassland habitat that surround it, it is considered that no suitable habitat for Green-winged Orchid exists within the proposed development boundary. This species will not be considered further.

There are no suitable habitats within the proposed development site for rare and protected flora – and these species are not expected to occur given domination of man-made habitats and artificial character of the surrounding environment. Therefore, these species are not selected as key ecological receptors.

Invasive Species - During the June and July 2023 surveys, no invasive plant species were recorded within the study area which includes as far as the Woodhouse Windfarm Entrance.

7.2.1.2.2 Baseline for Woodhouse Substation and Woodhouse Windfarm (Terrestrial Habitats)

KWF Grid Connection includes works and installations within Woodhouse Substation and use of some Woodhouse Windfarm roads including the entrance gate, for whole project site access. The baseline for those parts of Woodhouse Substation and Woodhouse Windfarm inside of the Cumulative Study Area is described below.

Operational Woodhouse Substation: Habitats present comprise buildings and artificial surfaces and have little ecological value. Conditions remain unchanged since Woodhouse Substation was built in 2015.

Operational Woodhouse Windfarm: Habitats present mainly comprise intensively managed highly modified agricultural grassland, which are of low ecological value. Conditions remain unchanged since the Woodhouse Windfarm was built in 2015.

7.2.1.2.3 Baseline for Whole Knocknamona Windfarm Project (Terrestrial Habitats)

KWF Grid Connection is part of the Whole Knocknamona Windfarm Project and includes works within the Knocknamona Windfarm site. The Whole Project also includes Knocknamona Windfarm as authorised in 2016, amendments to the size of the wind turbines and meteorological mast and also junction & bend widening works in the vicinity of Knocknamona Windfarm site entrance, both of which were authorised in 2022. The baseline described below informed the evaluation of cumulative effects, both the KWF Grid Connection cumulative effect and the Whole Project cumulative effect.

The **Knocknamona Windfarm** site overlaps with KWF Grid Connection along the existing forestry track as far as the Windfarm Substation. Habitats present within the Knocknamona Windfarm site are dominated by commercial conifer plantation stands in block formation with Sitka spruce (*Picea sitchensis*) the dominant species. Areas of closed canopy were characterised by no significant cover of ground flora, while some scrub/dry-humid acid grassland was noted between the rows of pre-thicket conifer. In the most recently planted areas, floral cover was characterised by poor structural diversity and a ground flora dominated by common shade-tolerant plants. Scrub occurs as a linear feature in some areas along the track-side margins of the site. These habitats are generally of low ecological value.

It is noted, that while small areas of Wet willow-alder-ash woodland (WN6) and Wet heath (HH3) were recorded on the Knocknamona Windfarm, these habitats do not occur within the Cumulative Evaluation Study Areas.

The habitats contained within the Knocknamona Windfarm site, their distribution, and quality remain largely unchanged in the passage of time since the initial 2014 habitat surveys for the windfarm. There have been minor changes to the structure of the conifer plantation in terms of the growth stages of the plantation. This plantation makes up the majority of the Knocknamona Windfarm site and it is harvested on rotation. Therefore, the conclusions of the previous evaluations and assessments for the authorised Knocknamona Windfarm remain unchanged, as do the interpretations for the low biodiversity value and ecological stability of the site.

Junction & Bend Widening Works are all located outside of the Study Areas. The works locations are adjacent to road corridors. Works relating to the work site HR2 are located within an area of road verge and conifer plantation, while work sites HR3 and HR4 are located within an area of intensively managed improved agricultural grassland. Thus, it is assessed here that the habitat types contained within the proposed works area, are of low local and national ecological value.

The Junction and Bend Widening Works are minor and short-term in nature mainly located within the public road corridor. The conditions remain unchanged since previous surveys in 2021/2022.

Relevant Figure (at the end of the chapter)

Figure 7.2: Study Area for Terrestrial Habitats

Relevant Volume F: Reference Documents

Reference Document 1 of 7 to 4 of 7: Knocknamona Windfarm R.EIS 2015

Reference Document 6 of 7 & 7 of 7: Amendment to Knocknamona Windfarm (Larger Turbines & Met Mast) R.EIAR 2021

Reference Document 5 of 7: Junction & Bend Widening Works Screening for EIA 2022.

7.2.1.3 IMPORTANCE of Terrestrial Habitats

The majority of the habitats that occur within the KWF Grid Connection Study Areas have been evaluated as being of 'Local Importance (lower value)' due to their low-level importance for local biodiversity and

supporting fauna i.e. improved agricultural grassland (50.1%); buildings & artificial surfaces (12.2%); and conifer plantation (10.56%). The small area of semi-natural woodland (0.2ha) and Hedgerow (61m) which are within the Study Area are ecologically more important than adjacent habitats such as grassland, which merits a Local Importance (higher value) status. This evaluation takes into account that these areas are of some local importance for wildlife.

Habitats within the Whole Knocknamona Windfarm Project site are described as modified, with commercial forestry and highly managed agricultural grassland dominating the surrounding upland area, resulting in habitats of low biodiversity value. **Overall, terrestrial habitats are evaluated to be of Local Importance (lower value).**

7.2.1.4 SENSITIVITY of Terrestrial Habitats

Terrestrial Habitats are sensitive to direct land take and encroachment from invasive species which may out-compete local native species.

7.2.1.5 TRENDS for Terrestrial Habitats in the Baseline Environment

No changes are expected within the KWF Grid Connection study areas, which mainly comprises existing access roads and existing substation compound area within established forestry, agricultural and windfarm/utility land use. The make-up of the conifer plantation will change in line with normal forest management. The proposed development is partially located within Coillte forestry, and as such the Coillte Central Munster Five Year Forest Plan 2021-2025 applies. According to the Forest Plan, considerable effort is now put into adjusting felling coupe size and shape to satisfy both environmental and landscape design purposes, this should lessen the environmental pressures of future forestry felling.

Climate Change from anthropogenic greenhouse gases now poses a grave threat to species and habitats (Dubash, 2020; Wuebbles *et al*. 2017). The evidence for catastrophic and permanent alteration of the habitats is abundantly clear and has already begun with severe habitat loss, flooding, droughts and wildfires worldwide (IPCC, 2007, 2014). The rate of loss and fragmentation of these habitats and their associated species as a result of climate change is only expected to increase. (Bellard *et al*. 2012)

7.2.1.6 The 'Do Nothing Scenario' (the Environment if the Development is not carried out)

If the KWF Grid Connection does not proceed, the effects on the environment will not occur, and the baseline environment will only change in line with the trends identified above.

7.2.1.7 Description of the RECEIVING ENVIRONMENT for Terrestrial Habitats

The receiving environment is the likely state of the baseline environment at the time of construction/operation/decommissioning as relevant i.e. baseline + trends.

Considering that forest management changes and the effects of climate change will happen relatively gradually, it is assumed in this report that the baseline environment in relation to Terrestrial Habitats, as identified above, will be the receiving environment at the time of construction with ongoing trends as identified expected to be reflected during the operational phase.

Relevant Figure at the end of this chapter

Figure 7.2: Study Area for Terrestrial Habitats

7.2.2 EVALUATION OF IMPACTS to Terrestrial Habitats

In this Section, the direct or indirect impacts and the cumulative impacts of KWF Grid Connection on Terrestrial Habitats are described.

7.2.2.1 Potential Impacts Evaluated for Terrestrial Habitats

A conceptual site model exercise was carried out to identify potential impacts through the examination of the specific pathways between the project (source) and the sensitive aspect (receptor).

The potential for impacts was **examined in the absence of mitigation measures**, and **based on the description of development, standard construction methodologies, construction activities and operational activities as described in Chapter 5**: **Description of the Development**.

The potential impacts which were evaluated are listed in the 1st column of the table below. As summarised in the table below, **no significant effects are likely to occur**.

Table 7-10: Conclusion of the Evaluation of Potential Impacts to Terrestrial Habitats

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Direct/Indirect Impact of KWF Grid Connection	Cumulative Impact with the Authorised Knocknamona Windfarm	Cumulative impact with Woodhouse Windfarm and Woodhouse Substation	Cumulative Whole Knocknamona Windfarm Project Impact
Reduction in Terrestrial Habitats	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not significant**
Hedgerow/earthen bank field boundary Severance	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not significant**
Landscape Level Habitat Fragmentation	Construction	**Neutral**	Imperceptible	No additional cumulative impact	**Not significant**
Loss of High Nature Value Trees	Construction	**No Impact**	No cumulative impact	No additional cumulative impact	**Not significant**
Loss of FPO Species	Construction	**No Impact**	No cumulative impact	No additional cumulative impact	**Not significant**
Introduction or spread of invasive species	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not significant**
Introduction or spread of invasive species	Operational	**Imperceptible**	Imperceptible	Imperceptible	**Not significant**

In order to keep this EIA Report concise and focused on potential significant impacts, where the evaluation of potential impacts found no significant impacts from the development, the evaluation tables are presented in the appendix to the chapter. Because no significant impacts to Terrestrial Habitats are likely to occur, the Impact Evaluation Tables for the potential impacts listed in the table above are in Appendix 7.1 at the end of the chapter.

Relevant Appendix (at the end of this chapter)

Appendix 7.1 Evaluation of Potential Impact to Biodiversity – Evaluation Tables for Effects on Terrestrial Habitats (Tables 1 to 7)

7.2.2.2 Summary of the Significance of the Potential Impacts to Terrestrial Habitats

As summarised in the table above, **negative impacts to Terrestrial Habitats as a direct result of KWF Grid Connection will be no greater than Imperceptible**, this is due to the Local importance (lower value) of the majority of the habitats present; the placement of the KWF Grid Connection development predominantly in Buildings & Artificial Surfaces habitat i.e. tracks and hardcore; the negligible level of habitat loss in the context of the availability of these habitats in the surrounding area (limited to scrub habitat along new Link Road (190m); the widening of an existing forestry road by 1m into 'Spoil and bare ground/Recolonising bare ground' habitat and the reversibility of temporary habitat loss with reinstatement of trenches and works areas, including the earthen bank. Additionally, there will be no permanent hedgerow severance, with impacts limited to one short (15m) section of scrubby earthen bank which will be temporarily removed during cable trenching and new Link Road works and then reinstatement along the original alignment, immediately following completion of the works. There will be no severance of any habitats, no High Nature Value Trees identified in the Study Area, no Flora Protection Order species detected or likely to occur in the Study Area. There is a negligible risk of spread of invasive species due to the absence of such species within the study area, the separation distance to watercourses, the statutory biosecurity measures to be used during the construction phase of the project and the general absence of pathways due to the minimum activities during operation of grid connection cabling and apparatus outside 'Buildings & Artificial Surfaces' habitat.

Cumulative impacts of the Whole Project i.e. KWF Grid Connection with Authorised Knocknamona Windfarm will not be greater than Imperceptible, for the same reasons as set out above for direct impacts. Additionally, the impacts to Terrestrial Habitats as a result of the Authorised Knocknamona Windfarm was previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. Also there is a general absence of pathways due to minimum operational activities in terrestrial habitats outside 'Buildings & Artificial Surfaces' habitat, during the operation of a windfarm. T**he combined 'whole project' effect will not be significant**.

When Woodhouse Windfarm and Woodhouse Substation are also taken into account, cumulative impacts will not be greater than Imperceptible because Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, there is a general absence of pathways due to the minimum activities in terrestrial habitat outside 'Buildings & Artificial Surfaces' habitat, during operation of a windfarm or substation and therefore there is no potential for these projects to cause cumulative impacts during the construction of KWF Grid Connection development.

7.3 Sensitive Aspect No. 2: Birds

This Section 7.3 provides a description of the baseline environment and an evaluation of the likely impacts of KWF Grid Connection, both alone and cumulatively, on **Birds**.

7.3.1 Description of the BASELINE ENVIRONMENT for Birds

This Section 7.3.1 comprises the identification of the Study Areas for direct or indirect effects and for cumulative effects, and a description of the baseline context, character, importance and sensitivity of the Birds in the area. Trends or changes in the baseline environment and expected receiving environment are also identified.

7.3.1.1 STUDY AREA for Birds

Study areas relate to areas which could be affected by impacts from KWF Grid Connection, whether direct impacts from the KWF Grid Connection on its own or cumulative impacts from KWF Grid Connection and other projects or activities. The study areas are described in the table below and on relevant figures

Relevant Figures at the end of this chapter

Figure 7.3: Study Area for Birds

Table 7-11: Study Areas for Birds

KWF Grid Connection Study Area (direct or indirect effects)	Cumulative Study Area (cumulative effects)
Study Area Extent: Construction works area boundary plus 50m	Study Area Extent: The KWF Grid Connection cumulative study area includes those parts of other projects or activities which occur within 1km of the construction works area boundary.
Justification for Study Area Extent: Professional judgement and as per Best Practice (CIEEM, 2016, NRA, 2008, Lusby et al., 2010, SNH 2014), it is considered that there will be no likely direct or indirect effects beyond the construction works area boundary and adjacent habitat. No requirement to extend study area to Woodhouse Windfarm entrance gate because delivery traffic is not considered to be a source of impact as birds are likely to be habituated to the existing windfarm and agricultural traffic.	Justification for Study Area Extent: Professional judgement and as per review of NatureScot Guidance on Disturbance Distances in selected Scottish Bird Species which identifies a maximum buffer zone of 1km for selected breeding and non-breeding species. No requirement to extend study area to Woodhouse Windfarm entrance gate because delivery traffic is not considered to be a source of impact as birds are likely to be habituated to the existing windfarm and agricultural traffic and the low quality of the affected habitats.
Relevant development stage: Construction Stage Justification: Works and main activities are confined to the construction stage.	Relevant development stage: Construction Stage Justification: Works and main activities are confined to the construction stage.

7.3.1.2 Description of the BASELINE CONTEXT and CHARACTER of Birds

The baseline context includes a description of the KWF Grid Connection Study Area and also the wider area which includes the Cumulative Study Area; Knocknamona Windfarm project area; Woodhouse Substation and Woodhouse Windfarm project areas.

7.3.1.2.1 Baseline for KWF Grid Connection Study Areas (Birds)

The feeding and nesting habitats of birds within the proposed development site are diminished with respect to the low value habitats present. Overall, the feeding and nesting habitats within the KWF Grid Connection Study Areas are not of any particular importance to birds. Bird habitats and birds affected by the proposed development are evaluated to be of Local Importance (lower value). Birds in the cumulative study area are evaluated be of Local Importance (higher value).

There has been extensive bird survey effort for the KWF Grid Connection and Knocknamona Windfarm sites.

Small numbers of birds were recorded within the KWF Grid Connection site and those observed during transect surveys in January to June 2018 were Meadow Pipit, Robin, Mistle Thrush, Goldcrest, Linnet, Starling, Song Thrush, Woodpigeon, Dunnock, Blackbird, Wren, Great tit, Coal tit, Blue tit, Rook, Hooded Crow, Raven, Chaffinch, Goldfinch, Blackcap, Whitethroat, Chiffchaff, Willow warbler, Magpie, Pheasant, Stonechat, Lesser redpoll, Bullfinch and Siskin. It is considered that these birds are typical countryside species. Breeding wader surveys carried out in April, May and June 2018 recorded one sighting of 2 Woodcock flying outside the site (to the north of the Knocknamona Windfarm site), down a field close to the Mountodell Stream.

Vantage point surveys were carried out at 3 vantage points surrounding the KWF Grid Connection and Knocknamona Windfarm sites, over a 5 month period January to May 2018. Bird species recorded in the wider surrounding area during vantage point surveys in 2018, include Kestrel, Sparrowhawk, Buzzard, Hen Harrier, Golden Plover, Snipe, Grey Heron, Lesser Black-backed Gull and Raven.

A Swan Census survey was undertaken between January and April 2018 on 5 No. of occasions and repeated between 10/09/2022 and 20/04/2023 on 16 No. of occasions. No Whooper Swans were recorded within the KWF Grid Connection site (either using habitats for foraging or loafing, or flying over) and there is no suitable feeding or breeding habitat for Whooper Swan on the site.

Baseline data is also derived from the Knocknamona Windfarm bird surveys (both transect surveys and vantage point surveys) which were carried out during 2010, 2013 and 2014. Additional species recorded during those surveys included Curlew, Barn Swallow, Skylark, Sand Martin and Swift. It is assumed in this report that these species also have potential to occur within the KWF Grid Connection Study Areas.

7.3.1.2.2 Baseline for Woodhouse Substation and Woodhouse Windfarm (Birds)

KWF Grid Connection includes works and installations within Woodhouse Substation and use of some Woodhouse Windfarm roads including the entrance gate, for whole project site access. The baseline for those parts of Woodhouse Substation and Woodhouse Windfarm inside of the Cumulative Study Area is described below.

Operational Woodhouse Substation: Based on professional judgement, it is expected that the following bird species use the habitats present around the Woodhouse Substation area – Kestrel, Barn Swallow, Robin, Starling and Linnet.

Operational Woodhouse Windfarm: Based on professional judgement, it is expected that the following bird species use the habitats present on Woodhouse Windfarm site where they occur within 1km of KWF Grid

Connection – Meadow Pipit, Curlew, Woodcock, Kestrel, Barn Swallow, Goldcrest, Robin, Starling, Sparrowhawk, Linnet, Skylark, Sand Martin, Mistle Thrush and Swift.

Relevant Appendix at the end of this chapter

Appendix 7.2: Bird Survey Data 2015 to 2023

7.3.1.2.3 Baseline for Whole Knocknamona Windfarm Project (Birds)

KWF Grid Connection is part of the Whole Knocknamona Windfarm Project and includes works within the Knocknamona Windfarm site. The Whole Project also includes Knocknamona Windfarm as authorised in 2016, amendments to the size of the wind turbines and meteorological mast and also junction & bend widening works in the vicinity of Knocknamona Windfarm site entrance, both of which were authorised in 2022. The baseline described below informed the evaluation of cumulative effects, both the KWF Grid Connection cumulative effect and the Whole Project cumulative effect.

Knocknamona Windfarm: Breeding and non-breeding season transect surveys for general birds were undertaken during May, June, July and August 2020 of the 2020 breeding season and during October, November, December and January of the 2020/2021 non-breeding season. Substantial survey effort to identify the bird populations occurring at and surrounding the Knocknamona Windfarm site has also been completed between 2010 and 2020, the results of these surveys are also relied upon to inform the baseline environment for birds.

A total of 36 and 38 species were recorded within and surrounding the windfarm site during the course of the breeding and non-breeding bird surveys respectively. Three 'red-list' species Meadow Pipit, Kestrel and Swift were recorded during 2020 breeding surveys with Meadow Pipit observed during all transect surveys and found to be commonly occurring, particularly in grassland habitat to the east of the Authorised Knocknamona Windfarm site. Three 'red-list' species Meadow Pipit, Snipe and Golden Plover were recorded during the winter season surveys. Meadow Pipit was again recorded frequently during the transects, while only one incidental observation of a small flock (approximately 15 individuals) of Golden Plover was observed flying high over conifer plantation during the November survey. Seven 'amber-list' species Goldcrest, Linnet, Skylark, Starling, Tree Sparrow, Swallow and House Martin were recorded during 2020 breeding season surveys, while six 'amber-listed' species Goldcrest, House Martin, House Sparrow, Linnet, Starling and Tree Sparrow were recorded during 2020/2021 non-breeding season surveys. All other species recorded were 'green-list' species.

No evidence indicating the presence of sensitive breeding bird species either within the windfarm site or within 500m of a turbine, including red grouse or nightjar, waders including golden plover, woodcock or curlew, swans including whooper swan, or birds of prey including hen harrier or merlin was observed during the 2020 breeding and 2020/2021 non-breeding season transect surveys. During the 2020 breeding season, surveys were also completed near dusk and surveyors remained on site into the night during the May and June surveys with no calling of nightjar heard during the surveys. During the 2020/2021 non-breeding season surveys were completed between November 2020 and February 2021 at dusk and dawn at the known foraging habitat for whooper swan at Cloghbog, approximately 2km to the west of the wind farm site. Whooper swans were observed flying between the foraging habitat at Cloghbog and the River Blackwater to the west of Cloghbog (and approximately 4km to the west of the wind farm site). The whooper swan foraging at Cloghbog were not observed flying in an easterly direction from Cloghbog in the direction of the wind farm site.

There were no sightings of hen harrier or merlin during the 2020 breeding season vantage point surveys. Similarly during the 2020/2021 non-breeding season vantage point surveys, between September 2020 and

January 2021 and during March to May 2023 vantage point surveys, there were no sightings of hen harrier or merlin. The only raptor species recorded during the breeding season and/or non-breeding season were the then non-target species kestrel, buzzard and sparrowhawk. It should be noted that Kestrel has since been added to the Red List, so would now be considered as target species. Kestrel and buzzard were the dominant raptor species recorded with only one observation of sparrowhawk recorded during all vantage point survey completed between April 2020 and January 2021. Both kestrel and buzzard were recorded foraging within the Knocknamona Windfarm site. A pair of buzzards are likely to have bred in the wider area surrounding the project site. Buzzards were noted perched, circling and calling at a location to the south, south-east of the wind farm site and juveniles were also heard calling from this direction during vantage point watches.

Curlew: No curlew were recorded during breeding season surveys in 2020, 2018, and 2013 for Knocknamona Windfarm. One flight observation of curlew was recorded during the 2011 breeding season when two birds were recorded flying over forestry. No curlew have been recorded at or within the 500m buffer area surrounding the Knocknamona Windfarm site during any winter season surveys between 2010 and 2021.

Woodcock: Woodcock was not recorded at or within the 500m buffer area surrounding the Knocknamona Windfarm site during the 2020 breeding season surveys. Woodcock was heard during 2010 surveys. No other sightings or observations of woodcock were made.

Gulls: No gulls were recorded on site during 2020/2021 Surveys. Sightings of lesser black-backed gull are limited to one sighting of a bird flying along the Finisk River valley approximately 3.5km to the north of the wind farm site during surveys in February 2018.

Junction & Bend Widening Works sites comprising improved agricultural grassland and conifer plantation are of low value for birds. Some hazel trees on-site provide limited habitat for passerines.

7.3.1.3 IMPORTANCE of Birds

All wild bird species are protected by legislation under the Wildlife Act, 1976 as amended by the Wildlife (Amendment) Act, 2000 and the Heritage Act 2018.

According to the Birds of Conservation Concern in Ireland (2020– 2026), bird species are assigned red, amber or green status depending on their prevalence/numbers occurring in Ireland. Birds of Conservation Concern in Ireland (BoCCI) Red-listed species are those of highest conservation priority, being globally threatened, declining rapidly in abundance or range, or having undergone historic declines from which they have not recently recovered. Amber-listed species have an unfavourable status in Europe, have moderately declined in abundance or range, a very small population size, a localised distribution, or occur in internationally important numbers. Those species which are Green-listed do not meet any of these criteria and therefore require little direct conservation action.

In general birds and their supporting habitats at the proposed development site are assessed as being of 'Local Importance (lower value).

Meadow Pipit, Curlew, Golden Plover, Kestrel, Swift, Snipe and Woodcock are included on the BoCCI red list.

Goldcrest, Linnet, Starling, Barn Swallow, Skylark, Sand Martin, Hen Harrier, Lesser blacked-backed gull and Whooper Swan are included on the BoCCI amber list.

Other species recorded, Song Thrush, Woodpigeon, Dunnock, Blackbird, Wren, Great tit, Coal tit, Blue tit, Rook, Hooded Crow, Raven, Chaffinch, Goldfinch, Blackcap, Whitethroat, Chiffchaff, Willow warbler, Magpie,

Pheasant, Stonechat, Lesser redpoll, Bullfinch, Siskin, and Grey Heron are green listed species.

7.3.1.4 SENSITIVITY of Birds

In general, birds are sensitive to habitat loss and disturbance/displacement from noise and/or visual intrusion, along with changes to weather patterns and extreme weather events (such as prolonged drought or extremely cold winters).

As per the methodology set out in Section 7.1.6 of this chapter, due to their red-listed status, but taking into account the low numbers of most species recorded during surveys and the low value of habitats potentially affected by the development, **Meadow Pipit, Curlew, Golden Plover, Kestrel, Swift, Snipe and Woodcock** are evaluated as having **medium sensitivity**.

The **amber-listed and green-listed species** recorded during surveys are considered to have **low sensitivity**, primarily due to their more favourable conservation status.

7.3.1.5 TRENDS for Birds in the Baseline Environment

The most recent Countryside Bird Survey report (Crowe et al., 2017) was undertaken over a 19-year period (1998-2016) for 53 bird species. Overall, 26 species showed increasing trends, 12 species declined, while the remaining 15 species remained relatively stable. The trend patterns illustrated that there were very severe declines in many species between 2009 and 2012 which coincided with two especially cold winters (2009/10 and 2010/11). Numbers of most species appear to have recovered since then. Wren was the most widespread species followed by Robin, Blackbird and Chaffinch.

In recent years the strongest trend in this upland area is the emergence of wind energy developments on upper slopes and ridges along with the ancillary development of roads and electrical infrastructure. This trend is likely to continue with the constriction of the Authorised Knocknamona Windfarm.

Intensification and extensification of agriculture is a national trend that may continue to affect the study area. This includes reclamation of marginal lands, additional management of existing agricultural lands such as regular scrub removal.

Climate Change from anthropogenic greenhouse gases now poses a grave threat to species and habitats (Dubash, 2020; Wuebbles *et al*. 2017). Climate Change affects Birds through rising temperatures and shifting weather patterns which affects the birds' ability to find food and reproduce, which over time impacts local populations, and ultimately continent-wide populations. Some species may even go extinct if they cannot find the conditions they need to survive and raise their young. Additionally birds are severely impacted by extreme storms particularly out at sea.

7.3.1.6 The 'Do Nothing Scenario' (the Environment if the Development is not carried out)

If the KWF Grid Connection does not proceed, the effects on the environment will not occur, and the baseline environment will only change in line with the trends identified above.

7.3.1.7 Description of the RECEIVING ENVIRONMENT for Birds

The receiving environment is the likely state of the baseline environment at the time of construction/operation/decommissioning as relevant i.e. baseline + trends.

It is assumed in this report that the baseline environment in relation to general bird species, as identified above, will be the receiving environment at the time of construction as no noticeable change is expected to

occur within the relatively short time period prior to commencement of construction and with ongoing trends as identified expected to be reflected during the operational phase.

Relevant Figure at the end of this chapter

Figure 7.3: Study Area for Birds

Relevant Appendix (at the end of this chapter)

Appendix 7.2: Bird Survey Data 2015 to 2023

7.3.2 EVALUATION OF IMPACTS to Birds

In this Section, the direct or indirect impacts and the cumulative impacts of KWF Grid Connection on Birds are described.

7.3.2.1 Potential Impacts Evaluated for Birds

A conceptual site model exercise was carried out to identify potential impacts through the examination of the specific pathways between the project (source) and the sensitive aspect (receptor).

The potential for impacts was **examined in the absence of mitigation measures**, and **based on the description of development, standard construction methodologies, construction activities and operational activities as described in Chapter 5**: **Description of the Development**.

The potential impacts which were evaluated are listed in the 1st column of the table below. As summarised in the table below, **no significant effects are likely to occur**.

Table 7-12: Conclusion of the Evaluation of Potential Impacts to Birds

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Direct/Indirect Impact of KWF Grid Connection	Cumulative Impact with Authorised Knocknamona Windfarm	Cumulative impact with Woodhouse Windfarm and Woodhouse Substation	Cumulative Whole Knocknamona Windfarm Project Impact
Red Listed species (**Meadow Pipit, Curlew, Kestrel, Swift, Snipe and Woodcock** - Habitat Loss	Construction/Operation	**Imperceptible**	Imperceptible to Slight	No additional cumulative impact	**Not Significant**
Red Listed species (**Meadow Pipit, Curlew, Kestrel, Swift, Snipe and Woodcock** Disturbance/Displacement	Construction	**Imperceptible**	Imperceptible to Slight	No additional cumulative impact	**Not Significant**
Amber and Green Listed species - Habitat Loss	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not Significant**
Amber and Green Listed species- Disturbance/Displacement	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not Significant**

In order to keep this EIA Report concise and focused on potential significant impacts, where the evaluation of potential impacts found no significant impacts from the development, the evaluation tables are presented in the appendix to the chapter. Because no significant impacts to Birds are likely to occur, the Impact Evaluation Tables for the potential impacts listed in the table above are in Appendix 7.1.

Relevant Appendix at the end of this chapter

Appendix 7.1 Evaluation of Potential Impacts to Biodiversity – Evaluation Tables for Effects on Birds (Tables 8 to 11)

7.3.2.2 Summary of the Significance of the Potential Impacts to Birds

As summarised in the table above, impacts to Birds as a direct result of KWF Grid Connection will be **no greater than Imperceptible** due to the medium sensitivity of Meadow Pipit, Woodcock, Curlew, Kestrel, Swift, Snipe and Golden Plover due to their red-listed conservation status; the negligible level of suitable Meadow Pipit, Kestrel, Snipe, Swift or Woodcock habitat loss in the context of the availability of grassland and scrub in the surrounding area; there being no suitable habitat within the KWF Grid Connection study area for Golden plover or Curlew; the low sensitivity of amber and green listed bird species which are expected to occur within the study area; the Local importance (lower value) of the majority of habitats present which are not of any particular importance to local bird species; the very short duration of construction works; the reversibility of temporary habitat loss within reinstatement of trenches and works areas; and the reduction in the magnitude of effect (due to landcover change) during the operational stage with the reinstatement of the works area including the earthen bank along the new Link Road with invertebrate friendly plant species comprising a mix of native wild grasses and native heather.

Cumulative impacts of KWF Grid Connection with Authorised Knocknamona Windfarm will not be greater than Imperceptible to Slight for the same reasons as set out above for direct impacts and also due to the temporary duration of combined construction works and the reversibility of disturbance/displacement effects with the completion of those construction works and reinstatement of the sites. Impacts to Birds as a result of the Authorised Knocknamona Windfarm were previously assessed by An Bord Pleanála in 2016 and 2022 as not significant. As KWF Grid Connection effects to Birds will be no greater than Imperceptible, **the combined 'whole project' effect will not be significant**.

When Woodhouse Windfarm and Woodhouse Substation are also taken into account, there will be no additional cumulative impacts, this is generally due to Woodhouse Windfarm and Woodhouse Substation been already constructed, with habitats fully revegetated along windfarm roads and around the substation compound, and minimal presence of operational personnel or machinery on either site. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative disturbance/displacement impacts during the construction of KWF Grid Connection.

7.4 Sensitive Aspect No.3: Mammals

This Section 7.4 provides a description of the baseline environment and an evaluation of the likely impacts of KWF Grid Connection, both alone and cumulatively, on **Mammals**.

7.4.1 Description of the BASELINE ENVIRONMENT for Mammals

This Section 7.4.1 comprises the identification of the Study Area for direct or indirect effects and for cumulative effects, and a description of the context, character, importance and sensitivity of the Mammals in the area. Trends or changes in the baseline environment and expected receiving environment are also identified.

7.4.1.1 STUDY AREA for Mammals

Study areas relate to areas which could be affected by impacts from KWF Grid Connection, whether direct impacts from the KWF Grid Connection on its own or cumulative impacts from KWF Grid Connection and other projects or activities.

The study areas are described in the table below and on relevant figures.

Relevant Figures at the end of this chapter

Figure 7.4.1: Study Area for Bats

Figure 7.4.2: Study Area for Other Mammals

Table 7-13: Study Areas for Mammals

KWF Grid Connection Study Area (direct or indirect effects)	Cumulative Study Area (Cumulative Effects)
Study Area Extent: - Bats: 150 m of the construction works area (CWA) boundary and access road through Woodhouse Windfarm Entrance - Otter: sections of watercourses within 300m of the CWA boundary - Badger & Other Mammals: 50m from the CWA boundary	Study Area Extent: - Bats: 300m of the construction works area (CWA) boundary and access road through Woodhouse Windfarm Entrance - Otter: 600m from the CWA boundary - Badger & Other Mammals: 100m from the CWA boundary The KWF Grid Connection cumulative study area includes those parts of other projects or activities which occur within 300m, 600m and 100m respectively for bats, Otter and Badger and Other Mammals, of the construction works area boundary.
Justification for Study Area Extent: Bats: Professional Judgement and as per Best Practice, and *Bat Surveys for Professional Ecologists: Good Practice Guidelines,* Collins, (2016), it is considered that there will be no likely direct or indirect effects beyond the construction works area boundary and adjacent habitat.	Justification for Study Area Extent: Bats: The increased distance facilitates the identification of other projects or activities which will be carried out within 150m of any identified bat roost (in any direction) affected by KWF Grid Connection. Beyond 150m from roosts, it is considered that cumulative effects to bats will be negligible.

Other Mammals: professional judgement and as per Best Practice as pertinent (CIEEM, 2016), Highways Agency (1999), NRA (2005), it is considered that there will be no likely direct or indirect effects beyond the construction works area boundary and adjacent habitat.	Other Mammals: In relation to the potential for cumulative effects to Mammals - doubling the distance for cumulative study areas, identifies those parts of other projects with potential to cause cumulative impacts with KWF Grid Connection.
Relevant development stage: Construction Stage Justification: Bats – effects are limited to the construction stage, when vegetation will be cleared, and ground works will take place. There is no risk of effects during the operational phase, because the additional apparatus will be immobile, and will be within the compound of the existing Woodhouse Substation. Other Mammals: Works and main activities are confined to the construction stage. No requirement to extend study area to Woodhouse Windfarm entrance gate because delivery traffic is not considered to be a source of impact as Badger & Other Mammals are likely to be habituated to the existing windfarm and agricultural traffic. Also limited habitat for these groups and species and limited traffic movements during evening/nighttime when such areas are more likely to be utilised by these animals. Limited volume of traffic over a short period during construction to use this entrance gate comprising mainly HGV loads carrying turbine components.	Relevant development stage: Construction Stage Justification: Bats – effects are limited to the construction stage, when vegetation will be cleared, and ground works will take place. There is no risk of effects during the operational phase, because the additional apparatus will be immobile, and will be within the compound of the existing Woodhouse Substation. Other Mammals: Works and main activities are confined to the construction stage No requirement to extend study area to Woodhouse Windfarm entrance gate because delivery traffic is not considered to be a source of impact as Badger & Other Mammals are likely to be habituated to the existing windfarm and agricultural traffic. Also limited habitat for these groups and species and limited traffic movements during evening/nighttime when such areas are more likely to be utilised by these animals. Limited volume of traffic over a short period during construction to use this entrance gate comprising mainly HGV loads carrying turbine components.

7.4.1.2 Description of the BASELINE CONTEXT and CHARACTER of Mammals

The baseline context includes a description of the KWF Grid Connection Study Area and also the wider area which includes the Cumulative Study Area; Knocknamona Windfarm project area; Woodhouse Substation and Woodhouse Windfarm project areas.

7.4.1.2.1 Baseline for KWF Grid Connection Study Areas (Mammals)

7.4.1.2.1.1 Bats

Bats are common and widespread throughout Ireland. There are nine resident species in Ireland, although one species – the lesser horseshoe bat – is only found in six counties in the west of Ireland. Bats occupy all habitat types, but are most common in lowland areas near broadleaf woodland and freshwater features. However, moderate numbers of bats can also be found in conifer plantations and agricultural land, such as the landscape surrounding the KWF Grid Connection site. Linear habitats such as treelines, hedgerows,

forestry roads and watercourses are favoured foraging and commuting habitats.

Bat Roost Survey

A site walkover survey undertaken in June 2023 identified a group of farm buildings located approx. 130 – 200 m west of the Woodhouse Substation compound. These are storage buildings / animal housing structures composed entirely of metal panels, which were considered to have negligible suitability for roosting bats. Also identified was a ruined traditional barn adjacent to the Woodhouse Windfarm entrance that is evaluated as being of low roosting potential.

The Woodhouse Substation control building is also within the survey areas. It was built in 2014/15, and is constructed of modern building materials, so it was considered to have negligible suitability for roosting bats. The exterior of the building was inspected, but no crevices suitable for bats were observed, nor any bat droppings or other field signs of bats. This confirms the findings of a survey carried out in December 2017, when an automated bat detector was placed outside the building during a period of mild weather in order to identify any bat activity around the building during winter months (which could indicate a hibernation roost), but no bats were recorded. Two other automated detectors were placed along the route of the KWF Grid Connection at the same time, and one common pipistrelle was recorded on a farm track approx. 200 m south of the Woodhouse Substation, but no other bats were recorded. In summary, there was no evidence in 2023 or in 2017 that any bats were roosting within the existing Woodhouse Substation.

The walkover survey in 2023 confirmed a large number of commercial forestry trees within the Study Areas, but most are coniferous species, which are rarely used by bats for roosting. It is standard practice in commercial forestry to remove any damaged trees in order to prevent the spread of disease and therefore crevices would not be a feature rendering these trees of negligible suitability for roosting bats. During the 2023 survey only two trees of moderate roosting potential were identified, outside of the coniferous plantation areas, both of these is within the Study Areas but not within the construction works area boundary and therefore will not be directly affected by the construction of the KWF Grid Connection.

Bridges: No watercourses occur within the construction works area, nor do any larger watercourses or bridges of stone or masonry construction occur within the study areas. Therefore, there are no bridges within the KWF Grid Connection Study Area that could be used by roosting bats.

In summary, there are no suitable roosting features within the construction works area boundary, the conifer forestry within the Study Areas are considered to have negligible suitability for roosting bats. Only two trees were found to have moderate suitability for roosting bats.

Bat activity survey

Based on national habitat suitability modelling for bats, the 5km grid square surrounding the KWF Grid Connection site is considered to have very high suitability for common pipistrelles and Natterer's bat; high suitability for Leisler's and brown long-eared bats, moderate suitability for soprano pipistrelles, Daubenton's and whiskered bats, and very low suitability for lesser horseshoe bats and Nathusius' pipistrelle. These results are from a study by Lundy et al. (2011), and were obtained from the online viewer of the National Biodiversity Data Centre (https://maps.biodiversityireland.ie/Map).

The species identified in the modelling are reflected in the transect surveys which were carried out along the route of the KWF Grid Connection on two occasions in September 2017.

There was clear spatial variation in the distribution of bat activity during these surveys. Common pipistrelle and soprano pipistrelles were frequent along roads within the forestry, including along the route of the KWF Grid Connection, making up the majority of bat records in each transect survey. Leisler's bats were also

present in small numbers (< 1 Leisler's pass per kilometre surveyed), particularly in the open farmland outside the forestry. A single *Myotis* bat was encountered within the forestry.

Relevant Figures at the end of this chapter

Figure 7.4.1: Study Area for Bats

In summary, the forestry roads are regularly used as feeding areas by moderate numbers of common pipistrelle and soprano pipistrelle bats, while the non-forested areas are used by low numbers of Leisler's bats and pipistrelles.

7.4.1.2.1.2 Other Mammals

Desktop Survey Results: The proposed KWF Grid Connection development site is located in OS grid square X19. Protected native mammal species recorded for this area include Otter *(Lutra lutra)*, Pine Marten (*Martes martes)*, Irish Hare *(Lepus timidus hibernicus)*, Red Squirrel (*Sciurus vulgaris*), Badger (*Meles meles*), Hedgehog (*Erinaceus europaeus*), Irish Stoat (*Mustela ermine hibernica*) and Fallow Deer (*Dama dama*).

Other species (not protected by National and/or European legislation) include: Pygmy Shrew (*Sorex minutus*), Red Fox (*Vulpes vulpes*) and Wood Mouse (*Apodemus sylvaticus*).

Species recorded within X19, and considered to be invasive species under Irish Legislation include Fallow Deer and Rabbit (*Oryctolagus cuniculus*).

Fieldwork Results: A site visit was conducted on 8/9th June 2023 when no mammal sightings were recorded. During previous field surveys in 2019, there was evidence of deer tracks and trails on the verges of the forestry tracks and droppings of deer and rabbit within the site were recorded, indicating that these mammals use the site.

Baseline data is also derived from previous Knocknamona Windfarm mammal surveys. Fallow deer were sighted opportunistically within the windfarm site during non-mammal surveys in April 2020. There was evidence of fallow deer utilising the minor streams which drain from the site, and deer tracks were continually found throughout the site. No evidence of breeding badger, red squirrel, or pine marten (i.e., presence of setts, dreys or dens) were recorded along the specified mammal transects undertaken for Knocknamona Windfarm in 2020, nor opportunistically during additional site visits. A site visit carried out in May 2020, recorded no mammal sightings, but badger tracks were found to the north-east of the windfarm site, along the banks of the Ballintaylor River. These tracks were the only evidence of badger found. This result is not an absolute determination of absence, rather an indication of low utilisation of the windfarm site by the aforementioned species. However, it is assumed in this report that these species also have potential to occur within the KWF Grid Connection Study Area.

Otter: The territories of otters can stretch for several kilometres; the total length of the home range depends on the availability of food. The smallest territories are thought to occur at coastal sites, where territories may be as small as 2km. The longest territories occur in upland streams where an individual otter may have to range more than 20km to find sufficient food. There are no watercourse crossings (streams or drains) required for KWF Grid Connection, with only 1 watercourse within 300m of KWF Grid Connection. This watercourse, the Mountodell Stream (a 1st order stream which drains into the River Brickey) is 280m to the east of the underground cabling to the north of the Knocknamona Windfarm substation area. There are no manmade drains of any significance along the proposed KWF Grid Connection route as there is very limited forestry and agricultural drainage in the area. No sightings or evidence of otter were recorded in either the 2023 or 2020 field surveys.

Pine Marten generally occur in coniferous or mixed forestry and scrub and therefore there is suitable habitat on site. Pine Marten was recorded on site in 2013 but there have been no recordings in subsequent surveys.

Irish Hare is generally found in upland bog, moor, heath and marsh in addition to lowland mixed farmland, pastoral farmland and more marginal habitats and therefore there is limited suitable habitat on site. Irish Hare was recorded on site in 2013 and 2020.

Badgers are found throughout Ireland in areas of suitable habitat: large swathes of the Irish countryside provide ideal conditions for badgers, with their mosaic of pasture grasslands, hedgerows, and areas of scrub and woodland. Habitats within the KWF Grid Connection Study Area mainly comprise conifer plantation and improved agricultural grassland, in addition to small areas of scrub. It is considered that foraging habitat that is present is broadly suitable for Badger. No sightings or evidence of badger has been recorded within the Study Areas during field studies for KWF Grid Connection.

Red Squirrel is mainly found in coniferous or mixed woodland and therefore there is suitable habitat on site. No sightings or evidence of red squirrel has been recorded within the Study Areas during field studies for KWF Grid Connection.

Hedgehogs are present in all lowland habitats where there is sufficient food to eat and ground cover for nesting, and commonest where grassland abuts mixed woodland and scrub and therefore there is limited suitable habitat on site. No sightings or evidence of hedgehogs has been recorded within the Study Areas during field studies for KWF Grid Connection.

Stoats are opportunistic feeders that prey on rodents, birds, rabbits and insects. They are generalists in terms of habitats but they are known to avoid open areas that lack cover and therefore there is suitable habitat on site. No sightings or evidence of Stoats has been recorded within the Study Areas during field studies for KWF Grid Connection.

The invasive species **Fallow Deer** has been recorded on site.

Overall, the feeding and resting habitats within the KWF Grid Connection (Figure 7.2) are not of any particular importance to mammals and are evaluated to be of Local Importance (lower value).

7.4.1.2.2 Baseline for Woodhouse Substation and Woodhouse Windfarm (Bats & Other Mammals)

KWF Grid Connection includes works and installations within Woodhouse Substation and use of some Woodhouse Windfarm roads including the entrance gate, for whole project site access. The baseline for those parts of Woodhouse Substation and Woodhouse Windfarm inside of the Cumulative Study Area is described below.

Given the contiguous location of the existing Woodhouse Substation and Woodhouse Windfarm these sites are considered to have levels of bat activity similar to those recorded in the open farmland (i.e. outside the forestry) in the 2017 transect surveys i.e. low numbers of Leisler's bats, common pipistrelles and soprano pipistrelles.

The habitats at the operational Woodhouse Substation, and at Woodhouse Windfarm and environs are widespread and common and are of no particular importance to Other Mammals. Based on professional judgement, it is expected that the following mammal species use the habitats present – Badger, Hare, Hedgehog, Pine marten, Fallow deer, Irish Stoat, Red squirrel and Pygmy Shrew.

7.4.1.2.3 Baseline for the Whole Knocknamona Windfarm Project (Bats & Other Mammals)

KWF Grid Connection is part of the Whole Knocknamona Windfarm Project and includes works within the

Knocknamona Windfarm site. The Whole Project also includes Knocknamona Windfarm as authorised in 2016, amendments to the size of the wind turbines and meteorological mast and also junction & bend widening works in the vicinity of Knocknamona Windfarm site entrance, both of which were authorised in 2022. The baseline described below informed the evaluation of cumulative effects, both the KWF Grid Connection cumulative effect and the Whole Project cumulative effect.

7.4.1.2.3.1 Bats

The habitats at the **Knocknamona Windfarm** site and environs are widespread and common and are of no particular importance to Bats. There has been a negligible change in the bat species recorded on the Authorised Knocknamona Windfarm site in the passage of time between 2013 and 2020. Common and Soprano pipistrelles remain the species with the highest recorded usage within the site, and these species are the most commonly recorded and widespread throughout Ireland. Leisler's bat was also recorded in similar levels of activity in 2013 and 2020. Both instances of Daubenton's myotis recordings from 2013 and 2020 highlight very low numbers for this site. The brown long-eared bat was recorded in low levels in 2013 and 2020. This species can travel up to 10km from its roosting site when foraging at night, and thus can be recorded quite some distance away from typical habitat. It is considered, based on the data detailed, that there is no significant change in the records of this species between 2013 and 2020. The Natterer's myotis was recorded in minor frequencies in both 2013 and 2020 suggesting that the population has not changed significantly in the intervening years.

Junction & Bend Widening Works: Two minor patches of trees will be pruned/felled, however, these are small areas: one patch of semi-mature willow, and the other a small area of conifer plantation. These patches do not have the characteristics to support bat roosts. The widening works are mainly located within the public road corridor which has limited ability to support terrestrial mammals.

7.4.1.2.3.2 Other Mammals (terrestrial)

The habitats within the Knocknamona Windfarm site have remained largely unchanged since the initial surveys for the windfarm in 2013. The site itself has a low importance for native Irish mammals, which is due to the intrinsic low biodiversity and low ecological value of a non-native conifer plantation monoculture. Mammal surveys in May 2020 for the larger turbines application confirmed low to negligible activity of terrestrial mammals within the windfarm site itself as found previously in 2013. Overall there is a negligible difference in the findings of the terrestrial mammal surveys on site between 2013 and 2020.

7.4.1.3 IMPORTANCE of Mammals

All bat species are protected under the *European Communities (Birds and Natural Habitats) Regulations* 2011 (as amended) and the *Wildlife Act 1976* as amended by the Wildlife (Amendment) Act, 2000 and the Heritage Act 2018. It is an offence to kill or injure a bat, or to destroy / disturb their breeding and resting places. In accordance with the combined Percival/NRA methodology outlined in Table 7-3, due to the high level of protection afforded to bat species, but the absence of bat roosts and low levels of bat activity within the study areas, **bats are assessed as being of 'Local Importance' (higher value), with 'Low' Sensitivity.**

Of the remaining mammal species recorded or assumed to be present in the study areas; Otter, Pine marten, Irish hare, Badger, Red Squirrel, Hedgehog and all deer species are afforded protection under the Wildlife Act (as amended). Otter, Pine marten and Irish hare are also protected under the EU Habitats Directive 92/43/EEC. Otter is further protected under the Convention on Trading in Endangered Species. The following mammals are afforded protection under the Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats): Otter, Pine marten, Irish hare, Badger, Red Squirrel, Hedgehog and Irish Stoat. In accordance with the combined Percival/NRA methodology outlined in Table 7-3, due to the very high level

of National and International protection afforded to Otter, Pine marten and Irish hare and: the high level of National or International level of protection for Red Squirrel, Badger, Hedgehog and Irish Stoat, in the context of low numbers recorded/assumed to be present, and the Local Importance (lower value) of suitable habitats – **these** are **assessed as being of 'Local Importance (higher value) with a 'Low' Sensitivity.**

The mammals which are not protected by National or European legislation - **Pygmy Shrew, Red Fox and Wood Mouse** are evaluated as **Local importance (lower value)** and '**Negligible**' Sensitivity and are not evaluated further in this report.

Two mammals, Fallow Deer and Rabbit, are listed as a High Impact Invasive Species and Medium Impact Invasive Species, respectively, under the European Communities (Birds and Natural Habitats) Regulations 2011 in Republic of Ireland. The invasive species, **Fallow Deer**, which is protected under the Wildlife is evaluated as **Local Importance (lower value) with a 'Low' Sensitivity**.

7.4.1.4 SENSITIVITY of Mammals

The conservation status of each of the protected species recorded or assumed to be present in the study area was obtained from the International Union for Conservation of Nature (IUCN) red list, the Habitat Directive Article 17 Reporting, and the NPWS 2009 Red List for Mammals.

According to the IUCN Red List: all mammals recorded/assumed to be present are listed as 'Least Concern', with the exception of Otter which is listed as 'Near Threatened'.

According to the Irish (NPWS 2009) Red List: Leisler's bat, Otter and Red Squirrel are classified as 'Near Threatened', while the remaining mammal species are 'Least Concern'.

According to Habitats Directive Article 17 Reporting: Otter, Pine Marten and Irish Hare are all listed as having 'Favourable' conservation status.

The sensitivity of mammals to particular types of change/development is outlined below:

Bats: The key sensitivities of bats are the destruction or disturbance of their roosting places, and the modification of their commuting routes and foraging habitats (NPWS 2013, Collins *et al.* 2016). They may suffer direct effects due to the destruction or modification of their roosts (e.g. the demolition of a house or felling of a tree), or indirect effects due to disturbance of the area surrounding a roost (e.g. illumination of exit / entry points, or removal of surrounding vegetation). Bats are sensitive to significant alteration/severance of linear foraging corridors, including vegetation removal or the installation of artificial lighting, although they can usually adapt to small-scale changes.

All Mammals are sensitive to the direct effects from disturbance/displacement from resting, breeding and foraging ranges as a result of noise and visual intrusion. Mammals are also sensitive to habitat loss and additive mortality from inadvertent contact with operating machinery or vehicles.

7.4.1.5 TRENDS for Mammals in the Baseline Environment

Bats: Under Article 17 of the EC Habitats Directive (European Commission Directive 92/43/EEC), the Irish government is obliged to assess and report on the conservation status of all habitats and species listed in Annexes I, II, IV and V of the directive, including bats. In the latest submission (NPWS 2020), the Common Pipistrelle; Soprano Pipistrelle; Natterer's Bat; Daubenton's Bat; Whiskered Bat; Brown Long-eared Bat and Leister's Bat is considered of Stable Status from the previous report (2013) with a Favourable Prospects status.

Bats were also monitored by the NPWS, with the latest Irish Bat Monitoring Programme being 2018-2021 (*Tina Aughney, Niamh Roche & Steve Langton* 2022). In summary the news for bats in Ireland over the past 12+ years has been largely positive with significant increases seen in several species such as common pipistrelle, soprano pipistrelle, Leisler's bat and the lesser horseshoe bat. The population trend of the brown long-eared bat appears to be currently stable. Daubenton's bat trend is also reasonably stable.

The abundance of Irish bats is monitored by Bat Conservation Ireland. In the BATLAS Report 2020 the soprano pipistrelle was the most commonly detected, followed by common pipistrelle, Leisler's bat and Daubenton's bat. All four target species were detected at higher rates compared to the 2010 study.

Other Mammals: Future prospects for Otter, Pine Martin and Irish Hare in Ireland are evaluated as 'favourable' (NPWS, 2020). Red squirrels, hedgehogs and badger are widespread throughout the island of Ireland. Records for red squirrels have increased both numerically and geographically between national Squirrel surveys in 2007 and 2012. The Badger population is currently stable in Ireland (Sleeman et al., 2009).

7.4.1.6 The 'Do Nothing Scenario' (the Environment if the Development is not carried out)

If the KWF Grid Connection does not proceed, the effects on the environment will not occur, and the baseline environment will only change in line with the trends identified above.

7.4.1.7 Description of the RECEIVING ENVIRONMENT for Mammals

The receiving environment is the likely state of the baseline environment at the time of construction/operation/decommissioning as relevant i.e. baseline + trends.

Bats: it is assumed in this report that the baseline environment identified above will be the receiving environment at the time of construction with ongoing trends as identified expected to be reflected during the operational phase.

Other Mammals: It is assumed in this report that the baseline environment in relation to the remaining mammal species, including Otter, Pine marten, Irish hare, Red squirrel, Badger, Hedgehog, Irish Stoat and Fallow deer, as described herein, will be the receiving environment at the time of construction with ongoing trends as identified expected to be reflected during the operational phase.

Relevant Figure at the end of this chapter

Figure 7.4.1: Study Area for Bats
Figure 7.4.2: Study Area for Other Mammals

7.4.2 EVALUATION OF IMPACTS to Mammals

In this Section, the direct or indirect impacts and the cumulative impacts of KWF Grid Connection on Mammals are described.

7.4.2.1 Potential Impacts Evaluated for Mammals

A conceptual site model exercise was carried out to identify potential impacts through the examination of the specific pathways between the project (source) and the sensitive aspect (receptor).

The potential for impacts was **examined in the absence of mitigation measures**, and **based on the description of development, standard construction methodologies, construction activities and operational activities as described in Chapter 5**: **Description of the Development**.

The potential impacts which were evaluated are listed in the 1st column of the table below. As summarised in the table below, **no significant effects are likely to occur**.

Table 7-14: Conclusion of the Evaluation of Potential Impacts to Mammals

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Direct/Indirect Impact of KWF Grid Connection	Cumulative Impact with Authorised Knocknamona Windfarm	Cumulative Impact with Woodhouse Windfarm and Woodhouse Substation	Cumulative Whole Knocknamona Windfarm Project Impact
Bats - Destruction or disturbance of bat roosts	Construction	**No Likely Impact**	No Likely Cumulative Impact	No Likely Cumulative Impact	**Not significant**
Bats – Severance / disruption of commuting routes and feeding areas	Construction	**No Likely Impact**	Imperceptible	No Likely Cumulative Impact	**Not significant**
Bats - Disturbance or Displacement due to lighting	Construction	**No Likely Impact**	No Likely Cumulative Impact	No Likely Cumulative Impact	**Not significant**
Otter- Habitat Degradation	Construction	**Imperceptible**	Imperceptible	No potential for cumulative impact	**Not significant**
Otter- Disturbance or Displacement	Construction	**Imperceptible**	Imperceptible	No potential for cumulative impact	**Not significant**
Pine marten & Irish Hare - Habitat Loss	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not significant**
Pine marten & Irish Hare - Disturbance or Displacement	Construction	**Imperceptible**	Imperceptible	Imperceptible	**Not significant**
Other Mammals - Habitat Loss	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not significant**
Other Mammals - Disturbance/Displacement	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not significant**

In order to keep this EIA Report concise and focused on potential significant impacts, where the evaluation of potential impacts found no significant impacts from the development, the evaluation tables are presented in the appendix to the chapter.

Because no significant impacts to Mammals are likely to occur, the Impact Evaluation Tables for the potential impacts listed in the table above are in Appendix 7.1.

Relevant Appendix at the end of this chapter

Appendix 7.1 Evaluation of Potential Impacts to Biodiversity – Evaluation Tables for Effects on Mammals (Tables 12 to 20)

7.4.2.2 Summary of the Significance of the Potential Impacts to Mammals

As summarised in the table above;

There is No Likely Direct Impact to Bats as a result of KWF Grid Connection. This is because there are no known bat roosts within the construction works area boundary, and because the majority of construction works will be in existing roads, so there will be minimal disruption of bat commuting routes and feeding areas. Furthermore, construction works will be very short in duration, and the ground will be reinstated afterwards, so the impact is reversible. Finally, there is no requirement for lighting during construction works, so this will not cause the displacement of bats.

Direct Impacts to Otter, is assessed as Imperceptible due to the separation distance (280m) to the nearest watercourse (Mountodell Stream) with no aquatic habitat reduction; the Imperceptible effect on water quality in local surface waterbodies, as per Chapter 9: Water; the carrying out of construction works during daylight hours; the linear nature of underground cabling construction and; the reversibility of any disturbance effects with the completion of construction works.

Direct Impacts to Pine Marten & Irish Hare the impact is assessed as Imperceptible due to the low numbers of these species using the site and therefore likely to be present at or in proximity to works areas; the Local importance (lower value) of the habitats present; the negligible level of habitat reduction/loss in the context of the availability of these habitats in the surrounding area; the reversibility of temporary habitat loss within reinstatement works and; the very short duration of construction works.

For **Other Mammals (Red Squirrel, Badger, Hedgehog, Irish Stoat and Fallow deer) the Direct Impact is assessed as Imperceptible** due to the Local importance (lower value) of the habitats present; the negligible level of habitat reduction/loss in the context of the availability of these habitats in the surrounding area; the reversibility of temporary habitat loss within reinstatement works; the very short duration of construction works and; the enhancement of habitats in the long term through invertebrate-friendly reinstatement of works areas, berms and banks and low usage indicated for Red Squirrel, Badger, Hedgehog and Irish Stoat with no evidence or sightings recorded during site surveys.

The Cumulative impact of the Whole Project i.e KWF Grid Connection with the Authorised Knocknamona Windfarm will not be greater than Imperceptible for Bats, because no important feeding corridors will be affected, and any forestry felling for the Knocknamona Windfarm will continue to provide tree lines along which bats can forage. Impacts to Bats as a result of the Authorised Knocknamona Windfarm were previously assessed by An Bord Pleanála in 2016 and 2022 and were not considered to be significant. When the additional effects of KWF Grid Connection are taken into account, the whole project effect remains not significant.

The Cumulative impact of the Whole Project i.e KWF Grid Connection with the Authorised Knocknamona Windfarm will not be greater than Imperceptible for Otter due to no effects predicted for KWF Grid Connection and also Imperceptible Impacts during construction of the windfarm as a result of the implementation of a Sediment & Erosion Control Plan; there are no requirements for instream works and no requirement for watercourse crossings and; in the context of the availability of aquatic habitats in the wider surrounding area.

The Cumulative impact of the Whole Project i.e KWF Grid Connection with the Authorised Knocknamona Windfarm will not be greater than Imperceptible for Pine Martins, Irish Hare, Red Squirrel, Badger, Hedgehog, Irish Stoat and Fallow deer due to the Local importance (lower value) of habitats lost in the Cumulative Study Area due to the construction of the whole Knocknamona Windfarm project; the low level of habitat loss in the Cumulative Study Area in the context of the availability of these habitats in the surrounding area; the very short duration of KWF Grid Connection works, and the temporary duration of the Authorised Knocknamona Windfarm construction works and the reversibility of any disturbance effects with the completion of construction works. In conclusion the whole Knocknamona Windfarm project effect will **Not be Significant**.

When Woodhouse Windfarm and Woodhouse Substation are also taken into account, cumulative impacts will be Imperceptible, because Woodhouse Windfarm and Woodhouse Substation have already been constructed; the habitats have fully revegetated along windfarm roads and around the substation compound and; the control of operational lighting. No further construction works are expected in relation to these projects.

7.5 Sensitive Aspect No.4: Aquatic Habitats & Species

This Section 7.5 provides a description of the baseline environment and an evaluation of the likely impacts of KWF Grid Connection, both alone and cumulatively, on **Aquatic Habitats & Species**.

7.5.1 Description of the BASELINE ENVIRONMENT for Aquatic Habitats & Species

This Section 7.5.1 comprises the identification of the Study Area for direct or indirect effects and for cumulative effects, and a description of the context, character, importance and sensitivity of the Aquatic Habitats & Species in the area. Trends or changes in the baseline environment and expected receiving environment are also identified.

7.5.1.1 STUDY AREA for Aquatic Habitats & Species

Study areas relate to areas which could be affected by impacts from KWF Grid Connection, whether direct impacts from the KWF Grid Connection on its own or cumulative impacts from KWF Grid Connection and other projects or activities.

The study areas are described in the table below and on relevant figures

Relevant Figures at the end of this chapter

Figure 7.5: Study Area for Aquatic Habitats & Species

Figure 7.5.1: Study Area for Aquatic Habitats & Species (zoomed in)

Table 7-15: Study Areas for Aquatic Habitats & Species

KWF Grid Connection Study Area (direct or indirect effects)	Cumulative Study Area (cumulative effects)
Study Area Extent: Local surface water body catchments	Study Area Extent: Local surface water body catchments
Justification for Study Area Extent: Professional judgement	Justification for Study Area Extent: Professional judgement
Relevant development stage: Construction Stage Justification: Works and main activities are confined to the construction stage.	Relevant development stage: Construction Stage Justification: Works and main activities are confined to the construction stage.

7.5.1.2 Description of the BASELINE CONTEXT and CHARACTER of Aquatic Habitats & Species

The baseline context includes a description of the KWF Grid Connection Study Area and also the wider area which includes the Cumulative Study Area; Knocknamona Windfarm project area; Woodhouse Substation and Woodhouse Windfarm project areas.

7.5.1.2.1 Baseline for KWF Grid Connection Study Areas (Aquatic Habitats & Species)

The study area lies in an upland area at the Blackwater and Colligan-Mahon catchment divide (see Figure 7.5). There are no watercourses or hydrological features within the Construction Works Area boundary for KWF Grid Connection.

Figure 7.5.1 Study Area for Aquatic Habitats & Species (zoomed in) shows water features draining the KWF Grid Connection construction works area and the most recent EPA biological water quality results at downstream EPA monitoring locations.

Aquatic Habitats: The closest watercourses are minor headwater streams which rise some distance from the site. These watercourses are of high to medium gradient near the proposed development and are categorised as 'Eroding/upland rivers' using Fossitt (2000) classification.

The nearest surface watercourse to the proposed development is the Mountodell Stream (EPA code 17M03). This 1st order stream flows within 280m of a short section of underground cabling associated with KWF Grid Connection and drains an area at the central portion of the proposed KWF Grid Connection site area. The Mountodell Stream flows north for ca. 2km to meet the 3rd order River Brickey (EPA code 17B01). The River Brickey flows east into Dungarvan Harbour.

The 1st order Monageela Stream (EPA code 18M16) drains the southern extent of the proposed development. It rises ca. 350m south of the KWF Grid Connection cabling at Knocknamona Windfarm Substation and flows south for ca. 1.6km into the 2nd order Goish River (EPA code 18G12). The 1st order Clashnadarriv Stream (EPA code 18C34) drains the northern most extent of the site and is 932m from KWF Grid Connection. This watercourse flows ca. 3.3km north into the 4th order Finisk River (EPA code 18F02). The Goish and Finisk Rivers flow west into the 6th order Blackwater River (EPA code 18B02).

The EPA River Water Quality Status (2019-2022) of the River Brickey is Poor. The EPA River Water Quality Status (2019-2022) of the Finisk River and Goish River is High and Moderate respectively. Surface water sampling at 6 locations demonstrated that downstream water quality is relatively consistent with at least Good Status.

Aquatic Species: The streams and rivers that ultimately drain the KWF Grid Connection development site support macroinvertebrate communities related to the quality of water they convey. The Mountodell, Monageela and Clashnadarriv Streams which are the closest downstream receptors are likely to support small numbers of Brown trout *Salmo trutta*. McGinnity *et al.* (2003) indicate that the Finisk River is a producer of Atlantic Salmon *S. salar*. and Sea trout i.e. downstream of the Clashnadarriv Stream. The Brickey and Goish Rivers are indicated in McGinnity *et al.* (2003) as supporting Sea trout only.

Relevant Figures at the end of this chapter

Figure 7.5: Study Area for Aquatic Habitats & Species

Figure 7.5.1: Study Area for Aquatic Habitats & Species (zoomed in)

7.5.1.2.2 Baseline for Woodhouse Substation and Woodhouse Windfarm (Aquatic Habitats & Species)

KWF Grid Connection includes works and installations within Woodhouse Substation and use of some Woodhouse Windfarm roads including the entrance gate, for whole project site access. The baseline for those parts of Woodhouse Substation and Woodhouse Windfarm inside of the Cumulative Study Area is described below.

Operational Woodhouse Substation exists within the Finisk River surface water catchment.

Operational Woodhouse Windfarm: The majority of the Woodhouse Windfarm exists within the Finisk River surface water catchment (7 of 8 no. turbines). One turbine and the Woodhouse Windfarm entrance exist within the Goish River surface water catchment. The Clashindarriv Stream, drains the local catchment of the Finisk River within the Woodhouse Windfarm site. The section of the site within the Goish River catchment drains to the Coolahest Stream, which drains into the Ballynaparka River which is a tributary of the Goish River.

7.5.1.2.3 Baseline for the Whole Knocknamona Windfarm Project (Aquatic Habitats & Species)

KWF Grid Connection is part of the Whole Knocknamona Windfarm Project and includes works within the Knocknamona Windfarm site. The Whole Project also includes Knocknamona Windfarm as authorised in 2016, amendments to the size of the wind turbines and meteorological mast and also junction & bend widening works in the vicinity of Knocknamona Windfarm site entrance, both of which were authorised in 2022. The baseline described below informed the evaluation of cumulative effects, both the KWF Grid Connection cumulative effect and the Whole Project cumulative effect.

Authorised Knocknamona Windfarm: Similar to KWF Grid Connection, there are no watercourses within the Knocknamona Windfarm Construction Works Area boundary. The majority of the Knocknamona Windfarm site exists within the Goish River surface water catchment (6 of 8 no. turbines, including the Knocknamona Substation). The 2 no. remaining turbines exist within the Brickey Rivers surface water catchment. The soil and subsoil within the windfarm site and adjacent areas are relatively free-draining. Trial pits excavated as part of the 2014 and 2019 site investigations indicated low water table levels with no groundwater being encountered in most cases. Therefore, surface water runoff rates are not thought to be high which would explain the low drainage density within the forestry.

Junction & Bend Widening Works locations HR1 to HR4 are located in the Goish and Brickey river sub catchments.

7.5.1.3 MPORTANCE of Aquatic Habitats & Species

The **watercourses downslope of KWF Grid Connection are assessed as being of 'Local Importance (higher value)**'. These channels connect the proposed development site to downstream areas of 'International Importance'.

The **aquatic fauna** in the watercourses downstream of the proposed development site are assessed as being of '**Local Importance (higher value)**'.

7.5.1.4 SENSITIVITY of Aquatic Habitats & Species

Aquatic habitats and species are sensitive to habitat degradation due to changes in surface water quality, riparian habitats, river morphology and flow regimes. Aquatic species can also be sensitive to disturbance or displacement where machinery and construction works are carried out in watercourses or in very close proximity.

With the KWF Grid Connection Study Areas, Aquatic Habitats & Species are evaluated as having **Low Sensitivity** to change due to the separation distance to watercourses (280m closest point) and the Local Importance (higher value) of Aquatic Species downgradient of the KWF Grid Connection works.

7.5.1.5 TRENDS for Aquatic Habitats & Species in the Baseline Environment

Based on the EPA catchment mapping (www.catchments.ie), the Brickey_010, Brickey_020 and Goish_020 are "At Risk" of not achieving "Good" status by 2027 and therefore are likely to have deteriorating or no improvement in water quality. The primary catchment pressure with respect to the Brickey River is agriculture. The primary catchment pressure with respect the Goish River is agriculture and forestry. We can assume that poor water quality trends in the Brickey River and Goish River are at least persisting or worsening.

The Finisk_030 River Sub Basin is 'Not at Risk' of deteriorating water quality or being at less than Good status in the future. It is assumed that High water quality trend in the Finisk_030 River Sub Basin is being maintained.

In the long term the trend in Climate Change in Ireland has resulted in average temperature rises, notable increase in autumn and winter precipitation and more intense flooding (Water Quality and Water Services Infrastructure DHPLG November 2021). According the EPA website infogram Ireland's Environment accessed in July 2023, Climate Change is expected to bring additional pressures to bear on Ireland's water environment.

7.5.1.6 The 'Do Nothing Scenario' (the Environment if the Development is not carried out)

It is assumed that the status of the surface wate bodies within the study area will be as reported above. This is the worst-case scenario as the Brickey River and the Goish River may achieve Good Status in the coming years which means catchment pressures would have eased or have been addressed.

7.5.1.7 Description of the RECEIVING ENVIRONMENT for Aquatic Habitats & Species

The receiving environment is the likely state of the baseline environment at the time of construction/operation/decommissioning as relevant i.e. baseline + trends.

In the context of KWF Grid Connection being constructed within the next ten years, it is assumed that the status of the surface water bodies within the receiving environment will be as reported above. This is the worst-case scenario as the Brickey River and the Goish River may achieve Good Status in the coming years which means catchment pressures would have eased or have been addressed.

Relevant Figures (at the end of this chapter)

Figure 7.5 and Figure 7.5.1: Study Area for Aquatic Habitats & Species

7.5.2 EVALUATION OF IMPACTS to Aquatic Habitats & Species

In this Section, the direct or indirect impacts and the cumulative impacts of KWF Grid Connection on Aquatic Habitats & Species are described.

7.5.2.1 Potential Impacts Evaluated for Aquatic Habitats & Species

A conceptual site model exercise was carried out to identify potential impacts through the examination of the specific pathways between the project (source) and the sensitive aspect (receptor).

The potential for impacts was **examined in the absence of mitigation measures**, and **based on the description of development, standard construction methodologies, construction activities and operational activities as described in Chapter 5**: **Description of the Development**.

The potential impacts which were evaluated are listed in the 1st column of the table below. As summarised in the table below, **no significant effects are likely to occur**.

Table 7-16: Conclusion of the Evaluation of Potential Impacts to Aquatic Habitats & Species

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Direct/Indirect Impact of KWF Grid Connection	Cumulative Impact with Authorised Knocknamona Windfarm	Cumulative impact with Woodhouse Windfarm and Woodhouse Substation	Cumulative Whole Knocknamona Windfarm Project Impact
Decrease in instream aquatic habitat quality	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not significant**
Changes to Instream Flow Regime	Construction	**Imperceptible**	Imperceptible	No additional cumulative impact	**Not Significant**
Disturbance or Displacement to fish and aquatic species	Construction	**No Impact**	No Impact	No cumulative impact	**Not Significant**
Spread of Aquatic Invasive Species	Construction	**No Likely Impact**	No likely impact	No likely cumulative impact	**Not Significant**

In order to keep this EIA Report concise and focused on potential significant impacts, where the evaluation of potential impacts found no significant impacts from the development, the evaluation tables are presented in the appendix to the chapter.

Because no significant impacts to Aquatic Habitats & Species are likely to occur, the Impact Evaluation Tables for the potential impacts listed in the table above are in Appendix 7.1.

Relevant Appendix at the end of this chapter

Appendix 7.1 Evaluation of Potential Impacts to Biodiversity – Evaluation Tables for Effects on Aquatic Habitats & Species (Tables 21 to 24)

7.5.2.2 Summary of the Significance of the Potential Impacts to Aquatic Habitats & Species

As summarised in the table above, **impacts to Aquatic Habitats & Species as a direct result of KWF Grid Connection will not be greater than Imperceptible** due to the absence of any watercourses within the construction works area boundary and therefore there is no requirement for instream works or works in close proximity (the nearest surface watercourse Mountodell Stream is 280m from works) and; the Imperceptible impacts to downstream watercourses with no invasive species recorded. (as per Chapter 9 Water).

Cumulative impacts of the Whole Project i.e. KWF Grid Connection with Authorised Knocknamona Windfarm will not be greater than Imperceptible due to the absence of any watercourses within the construction works area boundary for either KWF Grid Connection or Authorised Knocknamona Windfarm and therefore there being no requirement for instream works for either KWF Grid Connection or Authorised Knocknamona Windfarm; the separation distances to watercourses; the Imperceptible effect on water quality due to the KWF Grid Connection project and; the implementation of the Sediment & Erosion Control Plan for the windfarm project and, in relation to Junction & Bend Widening Works - the small scale and short duration of works; very small volumes of excavations/stone required. **Overall the 'whole project' effect of KWF Grid Connection and Authorised Knocknamona Windfarm will not be significant**

When Woodhouse Windfarm and Woodhouse Substation are also taken into account, there will be no additional cumulative impacts due to Woodhouse Windfarm and Woodhouse Substation been already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further groundworks or construction works are expected in relation to these projects and there is no requirement for instream works for any of the projects. Therefore there is no potential for cumulative impacts on aquatic habitats & species from Woodhouse Windfarm and Woodhouse Substation.

7.6 Summary of the Biodiversity Chapter

The Biodiversity chapter examines the effects of KWF Grid Connection on living organisms, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part.

Overall, the habitats in the vicinity of the development site are categorised as being of 'Local Importance (lower value)'. The fauna utilising the proposed development site are common in the Irish context, and there are no habitats of particular value to fauna at the site. There are no significant surface water vectors within 250m of the proposed KWF Grid Connection development site. The closest watercourse is the Mountodell Stream which is 280m from KWF Grid Connection works at its closest point.

The following aspects of Biodiversity were considered during scoping for this topic chapter: Designated National or European Sites; Amphibians; Reptiles; Invertebrates; Terrestrial Habitats; Birds; Mammals and Aquatic Habitats & Species.

Terrestrial Habitats; Birds; Mammals and Aquatic Habitats & Species were aspects deemed to be sensitive to the development and were scoped in for detailed examination.

The other aspects listed were scoped out because; the effects would be No Likely Impact/No potential for Impact (Designated National or European Sites); or; Neutral Impact (Amphibians, Reptiles and Invertebrates). (Rationale for scoping out Section 7.1.3.2)

Considering the ecological conditions that exist at the proposed works area, where highly disturbed habitats dominate and the scale and short duration of the works, no significant impacts to biodiversity is expected as a result of the construction and operational phase of the proposed development.

In relation to the sensitive aspects which were scoped in for evaluation, the results were as follows:

Terrestrial Habitat (reduction, severence, fragmentation, loss of high value trees for bats, loss of Flora Protection Order species and spread of invasive species): it was evaluated that there **is no greater than Imperceptible** potential negative impacts likely**.** (See this chapter, Section 7.2 and Appendix 7.1 Tables 1-7)

Birds (Landcover change; construction noise and visual intrusion for Red, Amber and Green listed birds): potential negative impacts were evaluated as no greater than **Imperceptible to Slight.** (See this chapter, Section 7.3 and Appendix 7.1 Tables 8-11)

Mammals (Disturbannce; destruction; habitat degradation or loss relating to Bats, Otter, Pine Martin, Irish Hare, Red Squirrel, Badger, Hedgehog, Irish Stoat and Fallow deer); potential negative impacts were evaluated as no greater than **Imperceptible**. (See this chapter, Section 7.4 and Appendix 7.1 Tables 12-20)

Aquatic Habitats & Species (decrease in instream aquatic habitat quality or changes to instream flow; disturbance/displacement to fish & aquatic species, spread of invasive species): potential negative impacts were evaluated as no greater than **Imperceptible**. (See this chapter, Section 7.5 and Appendix 7.1 Tables 21-24)

In relation to the overall effect to Biodiversity, it is concluded that the proposed development impact is evaluated as No Impact/No Likely Impact/Imperceptible to Slight at most, taking into account the low value habitats at the site, and the scale and duration of the project.

It is therefore concluded, by the topic authors, that no significant residual ecological impacts, either alone or in combination with other plans or projects (most notably the Authorised Knocknamona Windfarm), will arise from the construction or operation of KWF Grid Connection.

Relevant Documents

Non-Technical Summary of this chapter can be found in Volume C1: Non-Technical Summary: Section 7

Figures for Biodiversity chapter

Figure 7.1	Location of KWF Grid Connection in relation to Biodiversity
Figure 7.1.1	Location of KWF Grid Connection in relation to Designated Sites
Figure 7.2	Study Area for Terrestrial Habitats
Figure 7.3	Study Area for Birds
Figure 7.4.1	Study Area for Bats
Figure 7.4.2	Study Area for Other Mammals
Figure 7.5	Study Area for Aquatic Habitats & Species
Figure 7.5.1	Study Area for Aquatic Habitats & Species (zoomed in)

Appendices for Biodiversity chapter

Appendix 7.1	Evaluation of Potential Impacts to Biodiversity
Appendix 7.2	Bird Survey Data 2015 to 2023

7.7 Reference List

Andrews H & Gardener M 2016. Bat Tree Habitat Key – Database Report 2016. AEcol, Bridgwater.Bang, P. & Dahlstrom, P. (2004) Animal Tracks and Signs. Oxford University Press.

Curtis, T.G.F. and McGough, H.N. (1988) The Red Data Book 1: Vascular Plants. Dublin: The Stationery Office.

Collins, J. (ed.) (2016). Bat surveys for professional ecologists: good practice guidelines (3rd edn). The Bat Conservation Trust, London.

CIEEM (2016) Guidelines for Ecological Impact Assessment in the United Kingdom. Institute of Ecology and Environmental Management.

Crowe O, Coombes R.H. and O'Halloran J, Estimates and trends of common breeding birds in the Republic of Ireland

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

Wildlife Act, 1976 as amended by the Wildlife (Amendment) Act, 2000 and the Heritage Act 2018

Institute for Ecology and Environmental Management (IEEM) (2006) Guidelines for Ecological Impact Assessment in the United Kingdom. Institute for Ecology and Environmental Management.

Joint Nature Conservancy Committee (JNCC) (2001) Habitat management for bats: A guide for landowners, land managers and their advisors. Peterborough: Joint Nature Conservation Committee.

Keeley, B. (2005) NRA Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes, National Roads Authority, Dublin.

Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

King, J.J., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., Fitzpatrick, Ú., Gargan, P.G., Kelly, F.L., O' Grady, M.F., Poole, R., Roche, W.K. and Cassidy, D. (2011) Ireland Red List No. 5: Amphibians, Reptiles and Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Kingston (2005) Proposed Red Data List of Vascular Plants in Ireland. Unpublished Consultation List.

Kingston, N. (2012) Checklist of protected & rare species in Ireland. Unpublished National Parks & Wildlife Service Report.

Lundy, M.G., Aughney, T., Montgomery, W.I., & Roche, N., (2011). Landscape conservation for Irish bats & species-specific roosting characteristics. Bat Conservation Ireland.

McGinnity, P., Gargan, P., Roche W., Mills, P., and McGarrigle M. 2003. Quantification of the freshwater salmon habitat asset in Ireland using data interpreted in a GIS platform. Issue 3 of Irish Freshwater Fisheries Ecology and Management Series, Central Fisheries Board, Dublin, 3. 131 pp.

National Roads Authority (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority, Dublin.

National Roads Authority (2008). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes.

NS2 (2010). Freshwater Pearl Mussel Second Draft Munster Blackwater Sub-Basin Management Plan. Available at https://www.catchments.ie/download/freshwater-pearl-mussel-plans-2009-2015/

Parnell, J., and T. Curtis (2012). Webb's – An Irish Flora. 8th edn. Cork University Press, Cork

Percival, S.M. (2007) Predicting the effects of wind farms on birds in the UK: the development of an objective assessment method. [ed.] M., Janss, F.E., Ferrer, M. De Lucas. Madrid -(Quercus, 7, pp. 137-152).

Preston, C.D., Pearman, D.A. and Dines, T.D. (2002) New Atlas of the British Flora. Oxford University Press, Oxford.

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

Greater Impacts of wind farms on bird populations during construction than subsequent operation: results of a multisite and multi-species analysis. Pearce-Higgins, J.W., Stephen, L., Douse, A., Langston, R.H.W. s.l. : Journal of Applied Ecology, 2012, Vol. 49, pp. 386-394

The distribution of breeding birds around upland wind farms. Pearce-Higgins, J.W., Leigh,S., Langston, R.H.W., Bainbridge, Ian.P., Bullman, R. s.l. : Journal of Applied Ecology, 2009, Vol. 46, pp. 1323-1331.)

Figure 7.1 - Location of KWF Grid Connection in relation to Biodiversity

Legend:

- KWF Grid Connection
- Access Road through Woodhouse Windfarm Entrance

Figure 7.1.1 - Location of KWF Grid Connection in relation to Designated Sites

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance
- Special Areas of Conservation (SAC)
- Special Protected Areas (SPA)
- Proposed Natural Heritage Areas (pNHA)

Comeragh Mountains pNHA (001952)
Comeragh Mountains SAC (001952)
Lismore Woods pNHA (000667)
Blackwater Callows SPA (004094)
Glendine Wood SAC (002324)
Mid-Waterford Coast SPA (004193)
Dungarvan Harbour pNHA (000663)
Blackwater River (Cork/Waterford) SAC (002170)
KWF Grid Connection
Dungarvan Harbour SPA (004032)
Helvick Head SAC (000665)
Blackwater River and Estuary pNHA (000072)
Helvick Head to Ballyquin SPA (004192)
6km
Blackwater River (Cork/Waterford) SAC (002170)
Glenna Wood pNHA (001698)
10km
Blackwater Estuary SPA (004028)
Ballyeelinan Wood pNHA (001692)
15km
Ardmore Head SAC (002123)

N

Figure 7.2 - Study Area for Terrestrial Habitats

Existing Woodhouse Substation

100m Cumulative Study Area

50 from KWF Grid Connection

Existing Woodhouse Windfarm

Authorised Knocknamona Windfarm and amendments

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Boundary (not visible)
- Access Road through Woodhouse Windfarm Entrance (not visible)

Study Area Extents:

- 50m KWF Grid Connection Study Area
- 100m Cumulative Study Area

Whole Project:

- Authorised Knocknamona Windfarm and amendments

Other Projects:

- Existing Woodhouse Substation (not visible)
- Existing Woodhouse Windfarm

Survey Results:

- BL3 - Buildings and Artificial Surfaces
- GA1 - Improved Agricultural Grassland
- GS4 - Wet Grassland
- WD4 - Conifer Plantation
- WD4/WS1 - Conifer Plantation/Scrub
- WD4/WS2 - Conifer Plantation / Immature Woodland
- WN - Semi Natural Woodland
- WS1 - Scrub
- WS5/WS1/WS2 - Recently-felled Woodland / Scrub / Immature Woodland
- WL1 - Hedgerows
- WL2 - Treelines

N

Figure 7.3 - Study Area for Birds

Whooper Swan at Clogh Bog

SSAVP5

Existing Woodhouse Substation

VP1

Hen Harrier (Male)

T1

T2

KWF Grid Connection Construction Works Area

Existing Woodhouse Windfarm

Authorised Knocknamona Windfarm and amendments

VP2 & VP1- 2022/23 Whooper Swan Census Survey

VP3 & VP1 - 2023 Surveys

Hen Harrier (Female)

Authorised Junction & Bend widening works

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Study Area Extents:

- 50m KWF Grid Connection Study Area
- 1km Cumulative Study Area

Whole Project:

- Authorised Knocknamona Windfarm and amendments
- Authorised Junction & Bend widening works

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

General Legend Information:

- Transect Lines
- T2 Transect Lines Identification Number
- Vantage Point (VP) Locations (2018)
- VP3 VP Identification Number

2018 Survey Results:

- Flightline of Whooper Swan
- Flightline of Hen Harrier (Male)
- Flightline of Hen Harrier (Female)

N

Figure 7.4.1 - Study Area for Bats

Existing Woodhouse Substation

KWF Grid Connection Construction Works Area

Survey route for bat passes

Existing Woodhouse Windfarm

Survey route for bat passes

Mountodell Stream

Authorised Knocknamona Windfarm and amendments

Monageela Stream

N

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Study Area Extents:

- 150m KWF Grid Connection Study Area
- 300m Cumulative Study Area

Whole Project:

- Authorised Knocknamona Windfarm and amendments
- Authorised Junction & Bend widening works

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

Survey Results:

- Common Pipistrelles Bats
- Leislers Bats
- Myotis sp Bats
- Soprana Pipistrelles Bats
- Building with Low Suitability for Roosting Bats (PRA survey 2023)
- Tree with Moderate Suitability for Roosting Bats (PRA survey 2023)
- Survey route for bat passes in September 2017
- Watercourses

Existing Woodhouse Substation

KWF Grid Connection Construction Works Area

Existing Woodhouse Windfarm

Authorised Knocknamona Windfarm and amendments

N

Figure 7.4.2 - Study Area for Other Mammals

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Study Area Extents:

- 50m KWF Grid Connection Study Area
- 300m KWF Grid Connection Study Area
- 100m Cumulative Study Area
- 600m Cumulative Study Area

Whole Project:

- Authorised Knocknamona Windfarm and amendments

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

Survey Results:

- Deer Track
- Deer Droppings
- Watercourses

Figure 7.5 - Study Area for Aquatic Habitats & Species

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Study Area Extents:

Colligan - Mahon Catchment:

- Brickey_020 River Sub Basin
- Brickey_010 River Sub Basin

Blackwater (Munster) Catchment:

- Finisk_030 River Sub Basin
- Goish_10 River Sub Basin
- Goish_10 River Sub Basin

Whole Project:

- Authorised Knocknamona Windfarm and amendments
- Authorised Junction & Bend widening works

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

Finisk_030 River Sub Basin (Blackwater (Munster) Catchment)

Brickey_010 River Sub Basin (Colligan-Mahon Catchment)

Existing Woodhouse Substation

KWF Grid Connection Construction Works Area

Goish_020 River Sub Basin (Blackwater (Munster) Catchment)

Existing Woodhouse Windfarm

Brickey_020 River Sub Basin (Colligan-Mahon Catchment)

Authorised Knocknamona Windfarm and amendments

Authorised Junction & Bend widening works

Goish_010 River Sub Basin (Blackwater (Munster) Catchment)

N

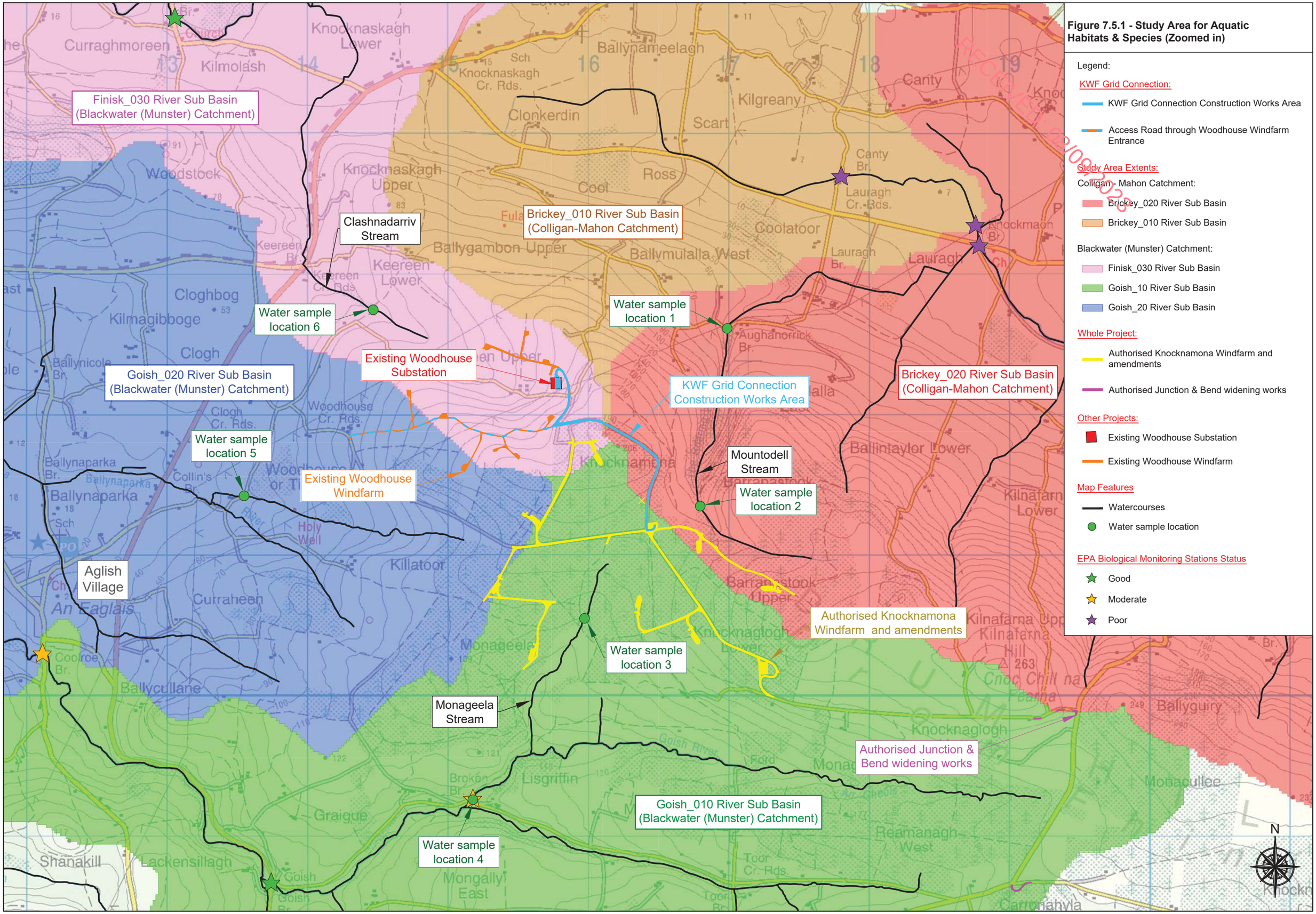

Figure 7.5.1 - Study Area for Aquatic Habitats & Species (Zoomed in)

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Study Area Extents:

Colligan - Mahon Catchment:

- Brickey_020 River Sub Basin
- Brickey_010 River Sub Basin

Blackwater (Munster) Catchment:

- Finisk_030 River Sub Basin
- Goish_10 River Sub Basin
- Goish_20 River Sub Basin

Whole Project:

- Authorised Knocknamona Windfarm and amendments
- Authorised Junction & Bend widening works

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

Map Features

- Watercourses
- Water sample location

EPA Biological Monitoring Stations Status

- Good
- Moderate
- Poor

Appendix 7.1: Evaluation of Potential Impacts to Biodiversity

This Appendix contains Impact Evaluation Table for the following Sensitive Aspect:

Sensitive Aspect Details as per Main EIA Report		Relevant Section of Main EIA Report:
Sensitive Aspect No. 1	Terrestrial Habitats	Section 7.2 of the Main EIA Report
Sensitive Aspect No. 2	Birds	Section 7.3 of the Main EIA Report
Sensitive Aspect No. 3	Mammals	Section 7.4 of the Main EIA Report
Sensitive Aspect No. 4	Aquatic Habitats & Species	Section 7.5 of the Main EIA Report

Evaluation of Potential Impacts to TERRESTRIAL HABITATS

In relation to **Terrestrial Habitats**, the following potential impacts were evaluated:

Impact evaluated during the Conceptual Site Model exercise	**Relevant Stage of KWF Grid Connection**	**in this Appendix in Table:**
Reduction in Terrestrial Habitats	Construction Stage	A7.1, Table 1
Hedgerow/Earthen Bank Field Boundary Severance	Construction Stage	A7.1, Table 2
Landscape Level Habitat Fragmentation	Construction Stage	A7.1, Table 3
Loss of High Nature Value Trees	Construction Stage	A7.1, Table 4
Loss of FPO Species	Construction Stage	A7.1, Table 5
Introduction or spread of invasive species during construction	Construction Stage	A7.1, Table 6
Introduction or spread of invasive species during operational works/activities	Operational Stage	A7.1, Table 7

A7.1 Table 1	Terrestrial Habitats - Reduction in Terrestrial Habitats
Impact Source	Excavation Works
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Land cover
Brief Impact Description	Land take during the construction stage may cause a direct reduction in habitats present. Land take associated with the proposed KWF Grid Connection relates to the 190m long new Link Road through scrub, and the widening of the existing forestry road by 1m into scrub/recolonising bare ground habitat. Temporary land use change relates to cable trenching within Built and Artificial Surfaces and across Scrub and Improved Agricultural Grassland habitats.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the Local importance (lower value) of the habitats present • the negligible level of habitat loss in the context of the availability of these habitats in the surrounding area, • the reversibility of temporary habitat loss with reinstatement of trenches and works areas.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the Local importance (lower value) of habitats lost in the Cumulative Study Area due to the construction of KWF Grid Connection and Authorised Knocknamona Windfarm, and the widening of forestry roads in the vicinity of Authorised Knocknamona Substation. • the low level of habitat loss in the Cumulative Study Area in the context of the availability of these habitats in the surrounding forestry area, • No invasive species within windfarm works area or along haulage route as far as Woodhouse Windfarm Entrance Gates (as per 2020 and 2023 surveys) • Due to the relatively small extent of habitat loss and the low ecological value of habitats at Junction & Bend Widening Works locations • impacts to Terrestrial Habitats as a result of Authorised Knocknamona Windfarm was previously assessed by An Bord Pleanála in 2016 and in 2022 as not significant. Because KWF Grid Connection effects to Terrestrial Habitats will be no greater than Imperceptible, the combined 'whole project' effect will also not be significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No likely Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative impacts during the construction of KWF Grid Connection.

A7.1 Table 2 Terrestrial Habitats - Hedgerow/Earthen Bank Field Boundary Severance

Impact Source	**Source: Excavation Works**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Land cover
Brief Impact Description	While there will be no permanent hedgerow severance associated with KWF Grid Connection, the construction of the underground cabling will involve the removal of 1 section (15m) of field boundary (scrubby earthen bank) on the Woodhouse Windfarm side of the crossing point of the farm lane which is located between the Knocknamona forestry and Woodhouse Windfarm roads. The field boundary will be reinstated immediately following completion of cable trenching works and new link road works at the crossing location.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • No permanent hedgerow severance, impacts limited to 1 short (15m) sections of earthen bank which will be temporarily removed during cable trenching and new link road works and reinstated immediately following completion of the works at the crossing location. • the Local importance (lower value) of the habitats present, • the negligible level of habitat loss in the context of the availability of these habitats in the surrounding area, • the reversibility of temporary habitat loss within reinstatement of trenches and works areas.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the Local importance (lower value) of habitats lost in the Cumulative Study Area due to the construction of KWF Grid Connection and Authorised Knocknamona Windfarm, and the widening of forestry roads in the vicinity of Knocknamona Substation, • Due to the relatively small extent of habitat loss and the low ecological value of habitats at Haul Route Works locations • the low level of habitat loss in the Cumulative Study Area in the context of the availability of these habitats in the surrounding forestry area, • Impacts to Terrestrial Habitats as a result of the Authorised Knocknamona Windfarm was previously assessed by An Bord Pleanála in 2016 and in 2022 as not significant. As KWF Grid Connection effects to Terrestrial Habitats will be no greater than Imperceptible the combined 'whole project' effect will also not be significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative impacts during the construction of KWF Grid Connection.

A7.1 Table 3 Terrestrial Habitats - Landscape level Habitat fragmentation

Impact Source	**Source: Excavation works**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Landcover
Brief Impact Description	The alteration of natural habitat can cause fragmentation effects within a wider landscape context. Habitat fragmentation occurs when larger areas of habitat are split into separate, smaller areas. The alteration of managed land use, such as forestry or agricultural lands, can also cause fragmentation effects. Fragmentation can cause declines in animal diversity and densities, and changes to community composition, species interactions and ecosystem functioning.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Neutral** significance because: no severance of any habitats associated with KWF Grid Connection; the Local importance (lower value) of the habitats present within the site. the negligible level of habitat loss (limited to scrub habitat along new link road (190m), and the widening of an existing forestry road by 1m into scrub/recolonising bare ground habitat) in the context of the availability of these habitats in the surrounding area, the reversibility of temporary habitat loss (along sections of the underground cabling) with reinstatement of trenches and works areas.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the Local importance (lower value) of habitats lost in the Cumulative Study Area due to the construction of KWF Grid Connection and Knocknamona Substation, and the widening of forestry roads in the vicinity of Knocknamona Substation. • the low level of habitat loss in the Cumulative Study Area in the context of the availability of these habitats in the surrounding forestry area i.e. the wider baseline environment comprises largely of intensively managed habitats, which eliminates/reduces the potential for further loss of important habitats, • Junction & Bend Widening Works will occur along public road corridor • Impacts to Terrestrial Habitats as a result of Authorised Knocknamona Windfarm was previously assessed by An Bord Pleanála in 2016 and 2022 as not significant. As KWF Grid Connection effects to Terrestrial Habitats will be no greater than Imperceptible, the combined 'whole project' effect will also not be significant.
C: Cumulative Impact with Woodhouse	**No Cumulative Impact** because:

Substation and Woodhouse Windfarm	• Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative impacts during the construction of KWF Grid Connection.

A7.1 Table 4 Terrestrial Habitats - Loss of High Nature Value Trees

Impact Source	**Source: Excavation Works**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Land cover
Brief Impact Description	Mature trees can contribute to habitat connectivity and provide breeding and resting habitat for other biodiversity receptors. Surveys carried out at KWF Grid Connection, found no High Nature Value Trees in the study area.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	**No Direct Impact** because: • no High Nature Value Trees within the study area, additionally no tree felling required for KWF Grid Connection • the reversibility of temporary habitat loss within reinstatement of trenches and works areas.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No cumulative Whole Project Impact** because: • no loss of high nature value trees associated with KWF Grid Connection, and therefore no potential to contribute to any cumulative impacts, • Loss of semi-mature trees limited to 5 willow trees at Junction & Bend works site HR3 which will be pruned, not felled. • Impacts to Terrestrial Habitats as a result of Authorised Knocknamona Windfarm was previously assessed by An Bord Pleanála in 2016 and 2022 as not significant. As KWF Grid Connection effects to Terrestrial Habitats will be no greater than Imperceptible (and No Impact in relation to High Nature Value Trees), the combined 'whole project' effect will also not be significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative impacts during the construction of KWF Grid Connection.

A7.1 Table 5 Terrestrial Habitats - Direct loss of Flora Protection Order species

Impact Source	**Excavation works**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Soils
Brief Impact Description	Flora Protection Order species detected or likely to occur in the zone of impact
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	**No Direct Impact** because: • No Flora Protection Order species detected or likely to occur in the zone of impact/the reversibility of temporary habitat loss within reinstatement of trenches and works areas.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No cumulative Whole Project Impact** because: • no loss of flora protection order species likely to occur, as a result of KWF Grid Connection, and therefore no contribution of KWF Grid Connection to cumulative impacts; • Junction & Bend Widening Works located along public road corridor • Impacts to Terrestrial Habitats as a result of Authorised Knocknamona Windfarm was previously assessed by An Bord Pleanála in 2016 and 2022 as not significant. As KWF Grid Connection effects to Terrestrial Habitats will be no greater than Imperceptible (and No Impact in relation to Flora Protection Order species), the combined 'whole project' effect on Terrestrial Habitats will also not be significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative impacts during the construction of KWF Grid Connection.

A7.1 Table 6 Terrestrial Habitats - Introduction or spread of invasive species

Impact Source	**Source: Movement of soils and machinery**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Soils
Brief Impact Description	Importation and establishment of non-native plants to the site, and subsequent competition with native species.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** significance because: • biosecurity measures used during the construction phase of the project e.g. the steam cleaning of all site machinery before entering the site will ensure that the spread of invasive species is avoided, in line with Irish Legislation (Regulation 49 of S.I. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011), • the absence of non-native species at habitats affected by the proposed KWF Grid Connection, • Separation distance to watercourses, • therefore it is considered that there is a negligible risk of spread of invasive species associated with KWF Grid Connection.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the negligible risk associated with KWF Grid Connection • the carrying out of Knocknamona Windfarm construction works in compliance with Irish Legislation • the Local importance (lower value) of habitats lost in the Cumulative Study Area due to the construction of KWF Grid Connection and Authorised Knocknamona Windfarm, and the widening of forestry roads in the vicinity of Knocknamona Substation, • the low level of habitat loss in the Cumulative Study Area in the context of the availability of these habitats in the surrounding forestry area • No invasive species within windfarm works area or along haul road through Woodhouse Windfarm Entrance (as per 2023 surveys) • biosecurity measures used during the construction phase of the project • The whole project effect will not be significant due to the compliance of construction works with national legislation.
C: Cumulative Impact with Woodhouse Substation and	**No Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these

Woodhouse Windfarm	projects, operational works take place from hardcore areas, and therefore there is no potential for these projects to contribute to the spread of invasive species during the construction of KWF Grid Connection.

A7.1 Table 7	Terrestrial Habitats - Introduction or spread of invasive species during operational works/activities

Impact Source	**Source: Movement of soils and machinery**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Soils
Brief Impact Description	Importation and establishment of non-native plants, and subsequent competition with native species
Project Stage:	Operation
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the general absence of pathways for this impact due to the minimum activities associated with KWF Grid Connection, comprising c. 4 visits per annum to the new apparatus within Woodhouse Substation compound, and a walkover of the underground cabling route, with infrequent use of the new Link Road for any replacement turbine component transportation; groundworks during the operation of KWF Grid Connection are not expected; therefore it is considered that the risk of invasive species being spread during the operational stage is negligible. • the context of the impact – e.g. the lower value importance of terrestrial habitats within the study area • the absence of non-native species at habitats affected by the proposed KWF Grid Connection
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the negligible risk associated with KWF Grid Connection, • the general absence of pathways for this impact on the Authorised Knocknamona Windfarm site – (i) biosecurity measures used during the construction phase of the project to ensure the project complies with legislative requirements, therefore it is considered that the risk of invasive species being spread during the operational stage is negligible • (ii) the carrying out of operational stage maintenance activities from hardcore areas (i.e. access roads and turbine hardstand areas); groundworks on the windfarm site are not expected; therefore it is considered that the risk of invasive species being spread during the operational stage is negligible.
C: Cumulative Impact with Woodhouse Substation and	The **Cumulative Impact will be Imperceptible** significance because: • all operational activities for Woodhouse Windfarm and Woodhouse Substation take place from hard-core surfaces, and no groundworks or land cover removal

Woodhouse Windfarm	or alternation is expected to take place, therefore it is considered that pathways for the spread of invasive species will not be present during the operation of these two projects, and given the general separation of Woodhouse Windfarm and Woodhouse Substation from Knocknamona Windfarm, combined with the minimal operational activities and negligible risk associated with KWF Grid Connection, the cumulative risk remains negligible.

Evaluation of Potential Impacts to BIRDS

In relation to **Birds**, the following potential impacts were evaluated:

Impact evaluated during the Conceptual Site Model exercise	Relevant Stage of KWF Grid Connection	Evaluated in this Appendix in Table:
Red Listed species (Meadow Pipit, Curlew, Golden Plover and Woodcock) - Habitat Loss	Construction/Operation	A7.1, Table 8
Red Listed species (Meadow Pipit, Curlew, Golden Plover and Woodcock) - Disturbance/Displacement	Construction	A7.1, Table 9
Amber & Green Listed Bird Species - Habitat Loss	Construction/Operation	A7.1, Table 10
Amber & Green Listed Bird Species - Disturbance/Displacement	Construction	A7.1, Table 11

A7.1 Table 8	Birds: Red Listed species (Meadow Pipit, Curlew, Golden Plover, Kestrel, Swift, Snipe and Woodcock) - Habitat Loss

Impact Source	**Permanent land cover change from scrub/road margin to stone access road, temporary landcover change on storage berms.**
Impact Pathway (between Source and Sensitive Aspect)	Land Cover
Brief Impact Description	BoCCI Red Listed species recorded during surveys for either KWF Grid Connection or Authorised Knocknamona Windfarm were Meadow Pipit, Curlew, Golden Plover, Kestrel, Swift, Snipe and Woodcock. Any reductions in suitable habitats may cause a knock-on effect on the breeding success of any local populations of these birds. Meadow pipit is the only red-listed species recorded within the KWF Grid Connection study area. Suitable habitats for Meadow Pipit are improved agricultural grassland, grassland mosaics and scrub. Kestrel require areas of open habitats including moorland, grasslands, roadside verges etc. Swift utilise open habitats for feeding and require buildings or other structures for breeding. Snipe require wet or boggy habitats for feeding and breeding. Woodcock occur in woodland and forests, as well as scrub and some open areas such as bracken or heather covered hills. Golden plover breed in heather moors, blanket bogs and acid grasslands. Suitable habitat for Curlew are wetlands, rough pastures, meadows and heather.
Project Stage:	Construction/Operation
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the medium sensitivity of Meadow Pipit, Woodcock, Curlew, Kestrel, Swift, Snipe and Golden Plover due to their red-listed conservation status; • the negligible level of suitable Meadow Pipit, Kestrel, Snipe, Swift or Woodcock habitat loss in the context of the availability of grassland and scrub in the surrounding area; • No suitable habitat within the KWF Grid Connection study area for Golden plover or Curlew; • the reversibility of temporary habitat loss within reinstatement of trenches and works areas; • the reduction in the magnitude of effect (due to landcover change) during the operational stage with the reinstatement of the earthen bank along the new Link Road with invertebrate friendly plant species comprising a mix of native wild grasses and native heather.

B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible to Slight** significance because: • the medium sensitivity of Meadow Pipit, Woodcock, Curlew, Kestrel, Swift, Snipe and Golden Plover due to their red-listed conservation status; • the low level of suitable habitat loss in the Cumulative Study Area, in the context of the availability of grassland and scrub in the surrounding area; • Regarding the Junction & Bend Widening Works, the very small scale of works, the temporary duration of the works and the pruning of five small trees will take place outside bird breeding season. • As per the Revised EIS 2015 and Revised EIAR 2021 for Authorised Knocknamona Windfarm impacts to the red-listed Meadow Pipit, Woodcock and Curlew as a result of Knocknamona Windfarm will be no greater than Slight significance. Effects to birds was previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. When the additional loss of suitable habitat for KWF Grid Connection is taken into account, the whole project effect to Meadow Pipit, Woodcock, Curlew and Golden Plover remains not significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No additional Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative habitat loss impacts these red-listed species during the construction of KWF Grid Connection.

A7.1 Table 9	Birds: Red Listed species (Meadow Pipit, Woodcock, Curlew, Kestrel, Swift, Snipe and Golden Plover) - Disturbance/Displacement

Impact Source	**During construction noise and visual Intrusion due to the presence of construction personnel, construction machinery and construction works**
Impact Pathway (between Source and Sensitive Aspect)	Air
Brief Impact Description	Disturbance effects can occur where Meadow pipit, Woodcock, Golden plover or Curlew is flushed from a resting feeding location due to the presence of people or machinery or occurrence of construction works in close proximity. Displacement may result from repeated disturbance, with birds moving to other habitats, which may not be as suitable, and this may lead to increased exposure to predation or reduced breeding success.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the medium sensitivity of Meadow Pipit, Woodcock, Curlew, Kestrel, Swift, Snipe and Golden Plover, • the Local importance (lower value) of the habitats present, • the very short duration of construction works, and • the reversibility of disturbance/displacement effects with the completion of construction works and the reinstatement of the earthen bank.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible to Slight** because: • the medium sensitivity of Meadow Pipit, Woodcock, Curlew, Kestrel, Swift, Snipe and Golden Plover, • the general Local importance (lower value) of the habitats present within the Cumulative Study Area, • the temporary duration of combined construction works, and • the reversibility of disturbance/displacement effects with the completion of construction works and reinstatement of the sites. • Most passerine (perching) species and general farmland birds are not considered to be particularly susceptible to impacts from wind farms (SNH, 2014) – including construction stage disturbance. Studies on the impacts of wind farms during both construction (Pearce-Higgins et al. 2012) and operation (Pearce-Higgins et al. 2009) have found little evidence of significant disturbance effects on passerine species • In relation to Junction & Bend Widening Works, the minor scale of works, completed over a short-term duration will not result in the loss of any high value breeding habitat for birds, • Impacts to birds as a result of the Authorised Knocknamona Windfarm were previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. The whole project effect will also not be significant due to the additional sources of disturbance/displacement effects associated with KWF Grid Connection.

C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No additional** cumulative impact because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound, and minimal presence of operational personnel or machinery on either site. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative disturbance/displacement impacts to Meadow Pipit, Woodcock, Curlew, Kestrel, Swift, Snipe or Golden Plover during the construction of KWF Grid Connection.

A7.1 Table 10 Birds: Amber & Green Listed Bird Species – Habitat Loss

Impact Source	**Permanent land cover change from scrub/road margin to stone access road, temporary landcover change on storage berms.**
Impact Pathway (between Source and Sensitive Aspect)	Land cover
Brief Impact Description	Changes in landcover from scrub/road margin to stone access road, can reduce available foraging area for birds which can have a knock-on effect on breeding success of local bird populations. Amber listed species recorded during 2013/2014 surveys and 2018/2019 surveys include Robin, Mistle Thrush, Goldcrest, Linnet, Starling, Kestrel, Barn Swallow, Sparrowhawk, Skylark, Sand Martin, Hen Harrier, Lesser blacked-backed gull and Whooper Swan. Green listed species recorded include: Song Thrush, Woodpigeon, Dunnock, Blackbird, Wren, Great tit, Coal tit, Blue tit, Rook, Hooded Crow, Raven, Chaffinch, Goldfinch, Blackcap, Whitethroat, Chiffchaff, Willow warbler, Magpie, Pheasant, Stonechat, Lesser redpoll, Bullfinch, Siskin, Snipe and Grey Heron.
Project Stage:	Construction/operation
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the low sensitivity of amber and green listed bird species which are expected to occur within the study area • the Local importance (lower value) of the habitats present which are not of any particular importance to local bird species; • the negligible level of habitat loss in the context of the availability of these habitats in the surrounding area, • the reversibility of temporary habitat loss within reinstatement of trenches and works areas. • the reduction in the magnitude of effect (due to landcover change) during the operational stage with the reinstatement of the earthen bank along the new Link Road with invertebrate friendly plant species.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine	The cumulative **Whole Project Impact will be Imperceptible** because: • the Local importance (lower value) of bird habitats lost in the Cumulative Study Area due to the construction of KWF Grid Connection and Authorised Knocknamona Windfarm, and the widening of forestry roads in the vicinity of Authorised Knocknamona Substation, • the low level of suitable habitat loss in the Cumulative Study Area, in the context of the availability of grassland, scrub and forestry in the surrounding area; • Regarding the Junction & Bend Widening Works, the very small scale and temporary duration of the works and the pruning of five small trees will take place outside bird breeding season; • Impacts to birds as a result of Authorised Knocknamona Windfarm was previously assessed in 2016 and 2022 by An Bord Pleanála as not significant.

component access through the windfarm site entrance at Knocknaglogh Lower	When the additional loss of suitable habitat as a result of KWF Grid Connection is taken into account, the whole project effect to amber or green listed species remains not significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No additional Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative habitat loss impacts to amber or green listed bird species during the construction of KWF Grid Connection.

A7.1 Table 11 Birds: Amber & Green Listed Bird Species – Disturbance or Displacement

Impact Source	**During construction noise and visual Intrusion due to the presence of construction personnel, construction machinery and construction works**
Impact Pathway (between Source and Sensitive Aspect)	Air
Brief Impact Description	Disturbance effects can occur where birds are flushed from a resting feeding location due to the presence of people or machinery or occurrence of construction works in close proximity. Displacement may result from repeated disturbance, with birds moving to other habitats, which may not be as suitable, thereby potentially causing increased exposure to predation or reduced breeding success.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the Low sensitivity of amber or green listed birds species which may be present within the KWF Grid Connection Study Area, • Local importance (lower value) of the habitats present, • the very short duration of construction works, and • the reversibility of disturbance/displacement effects with the completion of construction works and the reinstatement of roadside berms.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the Low sensitivity of amber or green listed birds species which may be present within the Cumulative Study Area, • the general Local importance (lower value) of the bird foraging or nesting habitats present, • the temporary duration of combined construction works, and • the reversibility of disturbance/displacement effects with the completion of construction works and reinstatement of the sites. • In relation to Junction & Bend Widening, the minor scale of works, completed over a short-term duration will not result in the loss of any high value breeding habitat for birds, • Impacts to birds as a result of Authorised Knocknamona Windfarm were previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. When the additional loss of suitable habitat as a result of KWF Grid Connection is taken into account, the whole project effect to amber or green listed species remains not significant
C: Cumulative Impact of with Woodhouse Substation and Woodhouse Windfarm	**No additional Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound, and minimal presence of operational personnel or machinery on either site. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause

	cumulative disturbance/displacement impacts to amber or green listed bird species during the construction of KWF Grid Connection.

Evaluation of Potential Impacts to MAMMALS

In relation to **Mammals**, the following potential impacts were evaluated:

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Evaluated in this Appendix in Table:
Bats - Destruction or disturbance of bat roosts	Construction	A7.1, Table 12
Bats - Severance of commuting routes or feeding areas	Construction/Early Operational	A7.1, Table 13
Bats - Disturbance or Displacement due to Lighting	Construction/Operation	A7.1, Table 14
Otter- Habitat Degradation	Construction	A7.1, Table 15
Otter- Disturbance or Displacement	Construction	A7.1, Table 16
Pine marten and Irish Hare – Habitat Loss	Construction	A7.1, Table 17
Pine marten and Irish Hare – Disturbance or Displacement	Construction	A7.1, Table 18
Other Mammals - Habitat Loss	Construction	A7.1, Table 19
Other Mammals - Disturbance/Displacement	Operational	A7.1, Table 20

A7.1 Table 12 Mammals: Bats – Destruction or Disturbance of bat roosts

Impact Source	**Source: Demolition / renovation of buildings or bridges, felling of mature trees**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Land cover
Brief Impact Description	Bats can roost in buildings, mature trees and masonry bridges. In all cases, they require crevices or cavities of sufficient size to accommodate bats, for example in attic spaces, rotten sections of trees, or gaps in masonry. Therefore, only a subset of buildings, trees and bridges are suitable for bats, typically features that are of significant age, and / or in poor condition. When assessing a site, the suitability for all buildings, trees and bridges is assessed on a four-point scale (negligible, low, moderate and high), as outlined in the Bat Conservation Trust guidelines (2016). Surveys are usually carried out for features of moderate or high suitability for bats, in order to determine whether or not bats are present. Damage or disturbance to a bat roost can have direct or indirect impacts on any bats that may be roosting within them. It may cause death or injury to bats, or can cause them to emerge during daylight, thus exposing them to diurnal predators. Potential roost features in the study area of the KWF Grid Connection are considered in Section 7.4.1.2: Baseline Context of related Chapter 7 of this EIAR. Two building were identified in the study area: the Woodhouse Substation control building was built in 2014/15, and is constructed of modern building materials, so it was considered to have negligible suitability for roosting bats and a ruined traditional barn adjacent to the Woodhouse Windfarm entrance that is evaluated as being of low roosting potential. There are a large number of trees with the Study Area, but most are coniferous species, which are rarely used by bats and therefore these trees are considered to be negligible suitability for roosting bats. A walkover survey in 2023 identified two trees of moderate roosting potential, outside of the coniferous plantation areas, only one of these is within the Study Area and will not be directly affected by the construction of the Grid Connection. No bridges or other structures are present within the KWF Grid Connection Study Area that could be used by roosting bats.
Project Stage:	Construction stage
A: Direct/Indirect Impacts of KWF Grid Connection	**No Likely Direct Impact** because: • All buildings, trees and bridges / watercourse crossings within the study area have negligible or moderate suitability for bats and/or are outside of the construction works area.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the	**No Likely cumulative Whole Project Impact** because: • In Table 13-23 of Chapter 13: Ecological Impact Assessment for the Knocknamona Windfarm EIS, the following is noted regarding impacts on bats:

authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	"*Conifer trees offer very low potential roosting habitat for bats. Felling of conifer trees to accommodate the wind farm will have a very low impact on bats*" • In Section 8.2.6.1.1 of the Revised EIAR for the Larger Turbines it states "The authorised Knocknamona site is a small, isolated conifer plantation situated in an area of highly modified agricultural habitat. In addition, the site is of low biodiversity and ecological value and is not in or near a protected area". • In relation to Junction & Bend Widening Works, tree trimming on the 2024 on outer branches of a parallel row of conifers and pruning of 5 semi-mature willow trees will not affect bat roosting habitat as the habitat in question is not suitable as bat roosts. • Effects on Bats as a result of Authorised Knocknamona Windfarm were previously assessed in 2016 and 2022 by An Bord Pleanála and concluded to be not significant. With the addition of KWF Grid Connection (no impact), the whole project effect will also be not significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No Likely Cumulative Impact** because: • It was concluded in the Knocknamona Windfarm EIS that felling of conifer trees "*will have a very low impact on bats*" • It was noted in the Woodhouse Windfarm EIS that "*the habitats appear poor for roosting bats*" • Woodhouse Substation is considered unsuitable for roosting bats, • As KWF Grid Connection will have no likely impact on bat roosts, and any impacts to roosting bats associated with Authorised Knocknamona Windfarm will be very low, it is considered that cumulative effects of construction works for KWF Grid Connection and Authorised Knocknamona Windfarm with Woodhouse Windfarm will be very low.

A7.1 Table 13 Mammals: Bats – Severance / disruption of commuting routes and feeding areas

Impact Source	**Source: Site Clearance**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Land cover
Brief Impact Description	Bats forage and commute along hedgerows, treelines and other linear habitat features, and can be affected by the removal or modification of these features. Such changes do not kill or injure bats, but they can disrupt their behaviour, reducing the value of regular feeding areas and forcing bats to use alternate commuting routes. Significant impacts can occur where lengthy sections of hedgerow / treeline in open farmland are severed, as it may prevent bats from accessing their feeding areas, and because there may be few alternative linear features in the surrounding area. However, bats can adapt to relatively small changes in linear habitats, because most species (e.g. pipistrelles) will readily cross open gaps of 5 - 10m. The construction of the KWF Grid Connection will require the removal of some mixed broadleaved/conifer woodland habitat along the proposed route, and some short sections of hedgerow and earth bank will be removed at the Link Road. In all cases the linear working corridor will be of approx. 5 m cross-sectional width. All other sections of the KWF Grid Connection will be along existing roads and will not require the removal of any linear habitat features. During baseline bat surveys of the site, the forestry roads were found to be used by moderate numbers of common pipistrelle and soprano pipistrelle bats, while the non-forested areas are used by low numbers of Leisler's bats and pipistrelles.
Project Stage:	Construction/early Operational
A: Direct/Indirect Impacts of KWF Grid Connection	**No Likely Direct Impact** because: • The cross-sectional width of the working corridor will be approx. 5m so it is highly likely that bats will cross the gap • The KWF Grid Connection will be laid in a linear corridor through the scrub habitat, leaving an alternative linear feature on at least one side, thus increasing the local prevalence of linear habitats
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate	**No Likely** cumulative **Whole Project Impact** because: • Based on a review of the Authorised Knocknamona Windfarm planning documents, no important feeding corridors will be affected, and any forestry felling for the windfarm will continue to provide a tree line along which bats can forage • The very small scale removal of linear features for the Junction & Bend Widening Works • Effects on Bats as a result of Authorised Knocknamona Windfarm were previously assessed in 2016 and 2022 by An Bord Pleanála and concluded to be not significant. With the addition of KWF Grid Connection (no impact), the whole project effect will also be not significant. • The KWF Grid Connection will have no likely impact

turbine component access through the windfarm site entrance at Knocknaglogh Lower	
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No Likely Cumulative Impact** because: • The KWF Grid Connection will have no likely impact, • When Woodhouse Windfarm and Woodhouse Substation are also taken into account, cumulative impacts will not be greater than Imperceptible, because Woodhouse Windfarm and Woodhouse Substation have already been constructed, and the habitats along windfarm roads and around the substation compound have fully recovered. No further construction works (the period wherein severance effects would be highest) are expected in relation to these projects.

A7.1 Table 14 Mammals: Bats – Disturbance or Displacement due to Lighting

Impact Source	**Source: Artificial Lighting**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Visibility
Brief Impact Description	Bats are nocturnal animals, and typically avoid any source of natural or artificial light. Lighting near hedgerows and other semi-natural habitats can form barriers to the movement of commuting bats, and displace them from feeding areas. In addition, lighting in the vicinity of bat roosts can cause roost abandonment, reduction in numbers of individuals, and reductions in juvenile growth rates. All construction work will take place during daylight hours as part of safe working practices, so it will not be necessary to use artificial lighting at construction works areas. During the operational phase, no lighting will be required along the route of the underground cabling, and no change is expected to the existing lighting regime at the Woodhouse Substation.
Project Stage:	Construction and Operation Phases
A: Direct/Indirect Impacts of KWF Grid Connection	**No Likely Direct Impact** because: • No requirement for lighting during construction works, • No additional lighting expected for additional apparatus at Woodhouse Substation
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No Likely** cumulative **Whole Project Impact** because: • The KWF Grid Connection will have no likely impact, therefore there is no potential for cumulative impacts with Authorised Knocknamona Windfarm • There will be no lighting required at the Junction & Bend Widening Works locations • Effects on Bats as a result of Authorised Knocknamona Windfarm were previously assessed in 2016 and 2022 by An Bord Pleanála and concluded to be not significant. With the addition of KWF Grid Connection (no impact), the whole project effect will also be not significant.
C: Cumulative Impact with Woodhouse Substation and	**No Likely Cumulative Impact** because: • The KWF Grid Connection will have no likely impact • Lighting at Woodhouse Windfarm and Woodhouse Substation is restricted to aeronautical lighting on top of the turbines, and to security lighting above turbine doors and at Woodhouse Substation, both of which are on motion sensor

Woodhouse Windfarm	timers, which minimise the amount of time the lights are turned on. In addition, the use of red aviation lighting such as used at Woodhouse has been rejected as a causal mechanism for the attraction of bats (Bennett & Hale, 2014[1]).

[1] Bennett, V.J., Hale, A.M. (2014) Red aviation lights on wind turbines do not increase bat-turbine collisions. *Animal Conservation* 17 354-358.

A7.1 Table 15 Mammals: Otter - Habitat Degradation

Impact Source	**Source: Soils from construction excavations and stockpiles, fuels, oils and lubricants**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Reductions in water quality in downstream watercourses
Brief Impact Description	Reduction in Otter prey items
Project Stage:	Construction stage
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • The nearest surface watercourse to the proposed development is the Mountodell Stream (EPA code 17M03). This 1st order stream flows within 280m of the proposed development and drains an area at the central portion of the proposed KWF Grid Connection works area. • The Imperceptible effect on water quality in local surface waterbodies, as per Chapter 9: Water • the negligible level of any aquatic habitat reduction in the context of the availability of these habitats in the surrounding area.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • The Imperceptible level of effects during the construction of the Authorised Knocknamona Windfarm with the implementation of the Sediment & Erosion Control Plan (as part of planning conditions); • the negligible level of aquatic habitat reduction in the context of the availability of these habitats in the surrounding area, • In relation to Junction & Bend Widening Works their location along / adjacent to the public road corridor; the small scale of works; the temporary duration; low levels of personnel and machinery and low ecological value of habitats present. • Habitat degradation effects to Otter as a result of Authorised Knocknamona Windfarm was previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. When the additional effects of KWF Grid Connection are taken into account, the whole project effect will also not be significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No potential** for **Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative impacts to Otter during the construction of KWF Grid Connection.

A7.1 Table 16 Mammals: Otter - Disturbance/Displacement

Impact Source	**Source: Construction Noise and Visual Intrusion**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Air and visibility
Brief Impact Description	As there are no requirements for instream works or watercourse crossings, there is no potential for effects to breeding otter. A short section of underground cabling is located within 300m of a watercourse – Mountodell Stream (nearest distance 280m from KWF Grid Connection works). Disturbance/displacement effects relate to foraging or resting animals which may be present within the Mountodell Stream and associated riparian corridor. Cumulative impacts may arise where construction works for both KWF Grid Connection and Authorised Knocknamona Windfarm take place in proximity to the Mountodell Stream. The potential magnitude of any impacts is minimised by the timing of construction works which will be carried out during daylight hours – as Otters are largely nocturnal.
Project Stage:	Construction stage
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • The separation distance (280m) to the nearest watercourse (Mountodell Stream); • The carrying out of construction works during daylight hours; • The linear nature of underground cabling construction; • the reversibility of any disturbance effects with the completion of construction works.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the relatively small extent of Authorised Knocknamona Windfarm works in proximity to the Mountodell Stream • no requirement for instream works or works at watercourse crossings required for Knocknamona Windfarm • the reversibility of areas any disturbance effects with the completion of construction works. • In relation to Junction & Bend Widening Works their location along / adjacent to the public road corridor; the small scale of works; the temporary duration; low levels of personnel and machinery and low ecological value of habitats present. • Impacts to Otter as a result of Authorised Knocknamona Windfarm was previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. Due to the imperceptible level of disturbance effects of KWF Grid Connection, the whole project effect will also not be significant.
C: Cumulative Impact with Woodhouse	**No potential** for **Cumulative Impact** because:

Substation and Woodhouse Windfarm	The separation distance between Woodhouse Windfarm and Woodhouse Substation and the Mountodell Stream (>1km), or other watercourses (>300m) in the vicinity.

A7.1 Table 17 Mammals: Pine Marten and Irish Hare – Habitat loss

Impact Source	**Source: Excavations and stockpiling of soil**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Landcover
Brief Impact Description	Construction Works will involve groundworks and vegetation clearance which will result in the temporary and permanent loss of potential foraging habitat - scrub - in respect of Pine Marten and temporary loss of potential foraging/breeding habitat - grassland - in respect of Irish Hare.
Project Stage:	Construction stage
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the Local importance (lower value) of the habitats present, • the negligible level of habitat loss in the context of the availability of these habitats in the surrounding area, • the reversibility of temporary habitat loss within reinstatement of trenches and works areas.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the Local importance (lower value) of habitats lost in the Cumulative Study Area due to the construction of KWF Grid Connection and Authorised Knocknamona Windfarm, and the widening of forestry roads in the vicinity of Authorised Knocknamona Substation, • no cumulative habitat loss effect to Irish hare in the Cumulative Study Area, • the low level of habitat loss effect to Pine Marten in the Cumulative Study Area in the context of the availability of these habitats in the surrounding forestry area, • In relation Junction & Bend Widening Works their location along / adjacent to the public road corridor; the small scale of works; the temporary duration; low levels of personnel and machinery and low ecological value of habitats present. • Impacts to Pine marten as a result of Authorised Knocknamona Windfarm was previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. When the additional effects of KWF Grid Connection are taken into account, the whole project effect will also not be significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No additional Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative impacts to pine marten or Irish hare during the construction of KWF Grid Connection.

A7.1 Table 18 Mammals: Pine Marten and Irish Hare - Disturbance/Displacement

Impact Source	**Source: Construction Noise and Visual Intrusion**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Air and visibility
Brief Impact Description	Avoidance of the area during construction works
Project Stage:	Construction stage
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the Local importance (lower value) of the habitats present, • the low numbers of Pine Marten or Irish hare likely to be present at or in proximity to works areas; • the very short duration of construction works • the reversibility of any disturbance effects with the completion of construction works.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the Local importance (lower value) of habitats lost in the Cumulative Study Area due to the construction of KWF Grid Connection and Authorised Knocknamona Windfarm, and the widening of forestry roads in the vicinity of Knocknamona Substation, • the low numbers of Pine Marten or Irish hare likely to be present at or in proximity to works areas; • the very short duration of KWF Grid Connection works, and the temporary duration of Authorised Knocknamona Windfarm construction works • the reversibility of any disturbance effects with the completion of construction works. • In relation to Junction & Bend Widening Works their location along / adjacent to the public road corridor; the small scale of works; the temporary duration; low levels of personnel and machinery and low ecological value of habitats present. • Disturbance effects as a result of the Authorised Knocknamona Windfarm was previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. When the additional effects of KWF Grid Connection are taken into account, the whole project effect will also not be significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	The **Cumulative Impact will be Imperceptible** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects. and therefore there is no potential for these projects to cause cumulative disturbance impacts during the construction of KWF Grid Connection. • The Woodhouse Windfarm turbines have been operational now for some time, and it is expected that any local populations of Pine marten or Irish hare have

	acclimatized to any operational noise and operational activities, therefore it is considered that operational noise/human presence in-combination with KWF Grid Connection construction noise or human presence will not contribute to noticeable cumulative impacts

A7.1 Table 19 Mammals: Other Mammals – Habitat loss

Impact Source	**Source: Excavations and stockpiling of soil**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Landcover
Brief Impact Description	Reduction of available foraging or breeding areas due to temporary and permanent land cover change.
Project Stage:	Construction stage
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the Local importance (lower value) of the habitats present, • the negligible level of permanent habitat loss in the context of the availability of these habitats in the surrounding area, • the reversibility of temporary habitat loss within reinstatement of trenches and works areas. • Enhancement of habitats in the long term through invertebrate-friendly reinstatement of works areas and berms.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the Local importance (lower value) of habitats lost in the Cumulative Study Area due to the construction of KWF Grid Connection and Authorised Knocknamona Windfarm, and the widening of forestry roads in the vicinity of Knocknamona Substation, • the low level of habitat loss in the Cumulative Study Area in the context of the availability of these habitats in the surrounding forestry area, • In relation to Junction & Bend Widening Works their location along / adjacent to the public road corridor; the small scale of works; the temporary duration; low levels of personnel and machinery and low ecological value of habitats present. • Impacts to Red Squirrel, Badger, Hedgehog, Irish Stoat and Fallow deer as a result of the Authorised Knocknamona Windfarm was previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. When the additional effects of KWF Grid Connection are taken into account, the whole project effect will also not be significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No additional Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative habitat loss impacts to Red Squirrel, Badger, Hedgehog, Irish Stoat, or Fallow deer during the construction of KWF Grid Connection.

A7.1 Table 20 Mammals: Other Mammals - Disturbance/Displacement

Impact Source	**Source: Construction Noise and Visual Intrusion**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Air and visibility
Brief Impact Description	Avoidance of the area during construction
Project Stage:	Construction stage
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the Local importance (lower value) of the habitats present, • the negligible level of habitat loss in the context of the availability of these habitats in the surrounding area, • the reversibility of temporary habitat loss within reinstatement of trenches and works areas.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the Local importance (lower value) of habitats lost in the Cumulative Study Area due to the construction of KWF Grid Connection and Authorised Knocknamona Windfarm, and the widening of forestry roads in the vicinity of Knocknamona Substation, • the low level of habitat loss in the Cumulative Study Area in the context of the availability of these habitats in the surrounding forestry and agricultural areas, • Impacts to Red Squirrel, Badger, Hedgehog, Irish Stoat and Fallow deer as a result of the Authorised Knocknamona Windfarm were previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. The whole project effect will not be significant due to the Imperceptible loss of habitats associated with KWF Grid Connection.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No additional Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with no further construction works required, and therefore there is no potential for these projects to cause cumulative impacts during the construction of KWF Grid Connection. • The Woodhouse Windfarm turbines have been operational now for some time, and it is expected that any local populations of Red squirrel, hedgehogs, badger, Irish stoat and Fallow deer have acclimatized to any operational noise and

Evaluation of Potential Impacts to Aquatic Habitats & Species

In relation to **Aquatic Habitats & Species**, the following potential impacts were evaluated:

Potential Impacts which were evaluated	Relevant Stage of KWF Grid Connection	Evaluated in this Appendix in Table:
Decrease in instream aquatic habitat quality	Construction	A7.1, Table 21
Changes to Instream Flow Regime	Construction	A7.1, Table 22
Disturbance or Displacement to fish and aquatic species	Construction	A7.1, Table 23
Spread of Aquatic Invasive Species	Construction	A7.1, Table 24

A7.1 Table 21 Aquatic Habitats & Species: Decrease in instream aquatic habitat quality

Impact Source	**Movement of soils and machinery; Excavation works; Hydrocarbons; Reinstatement**
Impact Pathway (between Source and Sensitive Aspect)	Soils; Surface water, Runoff and surface water, Flowpaths
Brief Impact Description	The nearest surface watercourse to the proposed development is the Mountodell Stream (EPA code 17M03), which rises in the valley to the north of the Authorised Knocknamona Windfarm Substation. This 1st order stream flows within 280m of the proposed development and drains an area at the central portion of the proposed KWF Grid Connection works area. The Monageela Stream drains a small section of the KWF Grid Connection works area and rises at a point c.350m southwest of works in the vicinity of Knocknamona Substation. Works in the vicinity of Woodhouse Windfarm and Woodhouse Substation area are located within the catchment of the local Clashnadarriv Stream, which is c.1km to the west of the works at the Woodhouse Substation. Although erosion and deposition are natural process in watercourses[2], varying naturally throughout the year, additional sediment contributions entering the watercourse, such as from construction works adjacent to or upstream of individual watercourses, can have negative implications for fish and invertebrates due to physical damage and reduced feeding/foraging, as well as negative impacts due to compaction of spawning gravels and mortality impacts for salmonid eggs (affecting recruitment) and invertebrate life stages within gravel substrates (interstitial spaces). These impacts may be mobilised downstream and affect river reaches at a distance from the physical works. In addition, water quality effects due to contamination by fuels, oils or cementitious material has the potential to lead to direct toxicity events, or sub-lethal degradation of aquatic habitat quality. Some fine particulates may eventually reach the headwater streams which drain the proposed KWF Grid Connection development site. As evaluated in Chapter 9 Water of this EIAR, impacts to downstream water quality will be temporary Slight (pre-mitigation and Imperceptible (post-mitigation) due to the small scale and duration of works, and due to the attenuation provided by grassland and other vegetated areas, coupled with significant dilution, along with the fact that much water overland flow from the site would percolate to ground prior to reaching important surface waters. The magnitude of any impacts to aquatic habitat quality, and indirectly on aquatic species will be negligible, based on the Imperceptible levels of potential impacts to water quality.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • the absence of any watercourses within the construction works area boundary, • the separation distances to watercourses, being 280m at the closest point, • the Imperceptible effect on water quality,

[2] EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems

	• the Local Importance (higher value) of the local watercourses and associated aquatic habitats and fauna, which equates to a Sensitivity rating of Low. • the negligible magnitude of impacts to aquatic habitats or species with any changes barely distinguishable, approximating to the "no change" situation.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	The cumulative **Whole Project Impact will be Imperceptible** because: • the absence of any watercourses within the construction works area boundary for either KWF Grid Connection or Authorised Knocknamona Windfarm, • the separation distances to watercourses • the Imperceptible effect on water quality due to KWF Grid Connection, • the implementation of the Sediment & Erosion Control Plan for the windfarm (as per planning conditions), • In relation to Junction & Bend Widening Works the small scale and short duration of works; very small volumes of excavations/stone; • the Local Importance (higher value) of the local watercourses and associated aquatic habitats and fauna, which equates to a Sensitivity rating of Low. • the negligible cumulative magnitude of impacts to aquatic habitats or species with any changes barely distinguishable, approximating to the "no change" situation. • Impacts to Aquatic Habitats & Species as a result of the Authorised Knocknamona Windfarm was previously assessed in 2016 and 2022 by An Bord Pleanála as not significant. When the additional effects of KWF Grid Connection are taken into account, the whole project effect will also not be significant.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No additional Cumulative Impact** due to: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative impacts to Aquatic Habitats or Species during the construction of KWF Grid Connection.

A7.1 Table 22 Aquatic Habitats & Species: Changes to Instream Flow Regimes

Impact Source	**Source: Sediment, Machinery movement, Stockpiles**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: local surface water
Brief Impact Description	Aquatic species are reliant on instream flow regimes, which relate to habitat heterogeneity (riffle/glide/pool structure); along with the availability of peak flow flushes (flood/spate); the provision of flows for upstream/downstream migration (impassable barriers); and avoidance of channel constriction during low flow. Changes to the morphology of a watercourse (shape of a watercourse channel, its bed and banks) can have indirect effects to flow regimes. Morphology can be affect by construction works, through instream works and sediment deposition. There is no requirement for instream works for KWF Grid Connection, and any impacts on downstream watercourses due to sediment deposition has been evaluated as Imperceptible (see Chapter 9: Water of this EIAR)., therefore no changes to flow regimes are expected.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	The **Direct Impact will be Imperceptible** because: • No requirement for instream works - the nearest surface watercourse is 280m from works. • Imperceptible impacts to downstream watercourses (as per Chapter 9 Water)
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower.	The cumulative **Whole Project Impact will be Imperceptible** because: • No requirement for instream works for either KWF Grid Connection or the Authorised Knocknamona Windfarm, • Imperceptible impacts to downstream watercourses (as per Chapter 9 Water)
C: Cumulative Impact with Woodhouse	**No additional Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation

Substation and Woodhouse Windfarm	compound. No further construction works or instream works are expected in relation to these projects, and therefore there is no potential for these projects to cause cumulative impacts during the construction of KWF Grid Connection.

A7.1 Table 23 Aquatic Habitats & Species: Disturbance/displacement to fish and aquatic species

Impact Source	**Source: Operating machinery; Excavation works; Noise and human disturbance;**
Impact Pathway (between Source and Sensitive Aspect)	Pathway: Surface water; Direct contact; Ground and air vibrations
Brief Impact Description	Aquatic species can be disturbed or displaced by works within or in close proximity to a watercourse. Fish are likely to mobilise outside of their territories due to human disturbance but will return once the disturbance effect diminishes. Aquatic invertebrates are less sensitive to disturbance and displacement arising from human activity. As there is no requirement for instream works or works in close proximity to a watercourse, the magnitude of disturbance/displacement impacts is 'none'.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	**No Direct Impact** because: • No requirement for instream works or works in close proximity - the nearest surface watercourse is 280m from works.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No** cumulative **Whole Project Impact** because: • No requirement for instream works for either KWF Grid Connection or Knocknamona Windfarm.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No cumulative impact** because: • No requirement for instream works for these projects.

A7.1 Table 24 Aquatic Habitats & Species: Spread of aquatic invasive species

Impact Source	**Excavation works**
Impact Pathway (between Source and Sensitive Aspect)	Surface water; Movement of soils and machinery
Brief Impact Description	Most aquatic invasive species require the water medium for survival. The absence of waterbodies at the proposed development site precludes the establishment of such plants, or survival of any non-native animal species. The intervening distance to the nearest watercourses and avoidance of these fluvial areas precludes the spread of any imported non-native invasive flora/fauna to watercourses downslope of the site.
Project Stage:	Construction
A: Direct/Indirect Impacts of KWF Grid Connection	**No likely Direct Impact** because: • No requirement for instream works or works in close proximity - the nearest surface watercourse is 280m from works. • No records of invasive species.
B: Cumulative Impact of the Whole Project - KWF Grid Connection with the authorised Knocknamona Windfarm i.e. the windfarm; amendments to the windfarm to provide for larger turbines and Junction & Bend Widening Works to facilitate turbine component access through the windfarm site entrance at Knocknaglogh Lower	**No likely** cumulative **Whole Project Impact** because: • No requirement for instream works for either KWF Grid Connection or Knocknamona Windfarm.
C: Cumulative Impact with Woodhouse Substation and Woodhouse Windfarm	**No likely Cumulative Impact** because: • Woodhouse Windfarm and Woodhouse Substation are already constructed, with habitats fully revegetated along windfarm roads and around the substation compound. No further construction works are expected in relation to these projects, • No requirement for instream works for these projects

Appendix 7.2: Bird Survey Data 2015 to 2023

The data and descriptions in this appendix have informed Chapter 7: Biodiversity.

The information presented in this Appendix 7.2 is outlined below.

Appendix Subsection	Title
A7.2.1	2021 Whooper Swan Survey Data (Inis Environmental Consultants)
A7.2.2	2020/2021 Data extract from Ornithological Surveys & Evaluation (Doherty Environmental Consultants)
A7.2.3	2019 Bird Survey Data (Inis Environmental Consultants)
A7.2.4	2015 Bird Survey Data (Malachy Walsh & Partners, engineering and environmental consultancy)
A7.2.5	2022/2023 Whooper Swan Survey Data (Inis Environmental Consultants)
A7.2.6	2023 Bird Survey Data (Inis Environmental Consultants)

Appendix 7.2: Bird Survey Data 2015 to 2023

A7.2.1

2021 Whooper Swan Survey Data (Inis Environmental Consultants)

Knocknamona

Appendix A2 Whooper Swan Survey 2021: Survey Results

February 2021

INIS Environmental Consultants Ltd.

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Gort Road,
Ennis,
County Clare
Ireland.

Table 1. Date and Location of Whooper Swan Surveys: January and February 2021

Site Location	Site Name	Date Surveyed
Site 1	*Deerpark North*	Dusk 26/01/2021, Dawn 27/01/2021, Dusk 01/02/2021, Dawn 02/02/2021
Site 2	*Dromana*	Dusk 26/01/2021, Dawn 27/01/2021, Dusk 01/02/2021, Dawn 02/02/2021
Site 3	/l·YLJKNWŜ	Dusk 26/01/2021, Dawn 27/01/2021, Dusk 01/02/2021, Dawn 02/02/2021
Site 4	Yy2Ǒ]l·fl·Kl·NJl·	Dusk 27/01/2021, Dawn 28/01/2021, Dusk 02/02/2021, Dawn 03/02/2021
Site 5	*Cloghbog*	Dusk 27/01/2021, Dawn 28/01/2021, Dusk 02/02/2021, Dawn 03/02/2021
VP 1		Dusk 26/01/2021, Dawn 27/01/2021, Dusk 27/01/2021, Dawn 28/01/2021, Dusk 01/02/2021, Dawn 02/02/2021, Dusk 02/02/2021, Dawn 03/02/2021
VP 2		Dusk 26/01/2021, Dawn 27/01/2021, Dusk 27/01/2021, Dawn 28/01/2021, Dusk 01/02/2021, Dawn 02/02/2021, Dusk 02/02/2021, Dawn 03/02/2021

Table 2. Number and Flight Heights of Whooper Swan Surveys: January and February 2021

VP Number	Site Number	Date	Watch Period		Species	Number Observed	Time of sighting	On/ Off Site	Flight Heights and times (m)							Bird Notes
			Start Time	End Time					<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	

	2	26/01/2021	16:07:00	18:37:00	Nil Sightings											Spp: 4 Herons feeding
	1	26/01/2021	16:05:00	18:35:00	Nil Sightings											
2		26/01/2021	16:00:00	18:30:00	Nil Sightings											Nil Sightings
1		26/01/2021	16:00:00	18:30:00	Nil Sightings											Spp: barn owl, buzzard, hooded crow
	3	26/01/2021	16:05:00	18:35:00	Whooper Swan_WS	105	16:05:00	On								Flock feeding in agricultural land
	3	26/01/2021	16:05:00	18:35:00	Whooper Swan_WS	4	17:48:00	On		24	5					Heading east, lost sight behind treeline
	3	26/01/2021	16:05:00	18:35:00	Whooper Swan_WS	12	18:01:00	On		30	2					low light x fog rounding in hindered line of sight @ 18:05 most WS still present at end of survey
	2	27/01/	07:1	09:3	Whooper	14	09:21:00	On		12						14 Whooper Swans flying in V formation west to east

		2021	7:00	7:00	Swan_WS											
	1	27/01/2021	07:17:00	09:47:00	Whooper Swan_WS	80	08:45:00	On								Changed position on hearing swans (8:30), large group feeding
	1	27/01/2021	07:17:00	09:47:00	Whooper Swan_WS	13	09:01:00	On								smaller such group feeding
	1	27/01/2021	07:17:00	09:47:00	Whooper Swan_WS	13	09:05:00	On	10							Group of 13 flew short distance to larger group
	1	27/01/2021	07:17:00	09:47:00	Whooper Swan_WS	12	09:15:00	Off/On	10	5						12 flew in from north east and joined larger group
	1	27/01/2021	07:17:00	09:47:00	Whooper Swan_WS	1	09:16:00	Off/On	10	5						Single swan joined from NE
	1	27/01/2021	07:17:00	09:47:00	Whooper Swan_WS	120	09:17:00	Off	10							Whole group (120) took off to NE
2		27/01/2021	07:17:00	09:47:00	Whooper Swan_WS	2	07:28:00	On	5							Two Whoopers flying over head and north of VP 2, towards site 5 and VP1. Flew over grassland for 5 seconds.

1		27/01/2021	07:15:00	09:45:00	Nil Sightings											Nil Sightings
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	6	08:08:00	On		5	10	17				Swans present when started survey, mist lingering on fileds so cant see them. Joining others in field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	6	08:19:00	On			14					Joining others in field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	20	08:28:00	On			9					Leaving field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	9	08:28:00	On			10					Leaving field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	5	08:40:00	On			5	26				Leaving field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	2	08:42:00	On			18					Leaving field, lost sight behind trees

	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	5	08:46:00	On		39					Leaving field, lost sight behind trees. 30 approx in field @08:48 as fog leaves (feeding)
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	4	09:03:00	On		20	3	40			Leaving field, lost sight behind tree line
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	12	09:07:00	On			39				Leaving field, lost sight behind tree line
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	14	09:11:00	On			39				Leaving field, lost sight behind tree line
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	4	09:15:00	On		34					Leaving field, lost sight behind tree line
	3	27/01/2021	07:20:00	09:50:00	Whooper Swan_WS	84	09:22:00	On	2	10	10	2			Flock landing in field
	4	27/01/2021	16:14:00	18:44:00	Nil Sightings										

2		27/01/2021	16:09:00	18:39:00	Nil Sightings											
	5	27/01/2021	16:09:00	18:39:00	Whooper Swan_WS	7	17:42:00	On/off		9						group of 7 swans flew overhead (G) before flying out of view
1		27/01/2021	16:10:00	18:40:00	Nil Sightings											
	4	28/01/2021	07:15:00	09:45:00	Nil Sightings											
2		28/01/2021	07:15:00	09:45:00	Nil Sightings											
	5	28/01/2021	07:17:00	09:37:00	Whooper Swan_WS	6	07:54:00	On		7						Whooper swans (6) flying in formation over RG (7secs)
	5	28/01/2021	07:17:00	09:37:00	Whooper Swan_WS	4	07:57:00	Off/On		7						Whooper swans (4) flying in formation over RG(7 secs)
	5	28/01/	07:1	09:3	Whooper	3	08:03:00	On		9						Whooper swans (3) flying in formation over RG(9 secs)

		2021	7:00	7:00	Swan_WS											
	5	28/01/2021	07:17:00	09:37:00	Whooper Swan_WS	8	08:11:00	On		8						Whooper swans (8) flying in formation over RG(8 secs)
	5	28/01/2021	07:17:00	09:37:00	Whooper Swan_WS	3	08:20:00	On		5						Whooper swans (3) flying in formation over RG(5 secs)
1		28/01/2021	07:15:00	09:55:00	Nil Sightings											
	3	01/02/2021	16:18:00	18:48:00	Whooper Swan_WS	12	17:57:00	On			34					flock leaving agricultural pasture. Approx 24 WS counted (feeding)
1		01/02/2021	16:19:00	18:39:00	Nil Sightings											
	1	01/02/2021	16:18:00	18:48:00	Nil Sightings											
	2	01/02/2021	16:18:00	18:48:00	Nil Sightings											

2		01/02/2021	16:18:00	18:50:00	Nil Sightings											
	3	02/02/2021	07:09:00	09:39:00	Whooper Swan_WS	13	07:43:00	On			17					Flying over agricultural fields
	3	02/02/2021	07:09:00	09:39:00	Whooper Swan_WS	2	07:45:00	On				27				Flying over agricultural fields
	3	02/02/2021	07:09:00	09:39:00	Whooper Swan_WS	8	08:11:00	On			10	33				Flying over agricultural fields, approx 38 WS counted (feeding)
1		02/02/2021	07:09:00	09:39:00	Nil Sightings											
	1	02/02/2021	07:09:00	09:39:00	Whooper Swan_WS	2	09:15:00	Off/On	20							2 whoopers flew overhead, heading NW, disappeared from sight over hill (flight over agricultural grassland)
	2	02/02/2021	07:09:00	09:39:00	Nil Sightings											

2		02/02/2021	07:10:00	09:40:00	Nil Sightings											
	5	02/02/2021	16:20:00	18:50:00	Whooper Swan_WS	8	18:01:00	On			11					WS (8) flying over GR for 11 secs
	4	02/02/2021	16:20:00	18:50:00	Nil Sightings											
1		02/02/2021	16:21:00	18:51:00	Nil Sightings											
2		02/02/2021	16:20:00	18:50:00	Nil Sightings											
	5	03/02/2021	07:07:00	09:37:00	Nil Sightings											
	4	03/02/2021	07:08:00	09:38:00	Nil Sightings											
1		03/02/	07:0	09:3	Whooper	34	08:14:00	Off	5							Flying low to ground and landing in agricultural field

		2021	7:00	7:00	Swan_WS											
2		03/02/2021	07:09:00	09:39:00	Nil Sightings											

Table 3. Weather Conditions of Whooper Swan Surveys: January and February 2021

VP Name	Site Number	Date	Start Time	End Time	Rain	Cloud	Visibility (km)	Wind Speed	Wind Direction	Temp.	Bird Notes
	2	26/01/2021	16:07:00	18:37:00	None	8/8	10	F1	W	9	Spp: 4 Herons feeding
	1	26/01/2021	16:05:00	18:35:00	Dry	8/8	5	F1	SE	11	
2		26/01/2021	16:00:00	18:30:00	Dry	8/8	2	F2	WSW	11	Nil Sightings
1		26/01/2021	16:00:00	18:30:00	None	8/8	5	F2	W	11	Spp: barn owl, buzzard, hooded crow
	3	26/01/2021	16:05:00	18:35:00	None	8/8	3	F1	W	11	Flock feeding in agricultural land

	3	26/01/2021	16:05:00	18:35:00	None	8/8	3	F1	W	11	Heading east, lost sight behind treeline
	3	26/01/2021	16:05:00	18:35:00	None	8/8	3	F1	W	11	low light x fog rounding in hindered line of sight @ 18:05 most WS still present at end of survey
	2	27/01/2021	07:17:00	09:37:00	None	8/8	4	F1	SW	9	14 Whooper Swans flying in V formation west to east
	1	27/01/2021	07:17:00	09:47:00	Dry	8/8	2	F1	E	9	Changed position on hearing swans (8:30), large group feeding
	1	27/01/2021	07:17:00	09:47:00	Dry	8/8	2	F1	E	9	smaller such group feeding
	1	27/01/2021	07:17:00	09:47:00	Dry	8/8	2	F1	E	9	Group of 13 flew short distance to larger group
	1	27/01/2021	07:17:00	09:47:00	Dry	8/8	2	F1	E	9	12 flew in form north east and joined larger group
	1	27/01/2021	07:17:00	09:47:00	Dry	8/8	2	F1	E	9	Single swan joined from NE
	1	27/01/2021	07:17:00	09:47:00	Dry	8/8	2	F1	E	9	Whole group (120) took off to NE
2		27/01/2021	07:17:00	09:47:00	Dry	8/8	<1	F2	S	10	Two Whoopers flying over head and north of VP 2, towards site 5 and VP1. Flew over grassland for 5 seconds.

1		27/01/2021	07:15:00	09:45:00	None	8/8	<1	F2	SW	9	Nil Sightings
	3	27/01/2021	07:20:00	09:50:00	None	8/8	<1	F1	SSW	8	Swans present when started survey, mist lingering on fileds so cant see them. Joining others in field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	None	8/8	<1	F1	SSW	8	Joining others in field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	None	8/8	<1	F1	SSW	8	Leaving field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	None	8/8	<1	F1	SSW	8	Leaving field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	None	8/8	<1	F1	SSW	8	Leaving field, lost sight in fog
	3	27/01/2021	07:20:00	09:50:00	None	8/8	1	F1	SSW	9	Leaving field, lost sight behind trees
	3	27/01/2021	07:20:00	09:50:00	None	8/8	1	F1	SSW	9	Leaving field, lost sight behind trees. 30 approx in field @08:48 as fog leaves (feeding)
	3	27/01/2021	07:20:00	09:50:00	None	8/8	1	F1	SSW	9	Leaving field, lost sight behind tree line
	3	27/01/2021	07:20:00	09:50:00	None	8/8	1	F1	SSW	9	Leaving field, lost sight behind tree line

	3	27/01/2021	07:20:00	09:50:00	None	8/8	2	F1	SSW	9	Leaving field, lost sight behind tree line
	3	27/01/2021	07:20:00	09:50:00	None	8/8	2	F1	SSW	9	Leaving field, lost sight behind tree line
	3	27/01/2021	07:20:00	09:50:00	None	8/8	2	F1	SSW	9	Flock landing in field
	4	27/01/2021	16:14:00	18:44:00	Occasional showers	8/8	5	F1	S	9	
2		27/01/2021	16:09:00	18:39:00	Occasional showers	8/8	5	F1	SW	10	
	5	27/01/2021	16:09:00	18:39:00	Heavy Showers	8/8	1	F2	SSE	9	Group of 7 swans flew overhead (G) before flying out of view
1		27/01/2021	16:10:00	18:40:00	Occasional showers	8/8	<1	F2	SW	9	
	4	28/01/2021	07:15:00	09:45:00	None	6/8	5	F1	SW	8	
2		28/01/2021	07:15:00	09:45:00	None	6/8	5	F1	SW	8	
	5	28/01/2021	07:17:00	09:37:00	None	7/8	8	F1	SW	8	Whooper swans (6) flying in formation over RG (7secs)

	5	28/01/2021	07:17:00	09:37:00	None	7/8	8	F1	SW	8	Whooper swans (4) flying in formation over RG(7 secs)
	5	28/01/2021	07:17:00	09:37:00	None	7/8	8	F1	SW	8	Whooper swans (3) flying in formation over RG(9 secs)
	5	28/01/2021	07:17:00	09:37:00	None	7/8	8	F1	SW	8	Whooper swans (8) flying in formation over RG(8 secs)
	5	28/01/2021	07:17:00	09:37:00	None	7/8	8	F1	SW	8	Whooper swans (3) flying in formation over RG(5 secs)
1		28/01/2021	07:15:00	09:55:00	None	8/8	10	F1	SW	9	
	3	01/02/2021	16:18:00	18:48:00	Drizzle	8/8	1	F1	S	8	flock leaving agricultural pasture. Approx 24 WS counted (feeding)
1		01/02/2021	16:19:00	18:39:00	Drizzle	8/8	1	F1	SSE	8	
	1	01/02/2021	16:18:00	18:48:00	Misty	8/8	2	F1	SE	6	
	2	01/02/2021	16:18:00	18:48:00	Misty	8/8	5	F1	SE	6	
2		01/02/2021	16:18:00	18:50:00	Constant	8/8	<1	F3	SSE	10	

	3	02/02/2021	07:09:00	09:39:00	Occasional showers	8/8	2	F2	S	10	Flying over agricultural fields
	3	02/02/2021	07:09:00	09:39:00	Occasional showers	8/8	2	F2	S	10	Flying over agricultural fields
	3	02/02/2021	07:09:00	09:39:00	Occasional showers	8/8	2	F2	S	10	Flying over agricultural fields, approx 38 WS counted (feeding)
1		02/02/2021	07:09:00	09:39:00	None	8/8	2	F2	S	9	
	1	02/02/2021	07:09:00	09:39:00	Occasional showers	8/8	10	F1	S	6	2 whoopers flew overhead, heading NW, disappeared from sight over hill (flight over agricultural grassland)
	2	02/02/2021	07:09:00	09:39:00	Occasional showers	8/8	5	F1	S	6	
2		02/02/2021	07:10:00	09:40:00	Dry	8/8	1	F3	SSW	9	
	5	02/02/2021	16:20:00	18:50:00	None	8/8	5	F2	SSW	10	WS (8) flying over GR for 11 secs
	4	02/02/2021	16:20:00	18:50:00	None	8/8	5	F1	SW	9	
1		02/02/2021	16:21:00	18:51:00	Occasional showers	8/8	5	F2	SW	9	

2		02/02/2021	16:20:00	18:50:00	Drizzle	8/8	5	F1	SW	8	
	5	03/02/2021	07:07:00	09:37:00	None	2/8	5	F1	SW	4	
	4	03/02/2021	07:08:00	09:38:00	None	2/8	8	F1	SW	4	
1		03/02/2021	07:07:00	09:37:00	None	1/8	10	F1	SSW	4	Flying low to ground and landing in agricultural field
2		03/02/2021	07:09:00	09:39:00	Dry	1/8	10	F1	SW	3	

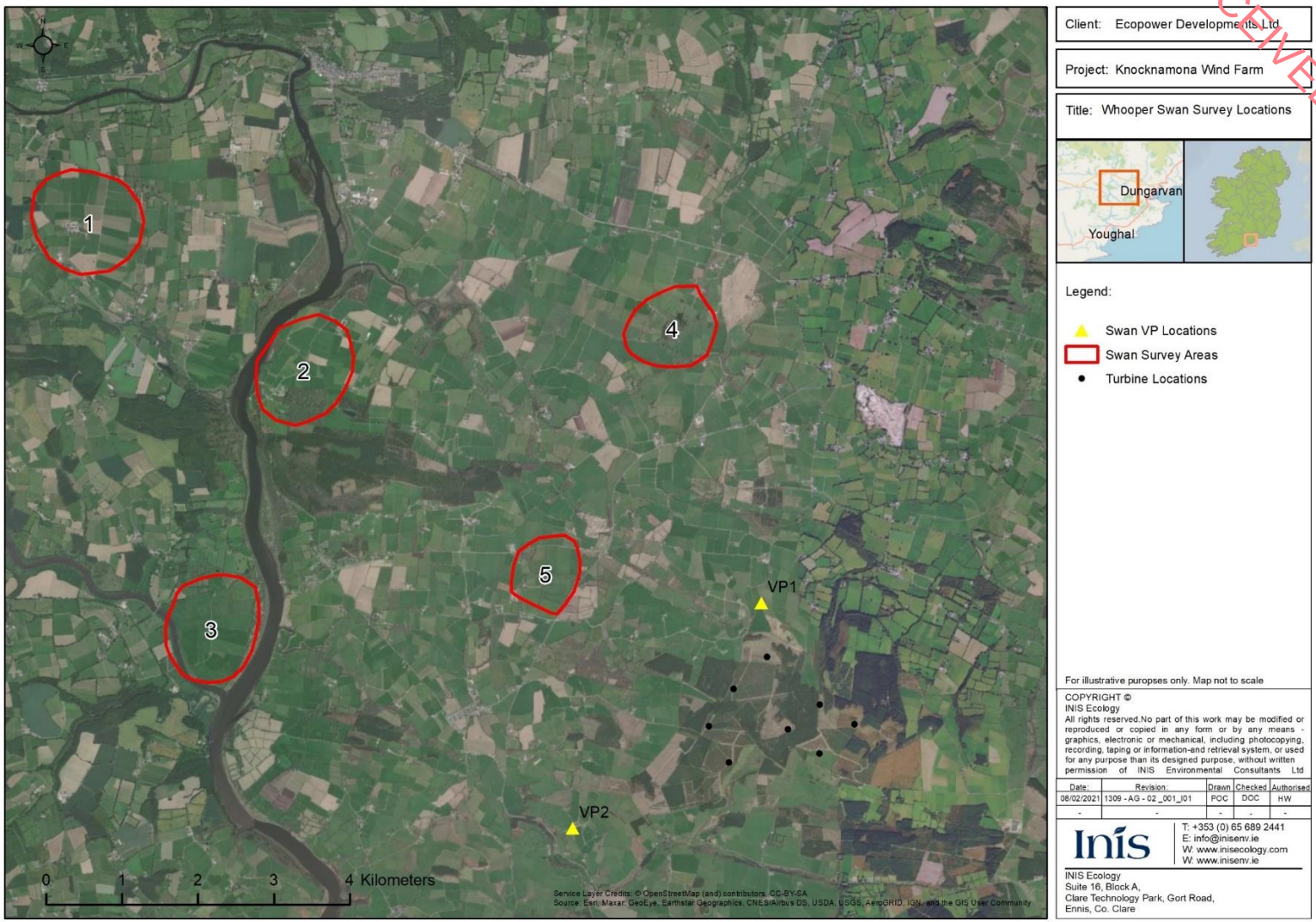


Figure 1. Whooper Swan Survey Locations

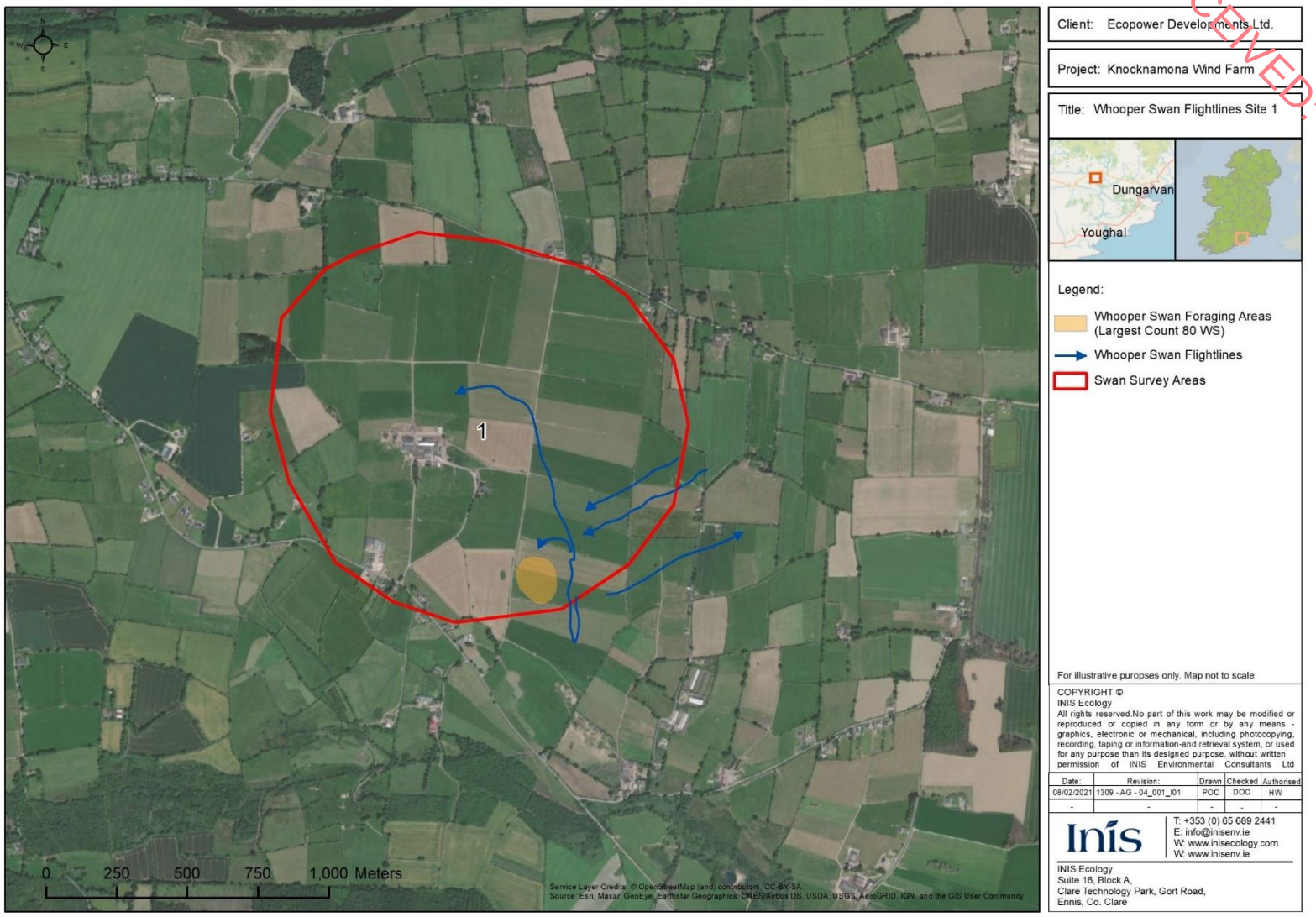


Figure 2. Whooper Swan Flightlines Site 1

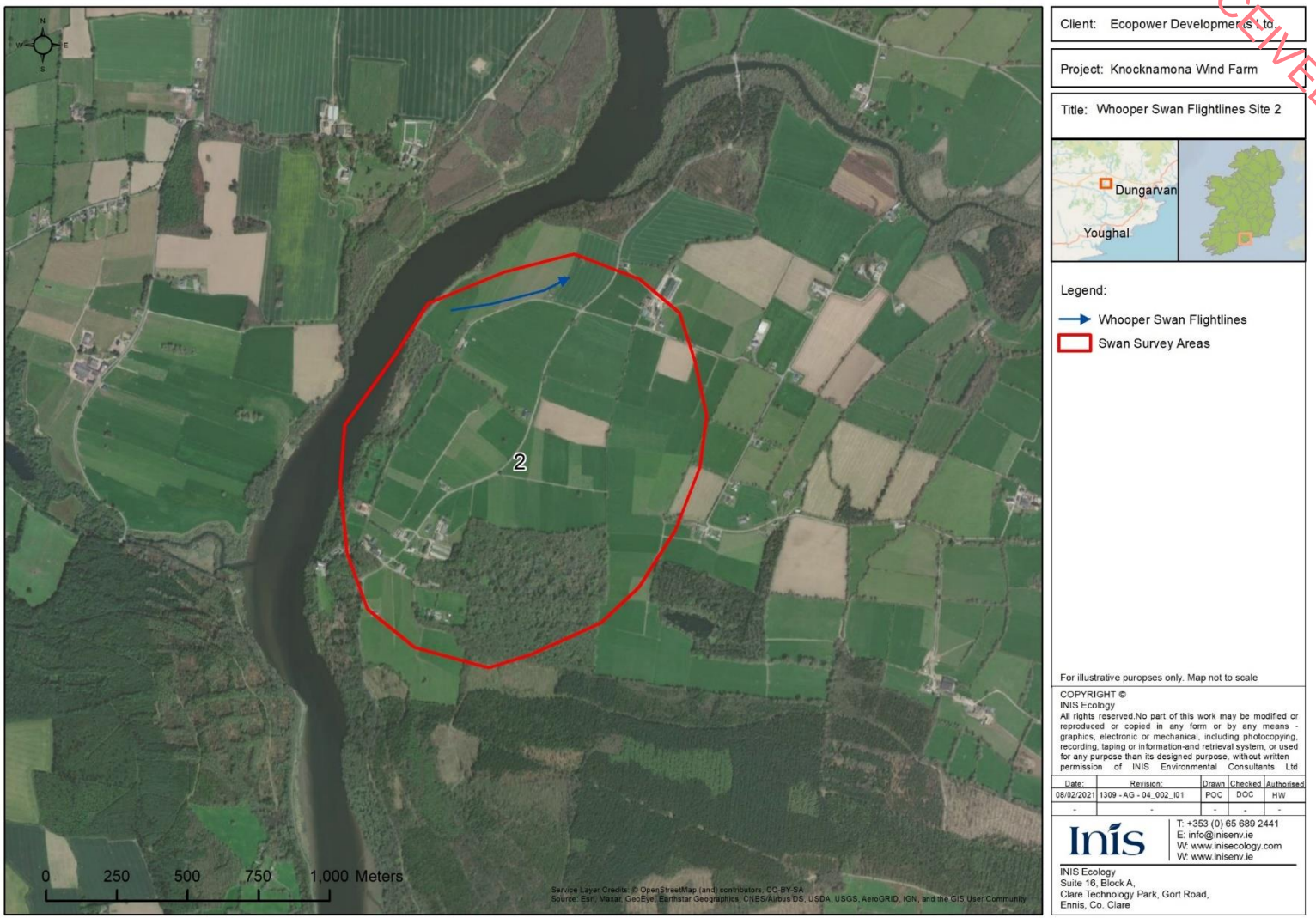


Figure 3. Whooper Swan Flightlines Site 2

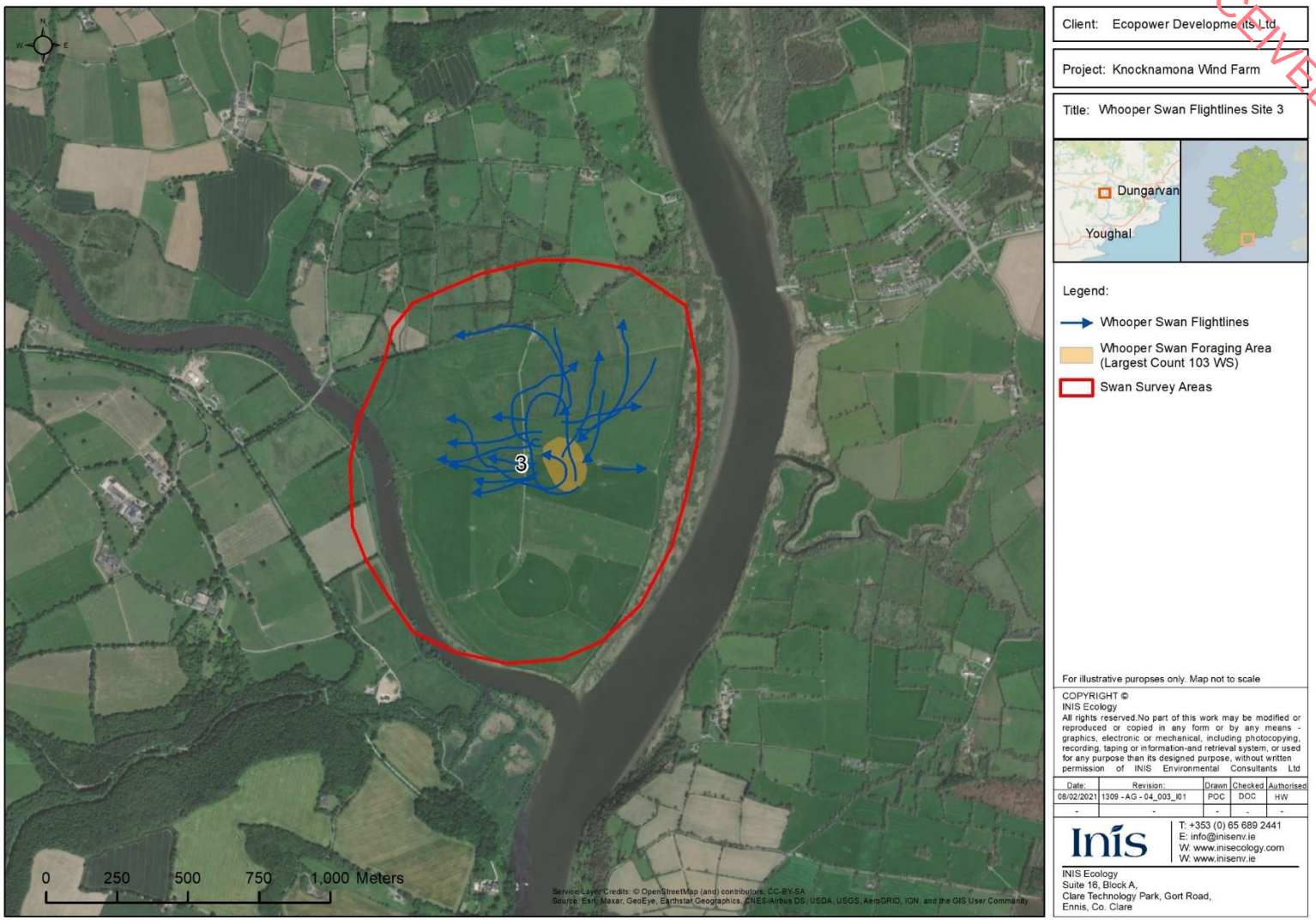


Figure 4. Whooper Swan Flightlines Site 3

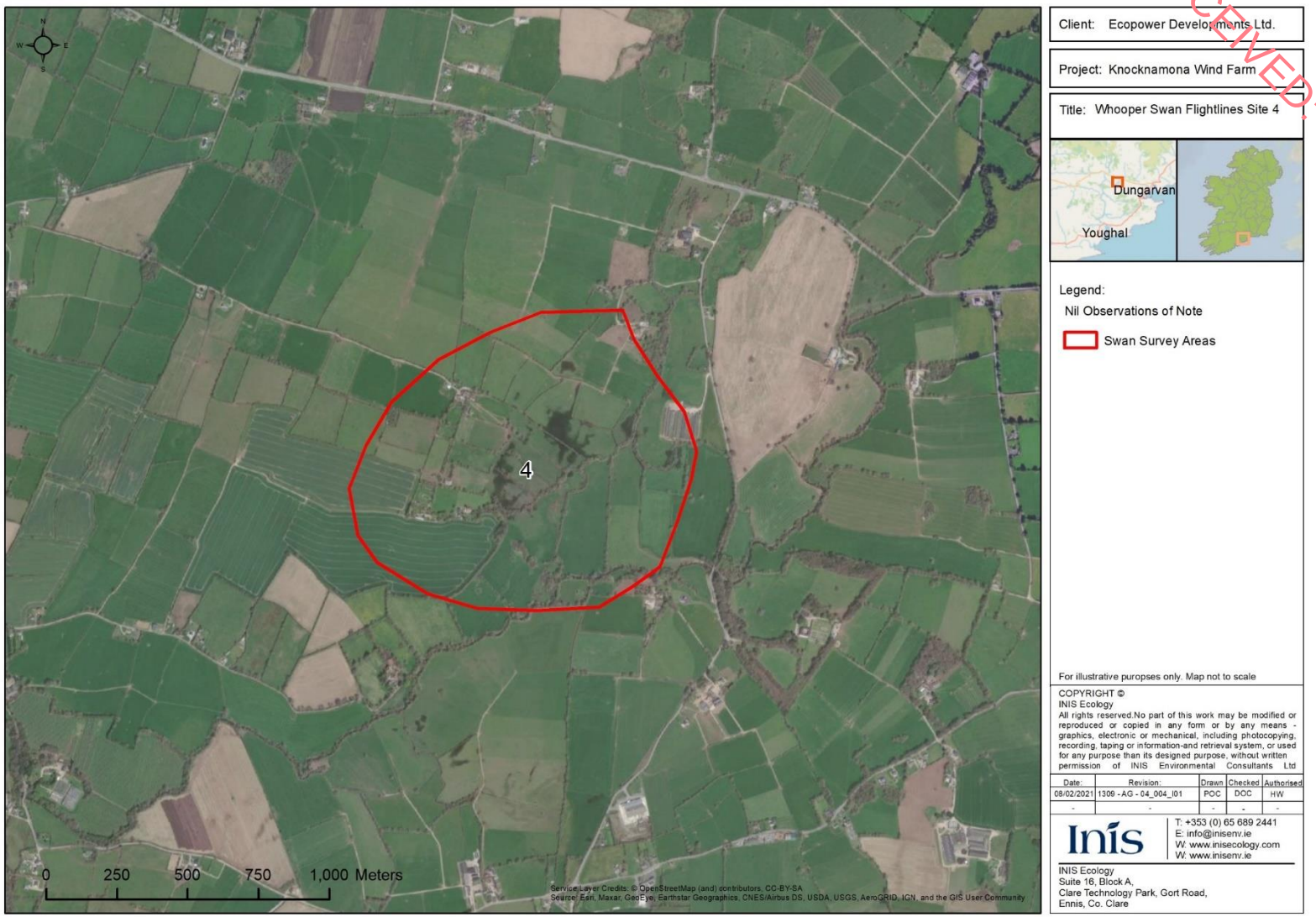


Figure 5. Whooper Swan Flightlines Site 4

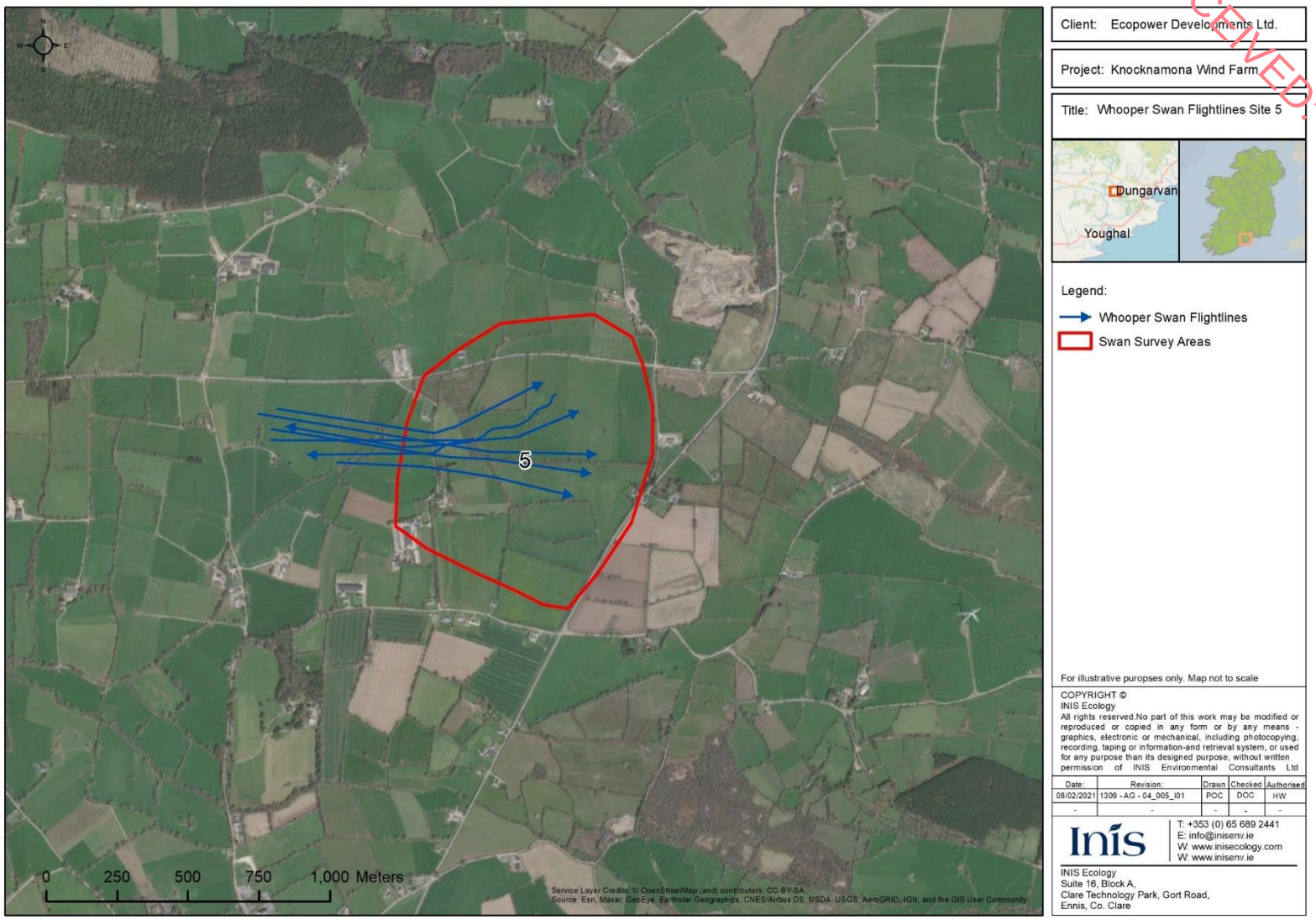


Figure 6. Whooper Swan Flightlines Site 5

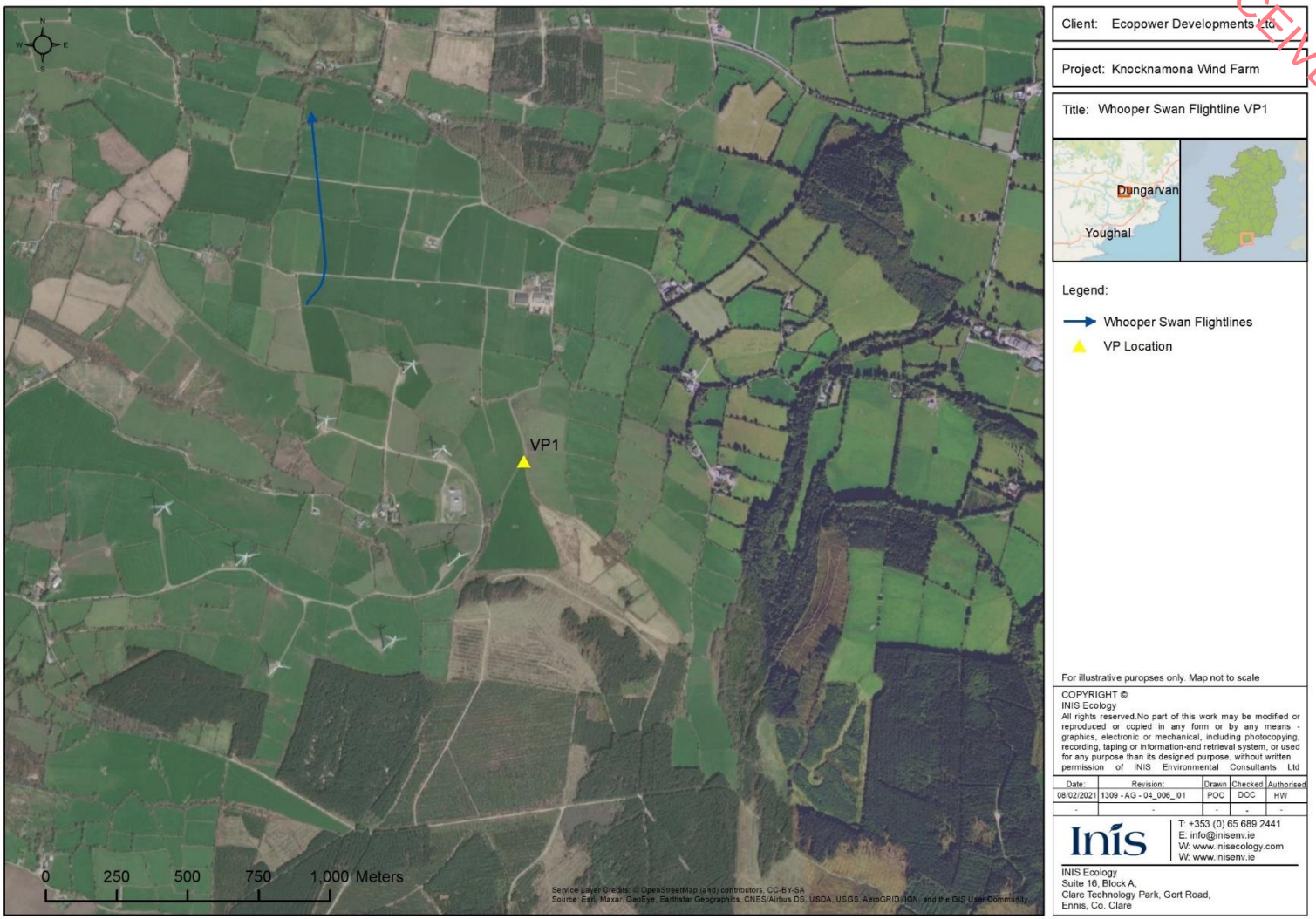


Figure 7. Whooper Swan Flightlines VP 1

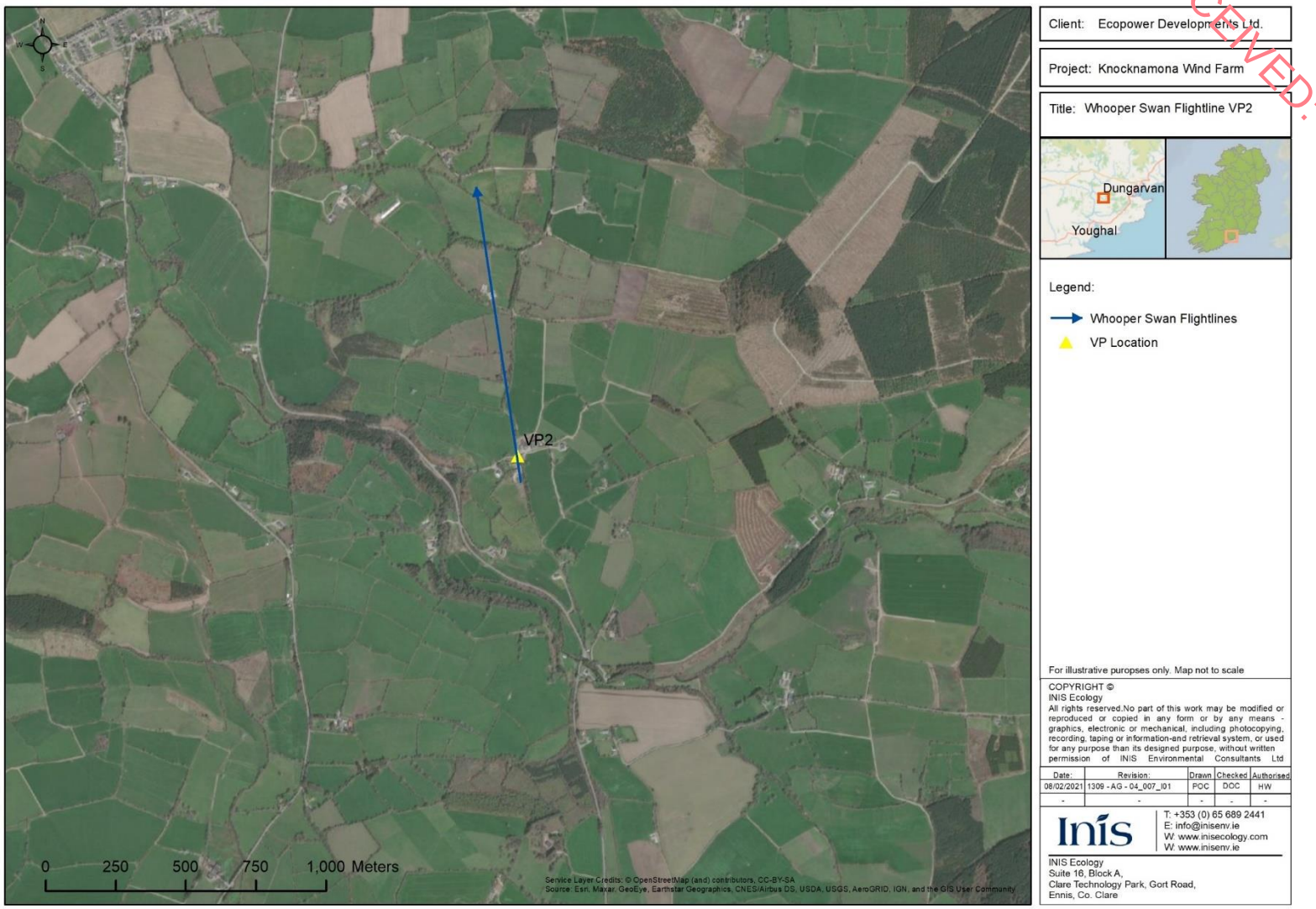


Figure 8. Whooper Swan Flightlines VP

Appendix 7.2: Bird Survey Data 2015 to 2023

A7.2.2

2020/2021 Data extract from Ornithological Surveys & Evaluation

Doherty Environmental Consultants Ltd

Flightlines recorded during 2018 surveys are included in Annex II, Figure 5.4.

5.2 2020 BREEDING SEASON SURVEY RESULTS

5.2.1 Breeding Season Vantage Point Survey Results

Table 5.3 provide details of the results of the Vantage Point Surveys undertaken at the Knocknamona Windfarm site and surrounding between April and August 2020. Flight lines of all activity associated with sensitive target species, secondary target species and/or other raptor or wetland bird species are illustrated on map figures in Annex II, Figures 5.1 to 5.3.

Table 5.3: Details of Flight Paths recorded during Vantage Point Surveys

Date	VP No	Species	Flight No. (AnnexII)	Duration (seconds)	Flight Height	Description
22/04/2020	1	Kestrel		240	10 to 15m	Individual hunting
22/04/2020	1	Buzzard		360	20 to 40m	Individual hunting
28/04/2020	2	Kestrel		240	20m to 25m	Individual hunting
28/04/2020	2	Buzzard		60	10m	Individual Flying
28/04/2020	2	Buzzard		280	10 to 30m	Individual hunting
28/04/2020	2	Buzzard		240	20m	Individual hunting
29/04/2020	2	Kestrel		840	15m to 20	Individual hunting
29/04/2020	2	Buzzard		120	50m	Individual hunting
29/04/2020	2	Buzzard		480	10 to 100m	Individual circling
30//04/2020	3	No sightings				
06/05/2020	1	Buzzard		300	20m	Individual hunting
06/05/2020	1	Buzzard		120	10m	Individual hunting
13/05/2020	1	Kestrel	1	260	40 to 120m for 45 sec.; >120 for remaining 215 sec.	One male observed flying to the west of VP1
13/05/2020	3	Kestrel	2	255	40 - 120 for 75 sec; ascended to >120m for remaining 185 sec.	Individual hunting
13/05/2020	3	Kestrel	3	260	40 - 120 for first 90 sec.; descended to 20 - 40m for 30 sec.; ascended to 40 - 120m for remaining 140 sec.	Individual hunting
13/05/2020	3	Kestrel	4	260	40 - 120m for 75 sec.; 20 - 40m for 15 sec; <20m for 30 sec; 20 - 40m for 15 sec; 40 -	Individual hunting

Date	VP No	Species	Flight No. (AnnexII)	Duration (seconds)	Flight Height	Description
					120m for 15 sec; >120m for 105 sec.	
13/05/2020	3	Kestrel	5	100	40 - 120m for 75 sec.; 20 - 40 sec for 25 sec.	Individual hunting
13/05/2020	3	Kestrel	6	130	40 - 120m for duration of flight.	Individual hunting
25/06/2020	3	Kestrel	7	135	20 - 40m for 60 sec.; <20m for 30 sec; 20 - 40m for 45 sec.	One male huinting
25/06/2020	3	Kestrel	8	75	20 - 40m for 60 sec; <20m for 15 sec.	One male huinting
25/06/2020	1	Buzzard	9	255	<20m for 30 sec.; 20 - 40m for 30 sec.; <20m for 45 sec; 20 - 40m for 30 sec.; 40 - 120m for 45 sec.; >120m for 75 sec.	Pair of buzzards
25/06/2020	1	Buzzard	10	90	<20m for 30 sec.; 20 - 40m for 30 sec.; <20m for 15 sec.; 20 - 40m for 15 sec.	One individual diverged in flight from pair at flight 9
25/06/2020	2	Buzzard	11	255	<20m for 30 sec.; 20 - 40m for 45 sec.; 40 - 120m for 60 sec.; >120m for 120 sec.	Pair calling and circling together
25/06/2020	2	Buzzard	12	75	>120m for duration of flight	Individual flying at height.
25/06/2020	3	Buzzard	13	255	40 - 120m for 45 sec.; >120 for 30 sec.; 40 - 120m for 30 sec.; >120m for 150 sec.	Pair in flight
21/07/2020	1	Buzzard	14	55	>120 for duration of flight.	Individual flying at height at distance
21/07/2020	1	Buzzard	15	30	<20m for 30m.	individual Buzzard observed flying short distance at low height. Perched on branch for conifer tree before losing sight.
21/07/2020	1	Buzzard	16	45	<20m for duration	Individual seen perched on tree along side public road. Flew south and mobbed by hooded crows

Date	VP No	Species	Flight No. (AnnexII)	Duration (seconds)	Flight Height	Description
21/07/2020	1	Kestrel	17	30	<20m for duration	Kestrel being mobbed by hooded crows
23/07/2020	3	Kestrel	18	135	40 - 120m for duration of flight.	Individual commuting
23/07/2020	3	Kestrel	19		40 - 120m for 15 sec.; 20 - 40 for 15 sec.; at ground for 15 sec; <20m for 15 sec.; at ground for 15 sec.; 20 - 40m for 15 sec.	Individual kestrel observed flying low hunting and taking prey
23/07/2020	3	Kestrel	20	30	<20m for duration of flight	individual flushed by fallow deer in forestry
23/07/2020	3	Buzzard	21	105	20 - 40m for duration of flight	commuting at tree top height over forestry
23/07/2020	3	Buzzard	22	255	20 - 40m for 60 sec.; <20m for 105 sec.; 20 - 40m for 90 sec.	Flying at tree top height and descended into a clearing
23/07/2020	3	Buzzard	23	255	<20m for 15 sec.; 20 - 40m for 15 sec; 40 - 120m for 30 sec.; >120m for 195 sec.	individual circling over forestry
23/07/2020	3	Buzzard	24	260	>120m for duration of flight	Individual circling at height over forestry
23/07/2020	3	Kestrel	25	260	20 - 40m for duration of flight	Individual hunting.
23/07/2020	3	Buzzard	26		<20m for 105 sec.; 20 - 40m for 60 sec.	Individual perched on tree before flying.
23/07/2020	3	Buzzard	27	270	40 - 120m for 60 sec.; >120 for 210 sec.	Individual flying at height over forestry
23/07/2020	2	Kestrel	28	255	40 - 120m for 60 sec.; >120m for 15 sec.; 40 - 120m for 30 sec.; >120m for 30 sec.; 20 - 40m for 90 sec.; 40 - 120m for 30 sec.	Individual hunting
23/07/2020	2	Kestrel	29	255	40 - 120m for 60 sec.; 20 - 40m for 135 sec.; 40 - 120m for 60 sec.	Individual hunting
24/07/2020	1	Buzzard	30	60	20 - 40m for duration of flight	individual foraging

Date	VP No	Species	Flight No. (AnnexII)	Duration (seconds)	Flight Height	Description
24/07/2020	1	Buzzard	31	135	>120m for 30 sec.; 40 - 120m for 30 sec.; 20 - 40m for 45 sec.; <20m for 30 sec.	individual foraging
24/07/2020	1	Buzzard	32	265	40 - 120m for 195 sec.; 20 - 40m for 45 sec.; <20m for 15 sec.	Pair flying

During the 2020 breeding season surveys between April and August no sensitive target species or secondary target species were recorded during surveys. The only raptor species recorded were the non-target species kestrel and buzzard.

A pair of buzzards are likely to have breeding in the wider area surrounding the project site. Buzzards were noted perched, circling and calling at a location to the south, southeast of the wind farm site and juveniles were also heard calling from this direction during vantage point watches completed at VP1.

5.2.1.1 Hen Harrier

No preferred hen harrier habitat in the form of open heath moorland (see Ruddock et al. 2016) occurs within or adjacent to the project site. While habitats such as thick-stage forestry that are known to be used as foraging habitat by hen harrier (Ruddock et al., 2016) occur within and surrounding the wind farm site, there were no sightings of these species during the vantage point surveys at the wind farm site during the 2020 breeding season VP surveys, none during previous surveys for the windfarm between 2010 and 2014, and only one male and one female flight lines (recorded separately) in 2018 for Knocknamona Windfarm Grid Connection surveys.

5.2.1.2 Wetland or Waterbirds

No wetland or waterbird bird species in the form of waders or gulls were observed flying over or in the wider vicinity of the wind farm site.

5.2.2 2020 Breeding Bird Transect Survey Results

A total of 36 species were recorded within and surrounding the site during the course of the summer bird surveys. Table 5.4 provides details of all birds recorded during the summer bird surveys. Species highlighted in red represent species whose breeding population has declined by 50% over the last 25-

30 years. Species highlighted in orange represent species that are of European Conservation Concern. They are Amber-listed because of their unfavourable conservation status but not concentrated in Europe. The remaining species are Green-listed, species of favourable conservation status.

No evidence indicating the presence of sensitive breeding bird species such as golden plover, curlew, nightjar, merlin or hen harrier was observed during the 2020 breeding season transect surveys.

Surveys were completed near dusk and surveyors remained on site into the night during the May and June surveys with no calling of nightjar heard during their presence on site.

Table 5.4: Bird species recorded within and outside of the site during the summer bird surveys

Species	Description
Blackbird	Common occurring along transect.
Blue Tit	Common occurring along transect.
Buzzard	Heard calling along transect.
Chaffinch	Common occurring along transect.
Chiffchaff	Common occurring along transect.
Coal Tit	Common occurring along transect.
Crossbill	Common occurring along transect.
Cuckoo	Heard calling in the vicinity of VP2
Dunnock	Common occurring along transect.
Goldcrest	Common occurring along transect.
Goldfinch	Common occurring along transect.
Great Tit	Common occurring along transect.
Hood Crow	Common occurring along transect.
House Martin	Observed foraging over field along transect in vicinity of VP1
Kestrel	Observed in flight during transect.
Lesser Redpoll	Heard and observed in vicinity of VP1 and VP2.
Linnet	Observed and heard calling along transect in vicinity of VP1.
Magpie	Common occurring along transect.
Meadow Pipit	Heard and observed in the vicinity of VP1 to the east of the site.
Mistle Thrush	Heard singing along transect.
Pheasant	Heard calling along transect.
Pied Wagtail	Common occurring along transect.

Species	Description
Raven	Observed flying over site.
Reed Bunting	Heard calling along transect.
Robin	Common occurring along transect.
Rook	Common occurring along transect.
Skylark	Observed over grassland in the vicinity of VP1 and also in clearfell in the vicinity of VP2.
Song Thrush	Common occurring along transect.
Starling	Common occurring along transect.
Stonechat	Common occurring along transect.
Swallow	Observed foraging over field along transect in vicinity of VP1
Swift	Observed foraging over field along transect in vicinity of VP1
Tree Sparrow	Heard singing along transect.
White Throat	Heard singing along transect.
Willow Warbler	Heard singing along transect.
Wren	Heard singing along transect.

5.3 2020/2021 NON-BREEDING SEASON SURVEY RESULTS

5.3.1 Non-Breeding Season Vantage Point Survey Results

Table 5.5 provide details of the results of the Vantage Point Surveys undertaken at the Knocknamona Windfarm site and surrounding between September 2020 and January 2021. Flight lines of all activity associated with sensitive target species, secondary target species and/or other raptor or wetland bird species are illustrated on map figures in Annex II, Figures 5.5 to 5.9.

Table 5.5: Details of Flight Paths recorded during the Non-Breeding Season Vantage Point Surveys

Date	VP	Species	Flight No. (AnnexII)	Duration (Seconds)	Flight Height	Description
2020-09-29	3	Kestrel	1	450	Flight between 20 and 40m for 120 seconds lowering to less than 20m for 30 seconds before returning to 20 to 40m for the remainder of a total flight of greater than 7 minutes.	Foraging flight.
2020-09-29	3	Kestrel	2	240	flight between 20 and 40m for 240 seconds	2 birds hunting. Female and juvenile
2020-09-29	3	Kestrel	3	75	flight between 20 and 40m for 75 seconds	2 birds hunting. Female and juvenile
2020-09-30	2	Kestrel	4	45	flight between 20 and 40m for 45 seconds.	Foraging flight. Bird landed in a tree
2020-09-30	3	Kestrel	5	240	flight between 20 and 40 m for 30 seconds dropping to less than 20m for a further 210 seconds.	Juvenile moving from perch to perch.
2020-10-14	3	Buzzard	6	165	flight above 120 m for 45 seconds	High foraging flight
2020-10-14	1	Kestrel	7	240	flight between 20 and 40m for 45 seconds reducing to less than 20m for a further 195 seconds.	
2020-10-15	2	Kestrel	8	30	Low flight of less than 10 m for 30 seconds	
2020-10-15	2	Kestrel	9	15	Low flight of less than 10 m for 15 seconds	
2020-11-12	1	Kestrel	10	240	flight of 20 to 40 m for 120 seconds rising to 40 to 120 m for a further 45 seconds before further rising to greater thhan non for 75 seconds for a total flight time of 240 seconds.	Foraging / hunting flight to the rear of the VP.

2020-11-12	1	Kestrel	11	240	Flight of 20 to 40 m for 30 seconds rising to 40 to 120 m for a further 105 seconds before descending again to 20 to 40m for 75 seconds before rising to 40 to 12om for 30 seconds for a total flightine of greater than 240 seconds.	Foraging / hunting flight to the rear of the VP.
2020-11-12	1	Kestrel	12	120	Flight of 40 to 120m for 120 seconds	oraging/ hunting flight to rear of VP.
2020-11-12	1	Kestrel	13	240	Flight of 40 to 120m for 90 seconds before reducing height to 20 to 40 m for a further 150 seconds.	Foraging/ hunting flight to rear of VP.
2020-11-12	1	Kestrel	14	240	Flight of 40 to 120m for 30 seconds before reducing height to 20 to 40 m for a further 30 seconds falling further to less than 20m for 75 seconds. Flight heights them rose to 20 to 40m for a further 105 seconds for a 240 second total flight.	Foraging/ hunting flight to rear of VP.
2020-11-12	1	Kestrel	15	120	Flight of 40 to 120m for 30 seconds before reducing height to 20 to 40 m for a further 90 seconds.	
2020-11-12	3	Buzzard	16	285	Flight of greater than 120 m for 60 seconds, lowering to 40 to 12O m for 75 seconds, further descending to 20 to 40m for 90 seconds before landing in a tree.	Foraging flight over forestry.
2020-11-13	2	Kestrel	17	300	FIight of over 300 seconds at 20 to 40m	Foraging flight
2020-11-13	2	Kestrel	18	240	Flight of over 240 seconds. flight at height 40 to 120 m for first 135 Seconds falling to 20 to 40 m for remaining 105 seconds.	Hunting flight before landing in trees.
2020-11-13	2	Buzzard	19	45	Low flight under 20m for 45 Seconds	Buzzard chased by raven landing in tree
2020-11-13	2	Buzzard	20	240	Flight of 40 to 120m for 15 seconds falling to 20 to 40m for a further 60 seconds. Landed in tree for 30 seconds before taking off and flying at 20 to 40 m for 135 seconds	Hunting flight, landing and then hunting again.
2020-11-13	2	Kestrel	21	240	Flight of 20 to 40m for over 240 seconds	Foraging flight
2020-11-19	1	Kestrel	22	15	Flight of <20m for 15 seconds	
2020-11-19	2	Kestrel	23	35	Flight of <20m for 35 seconds	

2020-12-03	1	Buzzard	24	260	Flight of 20 - 40m for 260 seconds.	Buzzard and kestrel interacting
2020-12-03	1	Kestrel	25	150	Flight of 20 - 40m for 150 seconds	Buzzard and kestrel interacting
2020-12-03	1	Buzzard	26	280	Flight of 20 - 40m for 280 seconds	Buzzard and kestrel interacting
2020-12-03	2	Kestrel	27	15	Flight of <20m for 15 seconds	Kestrel came in low hovered then landed in a tree
2020-12-03	2	Kestrel	28	60	Flight of 20 - 40m for 60 seconds	Same Kestrel as before
2020-12-03		Sparrowhawk	29	15	Flight of <20m for 15 seconds	
2020-12-04	3	Kestrel	30	160	Flight of 20 - 40m for 120 seconds, rising to 40 - 120m for 40 seconds	Flying north along edge of Conifers
2020-12-04	3	Buzzard	31	240	Flight of <20m for 120 seconds, rising to 20 - 40m for the next 120 seconds	Flying north along edge of Conifers
2020-12-19	1	Buzzard	32	105	Flight of 20 - 40m for 105 seconds.	Flying to the north of the wind farm site.
2020-12-19	2	Kestrel	33	25	Flight of <20m for 25 seconds	Flying along edge of conifer plantation
2021-01-14	1	Mallard	34	90	90 second flight between 40 and 120m	Flight along river valley
2021-01-14	1	Kestrel	35	180	Flight of 180 seconds between 20 and 40m	Foraging flight
2021-01-14	1	Kestrel	36	145	Flight of between 20 and 40m for 10 seconds raising to 40 to 20m for a further 90 seconds before falling to between 20 and 40m for a further 45 seconds.	Foraging flight
2021-01-14	1	Kestrel	37	90	Flight of 90 Seconds between 20 and 40m	Same bird as observation 35
2021-01-14	1	Kestrel	38	240	Flight of 240 seconds between 20 and 40m	Same bird as observation 35
2021-01-14	3	Kestrel	39	240	Flight for 240 seconds at 20 to 40m	Foraging flight over conifers Landed at tree edge
2021-01-14	3	Kestrel	40	240	Flight for 240 seconds at 20 to 40m	Same bird as flight 35. foraging flight to the N.west of the VP.

2021-01-14	3	Kestrel	41		Varying flights between 0 and 40m repeated for duration of survey	Continually present during survey flying the same lines N along forestry edge and then S to the west of the VP. Present from 15:00 went to ground at dusk around 4.50.
2021-01-14	3	Kestrel	42		Varying flights between 0 and 40m repeated for duration of survey	Continually present during survey flying the same lines N along forestry edge and then S to the west of the VP. Present from 15:00 went to ground at dusk around 4.50.
2021-01-22	2	Buzzard	43	45	Flight for 45 seconds at 20 - 40m	Flying over conifer plantation
2021-01-22	2	Buzzard	44	70	Flight for 70 seconds at 20 - 40m	Flying to the west of the wind farm site.

During the 2020/2021 non-breeding season surveys between September and January no sensitive target species or secondary target species were recorded during surveys. The only raptor species recorded were the non-target species kestrel and buzzard, which were regularly seen during watches and one registration of a sparrowhawk.

5.3.1.1 Hen Harrier

No suitable hen harrier winter roost habitat in the form of reedbeds, heather/bog, rank grassland etc (O'Donoghue, 2010) occurs within or adjacent to the project site. There were no sightings of hen harrier during the vantage point surveys at the wind farm site during the 2020/2021 non-breeding season VP surveys.

5.3.1.2 Wetland or Waterbirds

No wetland or waterbird bird species in the form of waders or gulls were observed flying over or in the wider vicinity of the wind farm site. No whooper swans were recorded flying in the vicinity of the wind farm site during any of the vantage point watches between September and January 2021.

5.3.2 Non-Breeding Bird Transect Survey Results

A total of 38 species were recorded within and surrounding the site during the course of the summer bird surveys. Table 5.6 provides details of all birds recorded during the non-breeding bird surveys. Species highlighted in red represent species whose breeding population has declined by 50% over the last 25-30 years. Species highlighted in orange represent species that are of European Conservation Concern. They are Amber-listed because of their unfavourable conservation status but not concentrated in Europe. The remaining species are Green-listed, species of favourable conservation status.

Table 5.6: Bird species recorded within and outside of the site during the non-breeding season transect and vantage point surveys

Species	Description
Blackbird	Common occurring along transect.
Blue Tit	Common occurring along transect.
Bullfinch	Observed and heard during the September transect.
Buzzard	Heard calling along transect.
Chaffinch	Common occurring along transect.
Coal Tit	Common occurring along transect.
Dunnock	Common occurring along transect.
Goldcrest	Common occurring along transect. Breeding population is of medium conservation concern.
Golden Plover	Observed on one occasion during the November 2020 transect flying high (>100m) above conifer plantation. Breeding and wintering population is of high conservation concern.
Goldfinch	Common occurring along transect.
Great Tit	Common occurring along transect.
Hood Crow	Common occurring along transect.
House Martin	Observed during September transect survey. Breeding population is of medium conservation concern.
House Sparrow	Observed during September transect. Breeding population is of median conservation concern.
Kestrel	Observed in flight during transect. Breeding population is of medium conservation concern.
Lesser Redpoll	Observed during December transect.
Linnet	Observed during September transect. Breeding population is of medium conservation concern.
Long-tailed Tit	Observed during December transect.

Species	Description
Magpie	Common occurring along transect.
Meadow Pipit	Common occurring along transect. Breeding population is of high conservation concern.
Pheasant	Heard calling along transect.
Raven	Observed flying over site.
Redwing	Observed during December transect
Reed Bunting	Heard calling along transect.
Robin	Common occurring along transect. Breeding population is of medium conservation concern.
Rock Dove	Observed during December transect
Rook	Common occurring along transect.
Siskin	Observed and heard during November transect
Snipe	Observed during October 2020 transect. Breeding and wintering population is of medium conservation concern.
Song Thrush	Heard and observed during September and January transect
Starling	Common occurring along transect. Breeding and wintering population is of high conservation concern.
Stonechat	Common occurring along transect. Breeding and wintering population is of high conservation concern.
Tree Sparrow	Head during September and October transects. Breeding and wintering population is of high conservation concern.
Wood Pigeon	Common occurring along transect.
Wren	Common occurring along transect.

No bird species whose wintering populations are of medium or high conservation concern were observed to rely on the wind farm site and surrounding area as non-breeding/over-wintering habitat. There was one observation of a flight of a small flock (approximately 15 individuals) of golden plover (high conservation concern) during a transect survey in November 2020, while one snipe (medium conservation concern) was observed during a transect in October 2020.

5.4 WHOOPER SWAN SURVEYS

The results of the whooper swan surveys completed at Cloghbog are provided in Table 5.7 below. Figure 5.9 illustrates the results of the surveys described in Table 5.7 below.

Table 5.7: Results of Whooper Swan surveys at Cloghbog

Date	Survey Type	No. Whooper Swans Observed	Details of any Flight Observations
19th November	Dusk	18 foraging towards the western side of the field at Cloghbog.	No flight observed at dusk or after dusk. Swans remained in field after dark.
19th December	Dusk	26 foraging towards the western side of the field at Cloghbog.	No flight observed at dusk or after dusk. Swans remained in field after dark.
19th January	Dusk	0	N/A – no swans were present during the survey.
22nd January	Dusk	2 foraging towards the eastern side of the field at Cloghbog	Two swans were observed flying directly west to the River Blackwater at 17:55
26th January	Dusk	8 foraging towards the eastern side of the field at Cloghbog	Eight swans were observed flying directly west to the River Blackwater at 17:55
9th February	Dawn	6 foraging towards the eastern side of the field at Cloghbog	Six swans were observed flying from the west and from the direction of the River Blackwater to the field at Cloghbog at 07:25. Swans settled in field to forage.

Whooper swan were only identified in the same large pasture field at Cloghbog, a short distance to the east of Keereen. The field consists of short-sward improved agricultural grassland. Whooper swan were not observed in surrounding grassland field during driven transects between Keereen and Villierstown pier or from an elevated vantage point along the minor road that leads uphill and to the east of Keereen crossroads.

When observed in flight at dusk, the flight was directly to the east towards the River Blackwater, where suitable night time roost habitat occurs along the fringes of the river. No whooper swans were observed flying east from Cloghbog in the direction of the wind farm site.

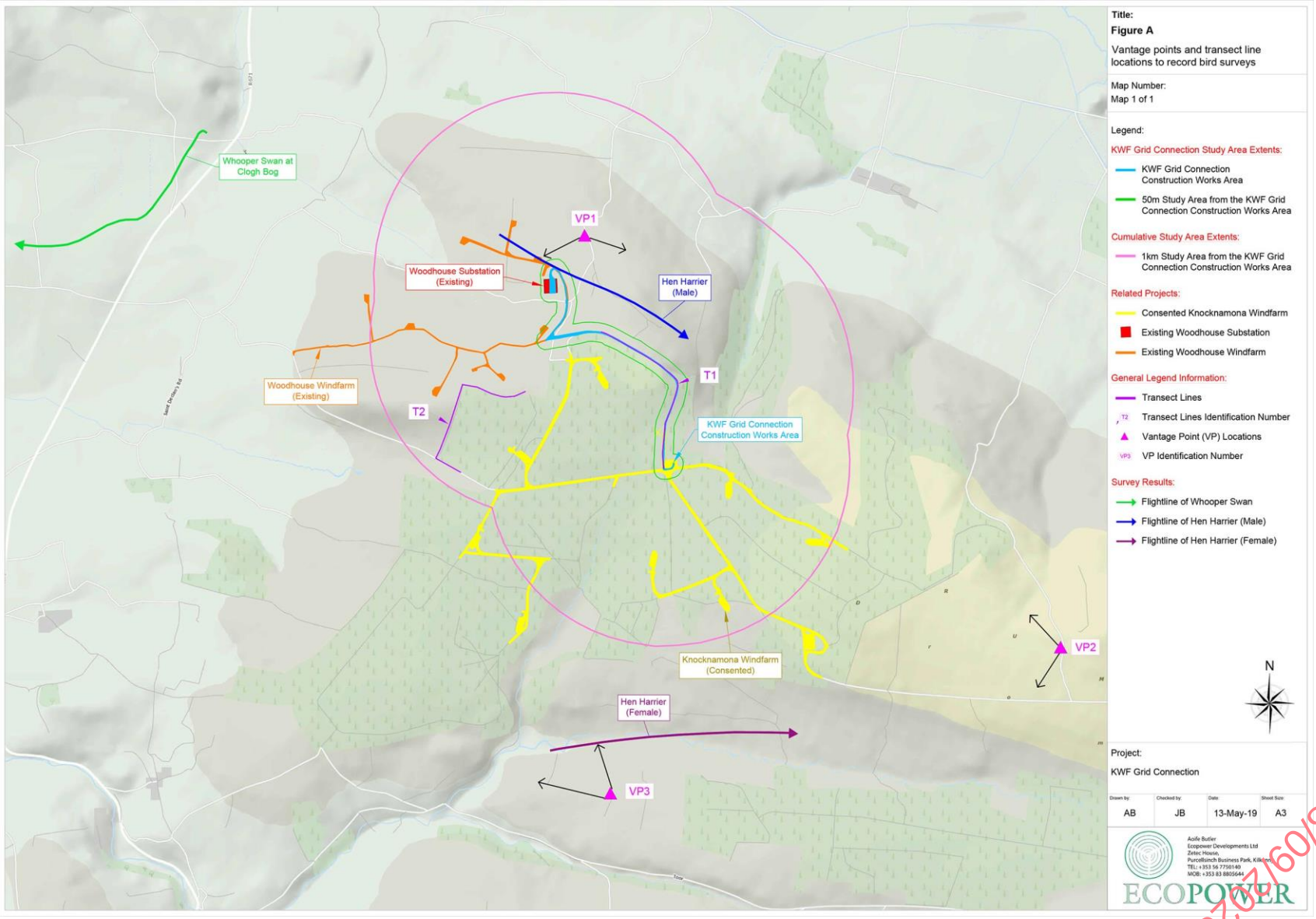
Appendix 7.2: Bird Survey Data 2015 to 2023

A7.2.3

2019 Bird Survey Data (Inis Environmental Consultants)

A7.2.1 Bird Surveys for KWF Grid Connection (carried out by Inis Environmental Consultants)

A7.2.1.1 Location of Vantage Point and Transect Surveys



A7.2.1.2 Vantage Point Surveys for KWF Grid Connection (carried out by Inis Environmental Consultants)

Survey	Date 2018	Days	Summary of Key Results
VP Winter Season Survey	Jan	3	Kestrel, Sparrowhawk, Buzzard, Raven
VP Winter Season Survey	Feb (early march)	3	Hen Harrier, Golden Plover, Snipe, Buzzard, Grey Heron
VP Winter Season Survey	March (early april)	3	Snipe, Buzzard, Raven
VP Breeding Season Survey	April	3	Buzzard, Raven
VP Breeding Season Survey	May	3	Buzzard

survey	VP Name	Date	Rain	Cloud	Visibility (km)	Species	Number	Sex	Bird Notes
Winter VP	1	25/01/2018	light-None	poor to good	Good	Raven	1		
Winter VP	1	30/01/2018	Misty	misty	500m at least	Nil			
Winter VP	1	30/01/2018	Misty	misty	500m at least	Raven	2		
Winter VP	2	25/01/2018	none	partly Overcast	Good	Nil	2		
Winter VP	2	25/01/2018	none	partly Overcast	Good	Golden Plover	3		
Winter VP	2	25/01/2018	none	partly Overcast	Good	Snipe	1		
Winter VP	2	25/01/2018	none	partly Overcast	Good	Raven	6		
Winter VP	2	29/01/2018	none	Overcast	Good	Nil	2		
Winter VP	2	29/01/2018	none	Overcast	Good	Raven	20		
Winter VP	3	29/01/2018	none	Clear	Good	Buzzard			Mewing and circling wood near Broken Bridge
Winter VP	3	29/01/2018	none	Clear	Good	Kestrel			On post in pasture

Winter VP	3	29/01/2018	none	Clear	Good	Raven			
Winter VP	3	30/01/2018	none	Overcast	Good	Buzzard			Flew NE from Broken Bridge area
Winter VP	3	30/01/2018	none	Overcast	Good	Sparrowhawk	2		Male and female flew NE from Broken Bridge area
Winter VP	3	30/01/2018	none	Overcast	Good	Kestrel			on ash
Winter VP	3	30/01/2018	none	Overcast	Good	Raven			
Winter VP	1	26/02/2018	none	Overcast	Good	Buzzard			Hovering just NE of VP
Winter VP	1	26/02/2018	none	Overcast	Good	Kestrel	2		Together, came from south S, returned S high near turbines
Winter VP	1	26/02/2018	none	Overcast	Good	Lesser Black-backed Gull	33		Flew east over low ground to N of VP over Finisk valley.
Winter VP	1	26/02/2018	none	Overcast	Good	Raven			
Winter VP	1	08/03/2018	none	Overcast	Good	Snipe			Flew over
Winter VP	1	09/03/2018	none	Overcast	Good	Raven			
Winter VP	2	26/02/2018	none	Overcast	Good	Buzzard			Flew to wood
Winter VP	2	26/02/2018	none	Overcast	Good	Kestrel			Hover at edge of wood
Winter VP	2	26/02/2018	none	Overcast	Good	Snipe			Pasture.
Winter VP	2	27/02/2018	none	Clear	Good	Raven	2		
Winter VP	3	27/02/2018	none	Clear	Good	Kestrel			A pair calling
Winter VP	3	27/02/2018	none	Clear	Good	Raven	6		
Winter VP	3	06/03/2018	none	clear	Good	Grey Heron			Flying E
Winter VP	3	06/03/2018	none	clear	Good	Hen Harrier	1	female	Flying in hunting mode to E.
Winter VP	3	06/03/2018	none	clear	Good	Golden Plover	2		Flying N
Winter VP	3	06/03/2018	none	clear	Good	Snipe			Flying over
Winter VP	3	06/03/2018	none	clear	Good	Raven			
Winter VP	1	06/03/2018	none	Overcast	Good	Buzzard			On bush at 14:00

Winter VP	1	06/03/2018	none	Overcast	Good	Buzzard			Perching on pole 16:15-16:23,
Winter VP	1	06/03/2018	none	Overcast	Good	Hen Harrier	1	male	Male flew very low through windfarm with stopped turbines; going SE;
Winter VP	1	03/04/2018	none	Clear	Good	Nil			
Winter VP	1	04/04/2018	none	Clear	Good	Buzzard			100m east of VP
Winter VP	1	04/04/2018	none	Clear	Good	Buzzard			100m east of VP
Winter VP	1	04/04/2018	none	Clear	Good	Buzzard			100m east of VP
Winter VP	1	04/04/2018	none	Clear	Good	Raven			
Winter VP	2	03/04/2018	none	Clear	Good	Snipe			Pasture
Winter VP	2	03/04/2018	none	Clear	Good	Raven			
Winter VP	2	04/04/2018	none	Overcast	Good	Snipe			
Winter VP	2	04/04/2018	none	Overcast	Good	Raven			
Winter VP	3	03/04/2018	shower	Overcast	Good	Nil			
Winter VP	3	04/04/2018	none	Clear	Good	Nil			
Breeding VP	1	23/04/2018	none	Clear	Good	Buzzard	2		Together at wood edge for 15 mins
Breeding VP	1	23/04/2018	none	Clear	Good	Raven			
Breeding VP	1	27/04/2018	none	Overcast	Good	Buzzard			Near wood.
Breeding VP	2	23/04/2018	misty	overcast	fair	Raven			
Breeding VP	2	25/04/2018	none	Clear	Good	Nil			
Breeding VP	3	25/04/2018	one shower	Clear	Good	Kestrel			
Breeding VP	3	25/04/2018	one shower	Clear	Good	Raven			
Breeding VP	3	27/04/2018	occasional showers	Overcast	Good	Buzzard			Nest later seen in Larch wood.
Breeding VP	1	29/05/2018	none	Clear	Good	Buzzard			Flew through windfarm at mid tower height
Breeding VP	1	31/05/2018	none	Overcast	Good	Buzzard			
Breeding VP	2	29/05/2018	none	haze	fair	Nil			
Breeding VP	2	30/05/2018	none	haze	fair	Nil			

Breeding VP	3	29/05/2018	none	haze	fair	Buzzard			
Breeding VP	3	30/05/2018	none	haze	fair	Buzzard			in nest area mewing

A7.2.1.3 Swan Census for KWF Grid Connection (carried out by Inis Environmental Consultants)

Survey	Date 2018	Grid Reference of Sighting	Location of Sighting	Species	Number	Notes
Swan Census	25/01/2018	X135 930	Clogh bog, west of Keereen Croos roads	Whooper Swan	40	The field the flock was observed in is 3km west of VP1
Swan Census	30/01/2018	X135 930	Clogh bog, west of Keereen Croos roads	Whooper Swan	41	37 adults, 4 juveniles
Swan Census	26/03/2018		Clogh bog	Whooper Swan	9	
Swan Census	27/03/2018		Clogh bog	Whooper Swan	11	
Swan Census	03/04/2018		Clogh bog	Nil		

A7.2.1.4 Breeding Wader Surveys for KWF Grid Connection (carried out by Inis Environmental Consultants)

Survey	Date (2018)	No. Transects	Vantage Point Grid Coordinates	Species Recorded	Time of Sightings	Notes
Breeding waders	11 May 2018 (April effort)	1	X166913	Nil	n/a	n/a
Breeding waders	31 May 2018	1	X166913	2 woodcock	21:55 - 22:08hrs	Woodcock flying down the field close to Mountodell Stream
Breeding waders	29 June 2018	1	X166913	Nil	n/a	n/a

A7.2.1.5 Bird Transect Surveys for KWF Grid Connection (carried out by Inis Environmental Consultants)

Survey	Date (2018)	No. Transects
Winter Bird Transect WF	Jan	2
Winter Bird Transect Grid	March	4
Breeding bird transect WF	April- mid May	2
Breeding bird transect Grid	April - mid May	4
Breeding bird transect WF	Mid May - June	2
Breeding bird transect Grid	Mid May - June	4

KWF Grid Connection: 2018 Winter Transect

Common Name	*Scientific Name*	Transect A	Transect B	Conservation Status	
				BoCCI	Annex I
Common Kestrel	*Falco tinnunculus*			Amber	No
Woodpigeon	*Columba palumbus*		2	Green	No
Pied Wagtail	*Motacilla alba*			Green	No
Dunnock	*Prunella modularis*	2	4	Green	No
Robin	*Erithacus rubecula*	7	8	Amber	No
Song Thrush	*Turdus philomelos*	1		Green	No
Mistle Thrush	*Turdus viscivorus*		1	Amber	No
Blackbird	*Turdus merula*	2	1	Green	No
Goldcrest	*Regulus regulus*	5	3	Amber	No
Wren	*Troglodytes troglodytes*	3	3	Green	No
Great Tit	*Parus major*	1	2	Green	No
Coal Tit	*Periparus ater*	3	1	Green	No
Blue Tit	*Cyanistes caeruleus*		1	Green	No
Magpie	*Pica pica*		1	Green	No
Jackdaw	*Corvus monedula*			Green	No
Rook	*Corvus frugilegus*			Green	No
Hooded Crow	*Corvus cornix*	5	3	Green	No
Chaffinch	*Fringilla coelebs*	2	4	Green	No
Bullfinch	*Pyrrhula pyrrhula*			Green	No
Buzzard	*Buteo buteo*			Green	
Goldfinch	*Carduelis carduelis*			Green	
Lesser Redpoll	*Carduelis flammea cabaret*			Green	
Little Egret	*Egretta garzetta*			Green	
House Sparrow	*Passer domesticus*			Amber	
Blackcap	*Sylvia atricapilla*			Green	
Greenfinch	*Chloris chloris*			Amber	
Raven	*Corvus corax*	1	1	Green	
Meadow Pipit	*Anthus pratensis*		1	Red	

Breeding bird transects for KWF Grid Connection to Woodhouse

Early visit; April –Mid May & Late visit; Mid May – June.

Common Name	*Scientific Name*	WF Transect A Early Visit	WF Transect B Early Visit	WF Transect A Late Visit	WF Transect B Late Visit	Conservation Status	
						BoCCI	Annex I
Woodpigeon	*Columba palumbus*			10	9	Green	No
Dunnock	*Prunella modularis*	1	3	5	3	Green	No
Robin	*Erithacus rubecula*	4	3	9	4	Amber	No
Mistle Thrush	*Turdus viscivorus*		1	2		Amber	No
Blackbird	*Turdus merula*	3	2	6	8	Green	No
Goldcrest	*Regulus regulus*	3	4	2	2	Amber	No
Wren	*Troglodytes troglodytes*	4	5	6	10	Green	No
Great Tit	*Parus major*	1		2	2	Green	No
Coal Tit	*Periparus ater*	3	3	4	2	Green	No
Blue Tit	*Cyanistes caeruleus*	1		1		Green	No
Rook	*Corvus frugilegus*			11		Green	No
Hooded Crow	*Corvus cornix*	1	4	5	2	Green	No
Chaffinch	*Fringilla coelebs*	3	10	9	10	Green	No
Goldfinch	*Carduelis carduelis*			1		Green	No
Blackcap	*Sylvia atricapilla*			1		Green	No
Meadow Pipit	*Anthus pratensis*			2	2	Red	No
Whitethroat	*Sylvia communis*	1		4	1	Green	No
Chiffchaff	*Phylloscopus collybita*	2	1	2	1	Green	No
Willow warbler	*Phylloscopus trochilus*	1	1	3	1	Green	No
Pheasant	*Phasianus colchicus*			1	1	Green	No
Stonechat	*Saxicola torquata*			1		Green	No
Linnet	*Carduelis cannabina*			3		Amber	No
Lesser Redpoll	*Carduelis flammea Cabaret*			2		Green	No
Bullfinch	*Phrrhula pyrrhula*			2		Green	No
Blackcap	*Sylvia atricapilla*		1		1	Green	No
Siskin	*Carduelis spinus*		1			Green	No
Starling	*Sturnus vulgaris*				2	Amber	No

Appendix 7.2: Bird Survey Data 2015 to 2023

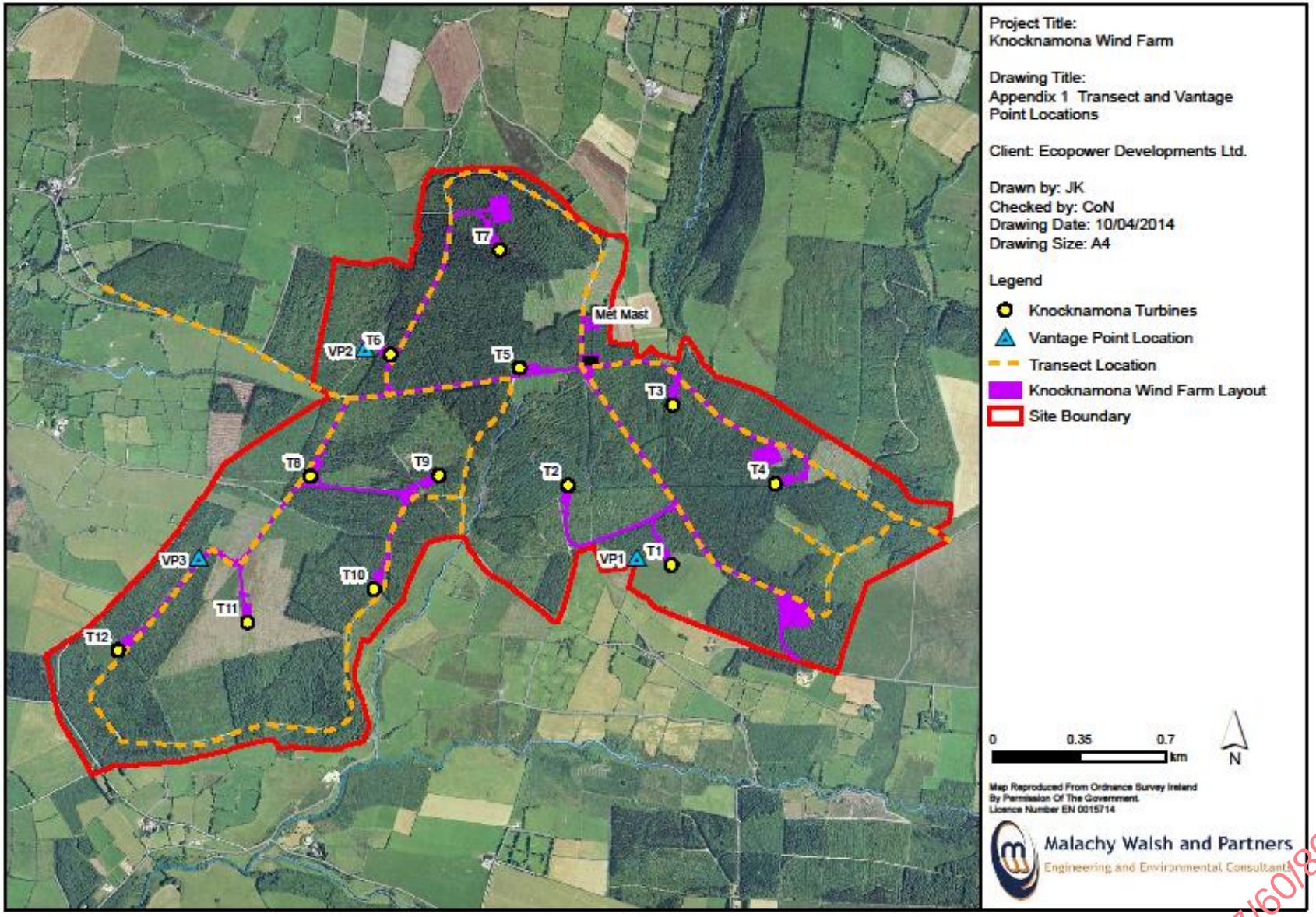
A7.2.4

2015 Bird Survey Data

Malachy Walsh & Partners, engineering and environmental consultancy

A7.2.2 Bird Surveys for Knocknamona Windfarm (carried out by Malachy Walsh & Partners, *source: Knocknamona Windfarm Revised EIS 2015*)

A7.2.2.6 Location of Vantage Point and Transect Surveys



A7.2.2.7 Vantage Point Surveys for Knocknamona Windfarm (carried out by Malachy Walsh & Partners)

Survey	Date 2018
VP Winter Season Survey	October 2012, November 2013 through to early April 2014
VP Breeding Season Survey	April through July 2010 inclusive, April and May 2011, May through July 2013 inclusive.

Winter Raptor Vantage Point Survey Results

There was one sighting of a Buzzard, observed from VP-1, during the vantage point survey in early April 2014. The bird was observed foraging in a southeasterly direction over grassland at approximately 10m in height. There were three sightings of Kestrel, during the vantage point survey in early April, from VP-2 and VP-3. There were two observations of Sparrowhawk at the site in early April 2014. The first observation concerned a pair, observed from VP-2 soaring high at a height of approximately 100m. The second observation concerned a male, observed from VP-3, observed briefly at the southwest of the site. Flight paths are illustrated in Appendix 2.

Summer Raptor Vantage Point Survey Results

There were no hen harrier sightings within the site during the Summer Vantage Point Survey and only one sighting of Kestrel within the site, observed from VP-2 in Summer 2013. There was one sighting of a Hobby hunting over agricultural grassland, just outside of the site, in May 2011.

A7.2.2.8 Bird Transect Surveys for Knocknamona Windfarm (carried out by Malachy Walsh & Partners)

Survey	Date	No. Transects
Winter Bird Transect	December 2013, February 2014	2
Summer Bird Transect	Late Spring/Summer 2010, early Spring 2011 and Spring/Summer 2013	4

Winter Bird Survey Results

A total of twenty five species were recorded during the winter bird survey. Bird species recorded at the site in winter are typical of the habitats present. The most abundant species within the site during the winter bird survey was Coal Tit. The table below provides details of all birds recorded during the winter bird surveys. Species highlighted in red represent species of High Conservation concern, having declined rapidly in abundance or range. Species highlighted in orange represent species that are species of European Conservation Concern. They are Amber-listed because of their unfavourable conservation status. The remaining species are Green-listed, species of favourable conservation status.

Bird species recorded within and outside of the site during the winter bird survey and raptor vantage point surveys

Species	Comments
Meadow Pipit ***Anthus pratensis***	Scarce in winter. Became more frequent in early April 2014
Buzzard ***Buteo buteo***	One sighting in early April 2014 from VP-1
Kestrel ***Falco tinnunculus***	Three sightings from VP-2 in early April 2014
Sparrowhawk ***Accipiter nisus***	A pair observed from VP-2 and a single sighting of a male from VP-3, in early April 2014
Woodpigeon ***Columba palumbus***	Frequent flyover at the site
Pied Wagtail ***Motacilla alba yarelli***	Occasional on forest tracks
Wren ***Troglodytes troglodytes***	Relatively common at the site
Dunnock ***Prunella modularis***	Relatively common at the site
Sand Martin ***Riparia riparia***	Two observed in early April 2014
Robin ***Erithacus rubicula***	Relatively common at the site
Blackbird ***Turdus merula***	Occasional at forest edges
Mistle Thrush ***Turdus viscivorus***	One flyover in November 2013 and two sightings in early April 2014
Song Thrush ***Turdus philomelos***	Observed from VP-2 in early April 2014
Goldcrest ***Regulus regulus***	Common in forestry throughout the site
Chiffchaff ***Phylloscopus collybita***	Frequently heard in early April 2014
Coal Tit ***Periparus ater hibernicus***	Very common in forestry
Rook ***Corvus frugilegus***	Infrequent over site. Common outside of site in farmland

Species	Comments
Hooded Crow ***Corvus corone***	A few pairs present over clearfell areas
Raven ***Corvus corax***	At least two pairs present. Male observed displaying in December 2013
Jackdaw ***Corvus monedula***	Observed flying over site towards improved pasture, southwest of the site
Magpie ***Pica pica***	Occasional
Starling ***Sturnus vulgaris***	Single flock of 12, flying outside of the site, south of VP-3
Chaffinch ***Fringilla coelebs***	Frequently heard and observed
Crossbill ***Loxia curvirostra***	One heard calling over VP-3
Lesser Redpoll ***Carduelis cabaret***	Heard and observed eard from VP-2 and VP-3

Summer Bird Survey Results

A total of 37 species were recorded within and surrounding the site during the course of the summer bird surveys. The table below provides details of all birds recorded during the summer bird surveys.

Summer Bird Survey Results

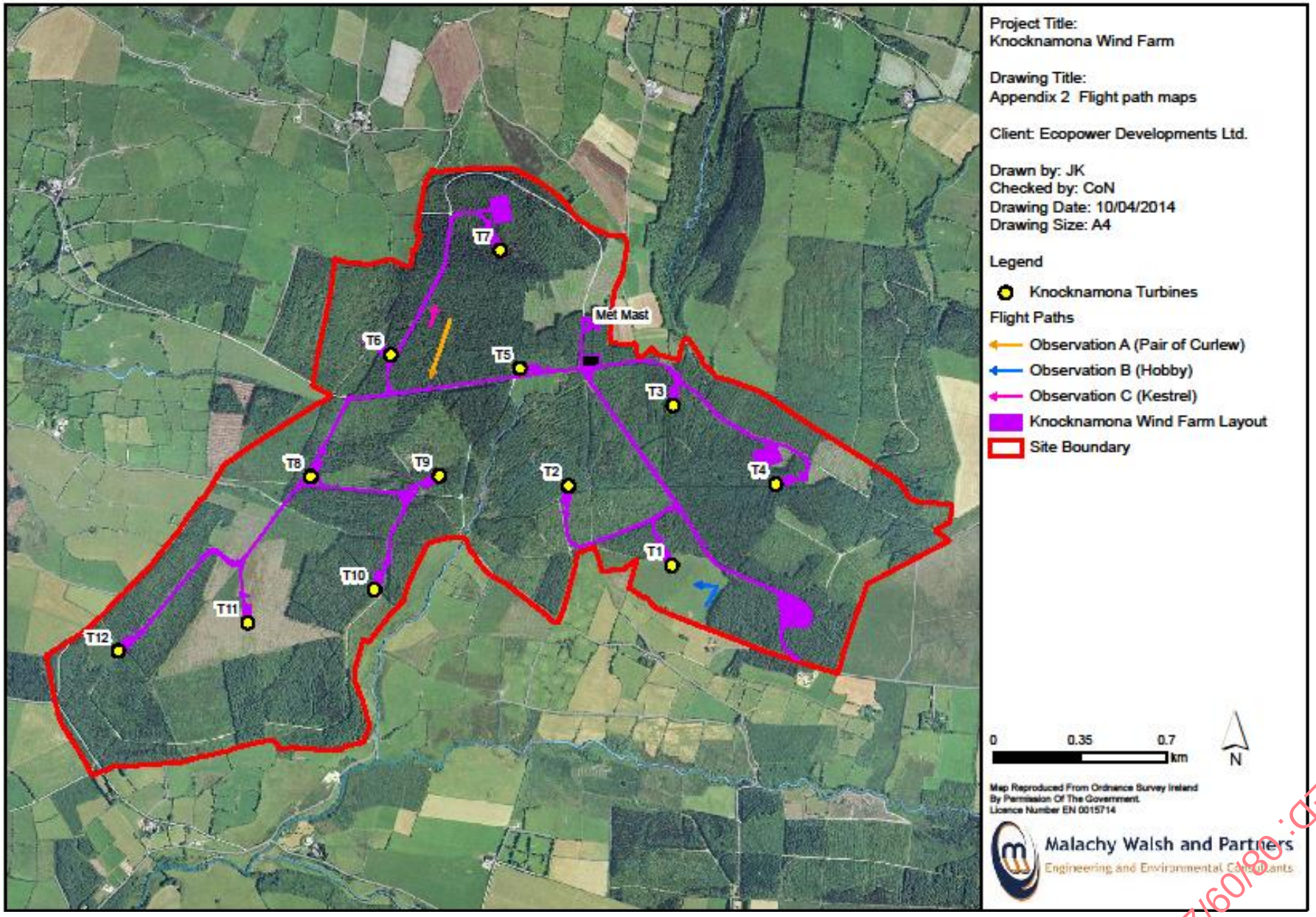
Bird species recorded in summer are typical of the habitats present within and around the site. Coal Tit and Goldcrest were the most abundant species recorded during the summer bird surveys. The number of species observed within and around the site in summer was greater than in winter mainly due to the arrival of breeding migrants, including Willow Warbler, Chiffchaff, Blackcap and Whitethroat.

Bird species recorded within and outside of the site during the summer bird survey and raptor vantage point survey

Species	Comments
Kestrel ***Falco tinnunculus***	Only one observation within the site, a male hunting in a northerly direction from VP-2, in June 2013
Hobby ***Falco subbuteo***	One observed hunting over agricultural grassland, along the boundary of the site in early May 2011. A rare migrant to Ireland
Curlew ***Numenius arquatus***	Two birds flying south over 2nd rotation forestry, from VP-2, in early May 2011
Whimbrel ***Numenius phaeopus***	One bird heard from VP-2 on 17th May 2011
Woodcock ***Scolopax rusticola***	One bird heard during the Nightjar survey in 2010
Woodpigeon ***Columba palumbus***	Occasional over forest
Long-eared Owl ***Asio otus***	Juvenile heard during Nightjar survey in 2010
Swift ***Apus apus***	Scarce over farmland, east of the site
Skylark ***Alauda arvensis***	Relatively scarce over farmland, east of the site
Barn Swallow ***Hirundo rustica***	Frequent over farmland, surrounding the site
Meadow Pipit ***Anthus pratensis***	Frequent over farmland, surrounding the site
Pied Wagtail ***Motacilla alba yarelli***	Occasional along forest tracks in open areas
Wren ***Troglodytes troglodytes***	Common
Dunnock ***Prunella modularis***	Common

Species	Comments
Robin *Erithacus rubicula*	Common
Blackbird *Turdus merula*	Common
Song Thrush *Turdus philomelos*	Occasional along forest edge
Mistle Thrush *Turdus viscivorus*	One singing at VP-2 in 2011
Grasshopper Warbler *Locustella naevia*	Occasionally heard in clearfell areas in Spring 2010 and 2012
Blackcap *Sylvia atricapilla*	Occasionally heard in conifer areas, more so in deciduous woodland north of the site
Whitethroat *Sylvia communis*	Frequently heard and observed in clearfell areas throughout the Summer period
Willow Warbler *Phylloscopus trochilus*	Frequently heard throughout the Summer period
Chiffchaff *Phylloscopus collybita*	Frequently heard throughout the Summer period
Goldcrest *Regulus regulus*	Common
Coal Tit *Parus ater hibernicus*	Common
Hooded Crow *Corvus corone*	3-4 pairs present throughout Summer
Raven *Corvus corax*	At least two pairs present, within the site
Jackdaw *Corvus monedula*	Relatively common over pasture, outside of the site, to the east
Magpie *Pica pica*	Relatively common over pasture, outside of the site, to the east
Jay *Garrulus glandarius*	One heard near VP-2 in May 2011
Starling *Sturnus vulgaris*	None within the site but frequently observed east of the site, with a lot of juveniles observed in July
Chaffinch *Fringilla coelebs*	Commonly heard and observed in open areas of the site and along forest edge
Siskin *Carduelis spinus*	Frequently heard and observed over conifers
Linnet *Carduelis cabaret*	None within the site but occasional over farmland, east of the site
Lesser Redpoll *Carduelis cabaret*	Commonly heard and observed in open areas of the site
Bullfinch *Pyrrhula pyrrhula*	Occasionally heard along forest edge
Reed Bunting *Emberiza schoeniclus*	Heard occasionally from VP-2

A7.2.2.9 Flightlines recorded during Knocknamona Windfarm Surveys (2014)



Appendix 7.2: Bird Survey Data 2015 to 2023

A7.2.5

2022/2023 Whooper Swan Survey Data (Inis Environmental Consultants)

Table 1 VP loactions

Swan_VP	Site Name
SSAVP1	Deerpark North
SSAVP2	Dromana
SSAVP4	Camphire
SSAVP3	Knockalahare
SSAVP5	Cloughbog
VP1	
VP2	

Table 2 2022/23 Whooper Swan Census Survey Data

VP Name	Date	Start Time	End Time	Species	Number	Time of Sighting	On/OffSite	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Bird Notes
SSA VP1	20/09/22	17:01	20:01	Nil Sightings											
SSA VP1	21/09/22	06:42	09:42	Nil Sightings											
SSA VP2	20/09/22	17:01	20:01	Nil Sightings											
SSA VP2	21/09/22	06:42	09:42	Nil Sightings											
SSA VP3	20/09/22	17:01:00	20:01:00	Nil Sightings											
SSA VP3	21/09/22	06:42	09:42	Nil Sightings											
SSA VP4	20/09/22	17:01	20:01	Nil Sightings											
SSA VP4	21/09/22	06:42	09:42	Nil Sightings											
SSA VP5	20/09/22	17:01	20:01	Nil Sightings											
SSA VP5	21/09/22	06:42	09:42	Nil Sightings											

Turbine VP1	20/09/22	16:40	20:15	Nil Sightings											no swan sightings
Turbine VP1	21/09/22	06:35	09:44	Nil Sightings											no swan sightings
Turbine VP2	20/09/22	17:01	20:01	Nil Sightings											
Turbine VP2	21/09/22	06:42	09:42	Nil Sightings											
SSA VP1	26/10/2022	15:45:00	18:45:00	Nil Sightings											
SSA VP1	27/10/2022	07:45:00	10:45:00	Nil Sightings											
SSA VP2	26/10/2022	15:45:00	18:45:00	Nil Sightings											
SSA VP2	27/10/2022	07:45	10:45	Nil Sightings											
SSA VP3	26/10/2022	15:45:00	18:45:00	Nil Sightings											
SSA VP3	27/10/2022	07:45:00	10:45:00	Nil Sightings											
SSA VP4	26/10/2022	15:45	18:45	Nil Sightings											
SSA VP4	27/10/2022	07:45	10:45	Nil Sightings											
SSA VP 5	26/10/2022	15:45	18:45	Nil Sightings											
SSA VP 5	27/10/2022	07:45	10:45	Nil Sightings											
1	26/10/2022	15:45:00	18:45:00	Nil Sightings											
1	27/10/2022	07:45:00	10:45:00	Nil Sightings											
2	26/10/2022	15:45:00	18:45:00	Nil Sightings											
2	27/10/2022	07:45:00	10:45:00	Nil Sightings											

SSA VP1	22/11/2022	14:00:00	17:00:00	Whooper Swan_WS	8	14:45:00	off	20							Heard calling and then saw commuting across field right behind VP
SSA VP1	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	1	08:36:00	On	40							
SSA VP2	22/11/2022	14:00:00	17:00:00	Nil Sightings											
SSA VP2	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	5	08:35			25						
SSA VP3	22/11/2022	14:02:00	17:02:00	Whooper Swan_WS	5	14:18:00	On/Off		30	30					
SSA VP3	22/11/2022	14:02:00	17:02:00	Whooper Swan_WS	8	14:38:00	On/Off	15	30						
SSA VP3	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	7	08:07:00	Off/On	45	15						Land in field to rest/forage
SSA VP3	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	4	08:47:00		15							Join larger foraging flock of 16 whooper swans
SSA VP3	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	6	08:49:00	On	30							
SSA VP3	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	4	08:53:00	On	15							
SSA VP3	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	3	09:13:00	On	15	15						
SSA VP3	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	1	09:25:00	On	15							
SSA VP3	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	2	09:40:00	On	15							
SSA VP4	22/11/2022	14:00:00	17:00:00	Whooper Swan_WS	8	15:27:00			5	20					flying over G heading NW
SSA VP4	22/11/2022	14:00:00	17:00:00	Whooper Swan_WS	8	16:07:00			45						flying over G heading W
SSA VP4	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	6	08:50:00			25						flying over G heding NE
SSA VP4	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	11	08:55:00		10	25						flying over G heading N
SSA VP4	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	7	10:23:00			15						flying over G heading SW

SSA VP5	22/11/2022	14:00:00	17:00:00	Nil Sightings											
SSA VP5	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	5	07:42:00	On			15					
SSA VP5	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	10	08:14:00	On			20					
SSA VP5	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	2	08:41:00	On	3	7						
SSA VP5	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	3	08:54:00	On		7						
SSA VP5	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	3	09:11:00	On			20					
SSA VP5	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	2	09:14:00	On	10	10						
SSA VP5	23/11/2022	07:35:00	10:35:00	Whooper Swan_WS	5	10:27:00	On	5	5						
WF1	22/11/2022	14:00:00	17:00:00	Nil Sightings											
WF1	23/11/2022	07:35:00	10:35:00	Nil Sightings											
WF 2	22/11/2022	14:00:00	17:00:00	Nil Sightings											
WF 2	23/11/2022	07:30:00	10:30:00	Nil Sightings											
SSA VP1	19/12/2022	13:50:00	16:50:00	Nil Sightings											
SSA VP2	19/12/2022	13:41:00	17:03:00	Nil Sightings											no sightings
SSA VP3	19/12/2022	13:52:00	16:45:00	Whooper Swan_WS	2	14:18:00		1		10					10
SSA VP3	19/12/2022	13:52:00	16:45:00	Whooper Swan_WS	35	14:20:00		2	5	10					15
SSA VP3	19/12/2022	13:52:00	16:45:00	Whooper Swan_WS	5	14:25:00		3	3	2					5
SSA VP3	19/12/2022	13:52:00	16:45:00	Whooper Swan_WS	3	14:33:00		4		10					10

SSA VP3	19/12/2022	13:52:00	16:45:00	Whooper Swan_WS	18	16:08:00		5	5	10					15
SSA VP4	19/12/22	13:45:00	16:45:00	Nil Sightings											
SSA VP5	19/12/2022	13:45	16:45	Whooper Swan_WS	2	14:22		1	2	3	5				10
SSA VP5	19/12/2022	13:45	16:45	Whooper Swan_WS	3	14:36		2	2	3	5				10
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	3	08:07:00		1	5	5	20				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	7	08:15:00		2	5	15	10				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	11	08:18:00		3	5	5	20				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	5	08:20:00		4	5	5	20				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	9	08:24:00		5	5	5	20				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	5	08:25:00		6	5	15	10				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	2	08:26:00		7	5	15					20
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	5	08:28:00		8	5	5	20				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	7	08:37:00		9	5	5	20				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	3	08:43:00		10	10	10					20
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	4	09:30:00		11	10	5	5				20
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	5	09:26:00		12	5	5	10				20
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	5	09:41:00		13	10	10	10				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	4	09:43:00		14	10	10	10				30

SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	9	09:44:00		15	20	20	10				50
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	2	09:46:00		16	5	15					20
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	3	09:58:00		17	5	15	10				30
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	4	10:00:00		18	5	5	5	5			20
SSA VP1	20/12/2022	08:00:00	11:00:00	Whooper Swan_WS	7	10:01:00		19	10	10					20
SSA VP2	20/12/2022	07:52:00	11:04:00	Nil sightings											no sightings
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	1	08:22:00		1		5	10				15
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	2	08:38:00		2		5	15				20
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	1	08:40:00		3			15				15
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	3	08:56:00		4			8				8
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	2	09:06:00		5		6	15				21
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	2	09:06:00		6		4	6				10
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	1	09:08:00		7		5					5
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	3	09:36:00		8			8				8
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	2	09:38:00		9			10				10
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	12	10:02:00		10		2	10				12
SSA VP3	20/12/2022	08:06:00	11:06:00	Whooper Swan_WS	1	10:04:00		11			11				11
SSA VP4	20/12/22	08:00:00	11:00:00	Whooper Swan_WS	5	08:11:00		1		30					30

SSA VP4	20/12/22	08:00:00	11:00:00	Whooper Swan_WS	2	08:26:00		2		50					50
SSA VP4	20/12/22	08:00:00	11:00:00	Whooper Swan_WS	5	09:03:00		3		45					45
SSA VP4	20/12/22	08:00:00	11:00:00	Whooper Swan_WS	5	09:37:00		4		20					20
SSA VP4	20/12/22	08:00:00	11:00:00	Whooper Swan_WS	6	10:50:00		5		25					25
SSA VP5	19/12/2022	13:45	16:45	Whooper Swan_WS	2	14:22		1	2	3	5				10
SSA VP5	19/12/2022	13:45	16:45	Whooper Swan_WS	3	14:36		2	2	3	5				10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	16	08:06		1	2	3	5				10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	3	08:11		2	2	3	5				10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	10	08:13		3			20				20
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	6	08:14		4	2	3	5				10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	2	08:22		5	2	3	5				10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	11	08:52		6	5	5	5				15
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	2	09:02		7	5	5					10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	5	09:02		8	5	5					10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	5	09:03		9	5	5					10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	6	09:25		10	5	5					10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	9	09:29		11	5	5					10
SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	4	09:34		12	2	3	5				10

SSA VP5	20/12/2022	08:00	11:00	Whooper Swan_WS	4	09:55		13	3	2					5
WF 1	20/12/2022	08:00:00	11:00:00	Nil Sightings											
WF 1	19/12/2022	13:45:00	16:45:00	Nil Sightings											
WF 2	19/12/2022	13:45:00	16:45:00	Nil Sightings											
WF 2	20/12/2022	08:00:00	11:00:00	Nil Sightings											
SSA VP1	24/01/2023	15:28:00	17:57:00	Whooper Swan_WS	42	17:32:00		1		25					25
SSA VP1	24/01/2023	15:28:00	17:57:00	Whooper Swan_WS	15	17:35:00		2		20					20
SSA VP2	24/01/2023	14:30:00	17:30:00	Nil Sightings											
SSA VP3	24/01/2023	15:34:00	17:34:00	Whooper Swan_WS	2	17:34:00		1		2					2
SSA VP4	24/01/2023	14:30:00	17:30:00	Nil Sightings											
SSA VP5	24/01/2023	14:30	17:30	Whooper Swan_WS	7	17:23		1	5	15					20
SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	8	07:58:00		1		12					12
SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	4	08:09:00		2	10	7					17
SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	22	08:11:00		3	11	8					19
SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	10	08:12:00		4	10	6					16
SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	15	08:13:00		5	9	8					17
SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	5	08:14:00		6	10	8					18
SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	7	08:14:00		7		7					7

SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	5	08:16:00		8	12						12
SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	2	08:17:00		9	5						5
SSA VP1	25/01/2023	07:55:00	11:08:00	Whooper Swan_WS	3	08:18:00		10	8	8					16
SSA VP2	25/01/2023	07:50:00	10:50:00	Whooper Swan_WS	4	08:11:00		1	10	2					12
SSA VP3	25/01/2023	07:50:00	10:50:00	Whooper Swan_WS	5	08:10:00		1		10					10
SSA VP3	25/01/2023	07:50:00	10:50:00	Whooper Swan_WS	10	09:55:00		2			10				10
SSA VP3	25/01/2023	07:50:00	10:50:00	Whooper Swan_WS	10	10:15:00		3			5				5
SSA VP3	25/01/2023	07:50:00	10:50:00	Whooper Swan_WS	30	10:10:00		4							
SSA VP4	25/01/2023	07:50:00	10:50:00	Whooper Swan_WS	10	08:00:00		1	10						10
SSA VP4	25/01/2023	07:50:00	10:50:00	Whooper Swan_WS	21	08:05:00		2	25						25
SSA VP4	25/01/2023	07:50:00	10:50:00	Whooper Swan_WS	7	08:08:00		3	15						15
SSA VP5	25/01/2023	07:50	10:50	Whooper Swan_WS	10	08:02		1	3	2					5
SSA VP5	25/01/2023	07:50	10:50	Whooper Swan_WS	10	08:10		2	5	5					10
SSA VP5	25/01/2023	07:50	10:50	Whooper Swan_WS	7	08:10		3			15				15
SSA VP5	25/01/2023	07:50	10:50	Whooper Swan_WS	2	08:11		4	5						5
SSA VP5	25/01/2023	07:50	10:50	Whooper Swan_WS	7	08:12		5	5	5					10
SSA VP5	25/01/2023	07:50	10:50	Whooper Swan_WS	8	08:14		6	5	5	5				15
WF 1	24/01/2023	14:30:00	17:30:00	Nil Sightings											

WF 1	25/01/2023	07:50:00	10:50:00	Nil Sightings											
WF 2	24/01/2023	14:30:00	17:30:00	Nil Sightings											
WF 2	25/01/2023	07:50:00	10:50:00	Nil Sightings											
SSA VP1	22/02/2023	15:30:00	18:30:00	Nil Sightings											
SSA VP2	22/02/2023	15:30:00	18:30:00	Nil Sightings											
SSA VP3	22/02/2023	15:30:00	18:30:00	Nil Sightings											
SSA VP4	22/02/2023	15:30:00	18:30:00	Nil Sightings											
SSA VP5	22/02/2023	15:30	18:30	Nil Sightings											
WF VP1	22/02/2023	15:30:00	18:30:00	Nil Sightings											
WF VP2	22/02/2023	15:30:00	18:30:00	Nil Sightings											
SSA VP1	23/02/2023	07:00:00	10:00:00	Nil Sightings											
SSA VP2	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	8	07:13:00		1	25						25
SSA VP2	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	31	07:22:00		2	20	35					55
SSA VP2	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	6	07:25:00		3	10	10					20
SSA VP2	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	3	07:26:00		4	15	10					25
SSA VP2	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	4	07:47:00		5	5						5
SSA VP2	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	6	07:49:00		6	5						5
SSA VP2	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	2	08:08:00		7		15	80				95

SSA VP3	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	12	07:14		1				20			20
SSA VP3	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	3	07:16		2				10			10
SSA VP3	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	10	07:18		3				10			10
SSA VP3	23/02/2023	07:00:00	10:00:00	Whooper Swan_WS	2	07:27		4				5			5
SSA VP4	23/02/2023	07:00:00	10:00:00	Nil Sightings											
SSA VP5	23/02/2023	07:00	10:00	Whooper Swan_WS	11	07:13		1	5	10	5				20
SSA VP5	23/02/2023	07:00	10:00	Whooper Swan_WS	3	07:18		2	5	10	5				20
SSA VP5	23/02/2023	07:00	10:00	Whooper Swan_WS	7	07:21		3	10	5	5				20
SSA VP5	23/02/2023	07:00	10:00	Whooper Swan_WS	5	07:22		4			30				30
SSA VP5	23/02/2023	07:00	10:00	Whooper Swan_WS	10	07:31		5	5	15					20
SSA VP5	23/02/2023	07:00	10:00	Whooper Swan_WS	9	07:34		6	5	5	10				20
SSA VP5	23/02/2023	07:00	10:00	Whooper Swan_WS	7	09:15		7	5	5					10
WF VP1	23/02/2023	07:00:00	10:00:00	Nil Sightings											
WF VP2	23/02/2023	07:00:00	10:00:00	Nil Sightings											
SSA 1	15/03/2023	16:05:00	19:05:00	Nil Sightings											
SSA VP2	15/03/2023	16:05:00	19:05:00	Nil Sightings											
SSA 3	15/03/2023	16:05:00	19:05:00	Nil Sightings											
SSA VP4	15/03/2023	16:05:00	19:05:00	Whooper Swan_WS	2	17:35:00		1	10						10

SSA VP4	15/03/2023	16:05:00	19:05:00	Whooper Swan_WS	2	18:02:00		2	7						7
SSA VP5	15/03/2023	16:05:00	19:08:00	Whooper Swan_WS	7	17:37:00		1		5					5
SSA VP5	15/03/2023	16:05:00	19:08:00	Whooper Swan_WS	7	18:58:00		2		12					12
SSA VP5	15/03/2023	16:05:00	19:08:00	Whooper Swan_WS	10	19:01:00		3		9					9
WF1	15/3/23	16:05:00	19:05:00	Nil Sightings											
WF VP1	15/03/2023	16.05 pm	19.05pm	Nil Sightings											
SSA 1	16/03/2023	06:15:00	09:15:00	Nil Sightings											
SSA VP2	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	26	07:37:00		1		10	10				20
SSA VP2	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	7	07:40:00		2		20					20
SSA VP2	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	6	07:41:00		3		20					20
SSA VP2	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	34	07:49:00		4			20				20
SSA VP2	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	4	07:52:00		5		10	5				15
SSA VP2	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	22	07:55:00		6		30					30
SSA VP2	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	4	08:31:00		7		20					20
SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	2	06:38:00		1	40						40
SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	2	06:39:00		2	30						30
SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	3	06:47:00		3	40						40
SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	3	06:59:00		4	60						60

SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	12	07:07:00		5	60						60
SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	7	07:10:00		6	60						60
SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	14	07:14:00		7	40						40
SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	4	07:24:00		8	30						30
SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	4	08:24:00		9	60						60
SSA 3	16/03/2023	06:15:00	09:15:00	Whooper Swan_WS	6	08:27:00		10	60						60
SSA VP4	16/03/2023	06:15:00	09:15:00	Nil Sightings											
SSA VP5	16/03/2023	06:14:00	09:20:00	Whooper Swan_WS	4	06:54:00		1		13					13
SSA VP5	16/03/2023	06:14:00	09:20:00	Whooper Swan_WS	9	07:47:00		2		14					14
SSA VP5	16/03/2023	06:14:00	09:20:00	Whooper Swan_WS	2	08:57:00		3		23					23
SSA VP5	16/03/2023	06:14:00	09:20:00	Whooper Swan_WS	6	09:04:00		4		7					7
WF1	16/3/23	06:15:00	09:15:00	Nil Sightings											
WF VP1	16/03/2023	06.15 am	09.05am	Nil Sightings											
SSA 1	18/04/2023	18:00	21:00	Nil Sightings											
SSA2	18/04/2023	18.00 pm	21.00pm	Nil sightings											
3	18/04/2023	18:00:00	21:00:00	Nil Sightings											
SSA VP4	18/04/2023	18:00	21:00	Nil Sightings											
SSA VP5	18/04/2023	18:00	21:00	Nil Sightings											

WF1	18/4/23	18:00	21:00	Nil Sightings											
WF2	18/04/2023	18:00:00	21:00:00	Nil Sightings											
SSA 1	20/04/2023	06:00	09:00	Nil Sightings											
SSA 2	20/04/2023	06.00 am	09.00am	Nil sightings											
3	20/04/2023	06:00:00	09:00:00	Nil Sightings											
SSA VP4	20/04/2023	06:00	09:00	Nil Sightings											
SSA VP5	20/04/2023	06:00	09:00	Nil Sightings											
WF1	20/4/23	06:00	09:00	Nil Sightings											
WF2	20/04/2023	06:00:00	09:00:00	Nil Sightings											

Table 3-2022/23 Whooper Swan Census Survey - Weather Data

VP Name	Date	Start Time	End Time	Rain	Cloud	Visibility	Wind Speed	Wind Direction	Temp	Bird Notes
SSA VP1	20/09/22	17:01	20:01	None	7/8	15	F2	S	16	
SSA VP1	21/09/22	06:42	09:42	None	8/8	12	F2	S	11	
SSA VP2	20/09/22	17:01	20:01	None	7/8	15	F2	SW	15	
SSA VP2	21/09/22	06:42	09:42	None	5/8	15	F1	SW	12	
SSA VP3	20/09/22	17:01:00	20:01:00	None	8/8	15km	F2	SW	18° C	
SSA VP3	21/09/22	06:42	09:42	None	7/8	15km	F2	SW	16° C	
SSA VP4	20/09/22	17:01	20:01	None	7/8	16	F3	S	18	
SSA VP4	21/09/22	06:42	09:42	None	8/8	16	F1	S	12	
SSA VP5	20/09/22	17:01	20:01	None	7/8	16	F2	SW	15	

SSA VP5	21/09/22	06:42	09:42	None	3/8	16	F2	SW	13	
Turbine VP1	20/09/22	16:40	20:15	None	8/8	>5	F2	SW	16	no swan sightings
Turbine VP1	21/09/22	06:35	09:44	None	6/8	>5	F1	SW	12	no swan sightings
Turbine VP2	20/09/22	17:01	20:01	Dry	5/8	20	F2	SW	14	
Turbine VP2	21/09/22	06:42	09:42	Dry	6/8	20	F1	SE		
SSA VP1	26/10/2022	15:45:00	18:45:00	Occasional showers	6/8	20	F2	N	14	
SSA VP1	27/10/2022	07:45:00	10:45:00	Occasional showers	8/8	3	F2	N	14	
SSA VP2	26/10/2022	15:45:00	18:45:00	Dry	4/8	20	F4	N	14	
SSA VP2	27/10/2022	07:45	10:45	Occasional showers	8/8	3	F2	N	14	
SSA VP3	26/10/2022	15:45:00	18:45:00	Dry	3/8	20	F2	N	14	
SSA VP3	27/10/2022	07:45:00	10:45:00	Occasional showers	8/8	3	F2	N	14	
SSA VP4	26/10/2022	15:45	18:45	Dry	6/8	11	F4	SSW	14	
SSA VP4	27/10/2022	07:45	10:45	Occasional showers	8/8	5	F4	SE	14	
SSA VP 5	26/10/2022	15:45	18:45	None	4/8	16	F3	SSW	12	
SSA VP 5	27/10/2022	07:45	10:45	Occasional showers	8/8	16	F2	SSW	14	
1	26/10/2022	15:45:00	18:45:00	None	7/8	15	F4	SW	13	
1	27/10/2022	07:45:00	10:45:00	Occasional showers	8/8	2	F3	S	13	
2	26/10/2022	15:45:00	18:45:00	None	3/8	15	F4	SW	13	

2	27/10/2022	07:45:00	10:45:00	Occasional showers	7/8	2	F3	S	13	
SSA VP1	22/11/2022	14:00:00	17:00:00	Constant	8/8	2	F1	SW	8	Heard calling and then saw commuting across field right behind VP
SSA VP1	23/11/2022	07:35:00	10:35:00	Occasional showers	3/8	20	F1	SW	7	
SSA VP2	22/11/2022	14:00:00	17:00:00	Constant	3/8	2	F1	SW	7	
SSA VP2	23/11/2022	07:35:00	10:35:00	Occasional showers	3/8	20	F1	SW	7	
SSA VP3	22/11/2022	14:02:00	17:02:00	Occasional showers	8/8	18	F2	SSW	9	
SSA VP3	23/11/2022	07:35:00	10:35:00	Occasional showers	7/8	10	F3	WSW	7	Land in field to rest/forage
SSA VP4	22/11/2022	14:00:00	17:00:00	Heavy Showers	8/8	2	F3	W	9	flying over G heading NW
SSA VP4	23/11/2022	07:35:00	10:35:00	Dry	6/8	23	F4	SW	6	flying over G heding NE
SSA VP5	22/11/2022	14:00:00	17:00:00	Occasional showers	6/8	16	F2	SW	7	
SSA VP5	23/11/2022	07:35:00	10:35:00	Occasional showers	6/8	16	F2	SW	8	
WF1	22/11/2022	14:00:00	17:00:00	Occasional showers	8/8	4	F1	W	9	
WF1	23/11/2022	07:35:00	10:35:00	Light drizzle	2/8	20	F3	SW	6	
WF 2	22/11/2022	14:00:00	17:00:00	Occasional showers	8/8	1	F1	W	9	
WF 2	23/11/2022	07:30:00	10:30:00	Occasional showers	5/8	5	F1	W	7	
SSA VP1	19/12/2022	13:50:00	16:50:00	Occasional showers	5/8	15	F4	SW	10	
SSA VP2	19/12/2022	13:41:00	17:03:00	Heavy Showers	6/8	>5	F2	SW	11	no sightings
SSA VP3	19/12/2022	13:52:00	16:45:00	Occasional showers	3/8	15	F1	SW	10	10
SSA VP4	19/12/22	13:45:00	16:45:00	Occasional showers	5/8	11	F4	SW	12	

SSA VP5	19/12/2022	13:45	16:45	None	5/8	16	F3	SW	11	10
SSA VP1	20/12/2022	08:00:00	11:00:00	Drizzle	7/8	15	F3	SW	6	30
SSA VP2	20/12/2022	07:52:00	11:04:00	Dry	6/8	>3	F2	W	7	no sightings
SSA VP3	20/12/2022	08:06:00	11:06:00	Occasional showers	7/8	15	F2	SW	6	15
SSA VP4	20/12/22	08:00:00	11:00:00	Light drizzle	6/8	16	F3	SSW	7	30
SSA VP5	19/12/2022	13:45	16:45	None	5/8	16	F3	SW	11	10
SSA VP5	20/12/2022	08:00	11:00	None	3/8	16	F2	SW	9	10
WF 1	20/12/2022	08:00:00	11:00:00	Dry	3/8	20	F4	SW	5	
WF 1	19/12/2022	13:45:00	16:45:00	Occasional showers	5/8	20	F4	SW	9	
WF 2	19/12/2022	13:45:00	16:45:00	Single shower	6/8	20	F4	SW	10	
WF 2	20/12/2022	08:00:00	11:00:00	Dry	3/8	12	F3	SW	6	
SSA VP1	24/01/2023	15:28:00	17:57:00	16	None	F3	SSE	5/8	10	25
SSA VP5	24/01/2023	14:30	17:30	16	Light Showers	F2	SSE	8/8	8	20
SSA VP1	25/01/2023	07:55:00	11:08:00	10	None	F2	WSW	6/8	8	12
SSA VP2	25/01/2023	07:50:00	10:50:00	10	None	F2	W	7/8	6	12
SSA VP3	25/01/2023	07:50:00	10:50:00	10	None	F2	W	7/8	6	10
SSA VP4	25/01/2023	07:50:00	10:50:00	13	Dry	F1	NW	8/8	6	10
SSA VP5	25/01/2023	07:50	10:50	10	Light drizzle	F3	SSE	8/8	6	5
WF 1	24/01/2023	14:30:00	17:30:00	<1	Drizzle	F3	SW	8/8	8	

WF 1	25/01/2023	07:50:00	10:50:00	<1	None	F2	W	8/8	6	
WF 2	24/01/2023	14:30:00	17:30:00	2	Light mist clearing	F1	NE	8/8	9	
WF 2	25/01/2023	07:50:00	10:50:00	2	Dry	F1	N	8/8	8	
SSA VP1	22/02/2023	15:30:00	18:30:00	20	None	F4	NW	1/8	5	
SSA VP2	22/02/2023	15:30:00	18:30:00	20	None	F4	NW	1/8	5	
SSA VP3	22/02/2023	15:30:00	18:30:00	20	Dry	F1	NE	2/8	5	
SSA VP4	22/02/2023	15:30:00	18:30:00	>20	None	F3	NNW	2/8	6	
SSA VP5	22/02/2023	15:30	18:30	16	None	F2	WNW	2/8	6	
WF VP1	22/02/2023	15:30:00	18:30:00	4	None	F1	NNW	4/8	5	
WF VP2	22/02/2023	15:30:00	18:30:00	2	Dry	F1	N	5/8	4	
SSA VP1	23/02/2023	07:00:00	10:00:00	15	None	F3	N	1/8	1	
SSA VP2	23/02/2023	07:00:00	10:00:00	15	None	F3	N	1/8	1	25
SSA VP3	23/02/2023	07:00:00	10:00:00	20	Dry	F1	NE	1/8	2	20
SSA VP4	23/02/2023	07:00:00	10:00:00	>20	None	F2	N	1/8	1	
SSA VP5	23/02/2023	07:00	10:00	16	None	F2	NNW	1/8	5	20
WF VP1	23/02/2023	07:00:00	10:00:00	2	None	F1	NNW	4/8	5	
WF VP2	23/02/2023	07:00:00	10:00:00	5	Dry	F2	E	1/8	1	
SSA 1	15/03/2023	16:05:00	19:05:00	Drizzle	8/8	2	F4	S	10	
SSA VP2	15/03/2023	16:05:00	19:05:00	Constant	8/8	2	F5	SE	10	

SSA 3	15/03/2023	16:05:00	19:05:00	Constant	8/8	2	F3	SSE	10	
SSA VP4	15/03/2023	16:05:00	19:05:00	Heavy Showers	8/8	2	F4	S	11	10
SSA VP4	15/03/2023	16:05:00	19:05:00	Heavy Showers	8/8	2	F4	S	11	7
SSA VP5	15/03/2023	16:05:00	19:08:00	Constant	7/8	2	F2	SSE	7	5
WF1	15/3/23	16:05:00	19:05:00	Constant	8/8	<1	F2	N	10	
WF VP1	15/03/2023	16.05pm	19.05 pm	Heavy Showers	8/8	<1	F5	SE	5	
SSA 1	16/03/2023	06:15:00	09:15:00	Drizzle	8/8	2	F4	S	11	
SSA VP2	16/03/2023	06:15:00	09:15:00	Heavy Showers	8/8	2	F5	S	11	20
SSA 3	16/03/2023	06:15:00	09:15:00	Occasional showers	8/8	2	F3	S	10	40
SSA VP4	16/03/2023	06:15:00	09:15:00	Heavy Showers	8/8	2	F4	S	10	
SSA VP5	16/03/2023	06:14:00	09:20:00	Drizzle/rain	5/8	3	F3	S	5	13
WF1	16/3/23	06:15:00	09:15:00	Occasional showers	8/8	<1	F2	N	10	
WF VP1	16/03/2023	06.15am	09.05 am	Heavy Showers	8/8	<1	F5	SW	10	
SSA 1	18/04/2023	18:00	21:00	None	1/8	5	F3	E	12	
SSA2	18/04/2023	18.00pm	21.00 pm	Dry	1/8	5	F1	E	12	
3	18/04/2023	18:00:00	21:00:00	None	3/8	16	F2	ESE	12	
SSA VP4	18/04/2023	18:00	21:00	Dry	1/8	16	F3	E	13	
SSA VP5	18/04/2023	18:00	21:00	None	1/8	16	F2	ESE	12	
WF1	18/4/23	18:00	21:00	None	3/8	3	F2	NW	9	

WF2	18/04/2023	18:00:00	21:00:00	None	1/8	15	F4	SE	14	
SSA 1	20/04/2023	06:00	09:00	None	1/8	10	F4	E	7	
SSA 2	20/04/2023	06.00am	09.00 am	Dry	2/8	2	F1	E	7	
3	20/04/2023	06:00:00	09:00:00	None	0/8	16	F2	E	7	
SSA VP4	20/04/2023	06:00	09:00	Dry	0/8	16	F3	E	6	
SSA VP5	20/04/2023	06:00	09:00	None	0/8	16	F4	E	8	
WF1	20/4/23	06:00	09:00	None	2/8	4	F2	SW	7	
WF2	20/04/2023	06:00:00	09:00:00	None	1/8	15	F3	SE	7	

Site Location	Date Surveyed
Site 1	Dusk 20/09/22, Dawn 21/09/22, Dusk 26/10/22, Dawn 27/10/22, Dusk 22/11/22, Dawn 23/11/22, Dusk 19/12/22, Dawn 20/12/22, Dusk 24/01/23, Dawn 25/01/23, Dusk 22/02/23, Dawn 23/02/23, Dusk 15/03/23, Dawn 16/03/23, Dusk 18/04/23, Dawn 20/04/23
Site 2	Dusk 20/09/22, Dawn 21/09/22, Dusk 26/10/22, Dawn 27/10/22, Dusk 22/11/22, Dawn 23/11/22, Dusk 19/12/22, Dawn 20/12/22, Dusk 24/01/23, Dawn 25/01/23, Dusk 22/02/23, Dawn 23/02/23, Dusk 15/03/23, Dawn 16/03/23, Dusk 18/04/23, Dawn 20/04/23
Site 3	Dusk 20/09/22, Dawn 21/09/22, Dusk 26/10/22, Dawn 27/10/22, Dusk 22/11/22, Dawn 23/11/22, Dusk 19/12/22, Dawn 20/12/22, Dusk 24/01/23, Dawn 25/01/23, Dusk 22/02/23, Dawn 23/02/23, Dusk 15/03/23, Dawn 16/03/23, Dusk 18/04/23, Dawn 20/04/23
Site 4	Dusk 20/09/22, Dawn 21/09/22, Dusk 26/10/22, Dawn 27/10/22, Dusk 22/11/22, Dawn 23/11/22, Dusk 19/12/22, Dawn 20/12/22, Dusk 24/01/23, Dawn 25/01/23, Dusk 22/02/23, Dawn 23/02/23, Dusk 15/03/23, Dawn 16/03/23, Dusk 18/04/23, Dawn 20/04/23
Site 5	Dusk 20/09/22, Dawn 21/09/22, Dusk 26/10/22, Dawn 27/10/22, Dusk 22/11/22, Dawn 23/11/22, Dusk 19/12/22, Dawn 20/12/22, Dusk 24/01/23, Dawn 25/01/23, Dusk 22/02/23, Dawn 23/02/23, Dusk 15/03/23, Dawn 16/03/23, Dusk 18/04/23, Dawn 20/04/23
VP 1	Dusk 20/09/22, Dawn 21/09/22, Dusk 26/10/22, Dawn 27/10/22, Dusk 22/11/22, Dawn 23/11/22, Dusk 19/12/22, Dawn 20/12/22, Dusk 24/01/23, Dawn 25/01/23, Dusk 22/02/23, Dawn 23/02/23, Dusk 15/03/23, Dawn 16/03/23, Dusk 18/04/23, Dawn 20/04/23
VP 2	Dusk 20/09/22, Dawn 21/09/22, Dusk 26/10/22, Dawn 27/10/22, Dusk 22/11/22, Dawn 23/11/22, Dusk 19/12/22, Dawn 20/12/22, Dusk 24/01/23, Dawn 25/01/23, Dusk 22/02/23, Dawn 23/02/23, Dusk 15/03/23, Dawn 16/03/23, Dusk 18/04/23, Dawn 20/04/23

Appendix 7.2: Bird Survey Data 2015 to 2023

A7.2.6

2023 Bird Survey Data (Inis Environmental Consultants)

Table 1 2023 VP Survey Data

VP Name	Date	Start Time	End Time	Species	Number	Time of sighting	<10m	10-20m	20-30m	30-40m	40-50m	50-160m	>160m	Bird Notes
1	March	12.05	15.05	Buzzard_BZ	2	13:32				60				Two separate birds in this bout. One flying over forestry for 30s and one flying over Grazing for 30s
1	March	12.05	15.05	Buzzard_BZ	1	13:36					30			
1	March	12.05	15.05	Buzzard_BZ	1	13:42						60		
1	March	12.05	15.05	Buzzard_BZ	2	14:13						60		
1	March	12.05	15.05	Buzzard_BZ	1	14:26						120		
1	March	12.05	15.05	Buzzard_BZ	2	14:35						60		
1	March	15.35	18.35	Buzzard_BZ	1	15:42					30			
1	April	09.10	12.10	Buzzard_BZ	1	11:16				120		180	240	
1	April	09.10	12.10	Kestrel_K.	1	11:34		30		60		150	240	
1	April	09.10	12.10	Buzzard_BZ	1	11:49						300		
1	April	09.10	12.10	Kestrel_K.	1	12:00				10				
1	April	07.40	10.40	Buzzard_BZ	1	09:36						600		
1	April	07.40	10.40	Buzzard_BZ	1	10:32					30			
1	May	12:50	15:50	Kestrel_K.	1	13:56						30		
1	May	12:50	15:50	Buzzard_BZ	1	15:07					30	30	120	
1	May	12:50	15:50	Herring Gull_HG	1	15:07						60		
1	May	16:20	19:20	Buzzard_BZ	1	16:24						180		
1	May	16:20	19:20	Buzzard_BZ	1	16:31					30	90	180	
1	May	16:20	19:20	Buzzard_BZ	1	16:46			10	20	30			
1	May	16:20	19:20	Buzzard_BZ	1	17:32			60	60	180			
1	May	16:20	19:20	Buzzard_BZ	1	17:52				120	120			
1	May	16:20	19:20	Buzzard_BZ	1	18:09				120	180	60		

Table 2 2023 VP Survey Weather Data

VP Name	Date	Start Time	End Time	Visibility (km)	Rain	Wind Speed	Wind Direction	Cloud	Temp.
1	March	12.05	15.05	2	dry	F3	N	6/8	14
1	March	12.05	15.05	2	dry	F3	N	6/8	14
1	March	12.05	15.05	2	dry	F3	N	6/8	14
1	March	12.05	15.05	2	dry	F3	N	6/8	14
1	March	12.05	15.05	2	dry	F3	N	6/8	14
1	March	12.05	15.05	2	dry	F3	N	6/8	14
1	March	15.35	18.35	2	dry	F2	N	7/8	14
1	April	09.10	12.10	Dry	4/8	2	F2	SW	13
1	April	09.10	12.10	Dry	4/8	2	F2	SW	13
1	April	09.10	12.10	Dry	4/8	2	F2	SW	13
1	April	09.10	12.10	Dry	4/8	2	F2	SW	13
1	April	07.40	10.40	Dry	8/8	2	F1	N	10
1	April	07.40	10.40	Dry	8/8	2	F1	N	10
1	May	12:50	15:50	Dry	5/8	2	F1	E	19
1	May	12:50	15:50	Dry	5/8	2	F1	E	19
1	May	12:50	15:50	Dry	5/8	2	F1	E	19
1	May	16:20	19:20	Dry	5/8	2	F1	E	20
1	May	16:20	19:20	Dry	5/8	2	F1	E	20
1	May	16:20	19:20	Dry	5/8	2	F1	E	20
1	May	16:20	19:20	Dry	5/8	2	F1	E	20
1	May	16:20	19:20	Dry	5/8	2	F1	E	20
1	May	16:20	19:20	Dry	5/8	2	F1	E	20