

**REFERENCE DOCUMENTS for
PROPOSED LARGER TURBINES AND MET MASTS
AT UPPERCHURCH WINDFARM
for EIAR 2021 and AA 2021**

REFERENCE DOCUMENT 35 of 36

This document contains the following:

UWF Replacement Forestry

- **2018 Natura Impact Statement for Whole UWF Project Elements 1 to 5 – Volume D5 (Volume 5 of 6)**
 - Appendix A12: Biodiversity Information: EIAR for UWF Related Works Ch.8
Biodiversity
 - Appendix A13: Biodiversity Information: EIAR for UWF Replacement Forestry Ch.8
Biodiversity

VOLUME D: APPROPRIATE ASSESSMENT REPORTING

Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

May 2018

Volume D5 (Volume 5 of 6)

**Appendix A12: Biodiversity Information: EIAR for UWF Related Works Ch.8
Biodiversity**

**Appendix A13: Biodiversity Information: EIAR for UWF Replacement Forestry
Ch.8 Biodiversity**



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Appendix A12: Biodiversity Information

EIAR for UWF Related Works Ch.8 Biodiversity



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UWF Related Works EIA Report

Volume C2: EIAR Main Report

Chapter 8: Biodiversity

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May 2018

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Figures and mapping referenced in this topic chapter can be found in **Volume C3 EIA R Figures.**

List of Appendices

<u>Appendix No.</u>	<u>Appendix Title</u>
Appendix 8-1	Detailed Biodiversity Data and Supplementary Information

Appendices referenced in this topic chapter can be found in **Volume C4 EIA R Appendices.**

Glossary of Terms

<u>Term</u>	<u>Definition</u>
Afforestation	The establishment of a forest or stand of trees (forestation) in an area where there was no previous tree cover
Anadromous	Fish that migrate up rivers from the sea to spawn
Appropriate Assessment	An assessment required by the EU Habitats Directive where a project (or plan) would be likely to have a significant effect on a European site, either alone or in combination with other plans or projects
Avoidance	Prevention of impacts occurring, having regard to predictions about potentially negative environmental effects (e.g. project decisions about site location or design).
Baseline Environment	The conditions that would pertain in the absence of the proposed project at the time that the project would be constructed / operated / decommissioned. The definition of these baseline conditions should be informed by changes arising from other causes (e.g. other consented developments)
Bern Convention	Convention on the Conservation of European Wildlife and Natural Habitats in Bern in 1992 ensures that governments take into account the conservation needs of species during the formulation of planning and development policies
Biodiversity	The biological diversity of the earth’s living resources. The total variability among organisms and ecosystems. In common usage, and within these Guidelines, biodiversity is used to describe the conservation of the natural environment, rather than describing the variation within it.
Catchment	A catchment area is a hydrological unit. Each drop of precipitation that falls into a catchment area eventually ends up in the same river. Catchment areas are separated from each other by watershed
Climate change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Compensation	Measures taken to make up for the loss of, or permanent damage to, ecological features despite mitigation. Any replacement area should be similar in terms of biological features and ecological functions that have been lost or damaged, or with appropriate management have the ability to reproduce the ecological functions and conditions of those biological features.
Competent Authority	An organisation or individual who is responsible for determining an application for consent for a project. Competent authorities in relation to Appropriate Assessment in Ireland are set out in SI 477 of 2011.
Conceptual Site Model	Model used to facilitate the identification of source-pathway-receptor links between a project and the receiving environment
Connectivity	A measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.
Conservation objective	Objective for the conservation of biodiversity (e.g. specific objective within a management plan or broad objectives of policy).
Conservation status	The state of a species or habitat including for example, extent, abundance, distribution and their trends.
Couches	Overground nest like structure used by Otter for resting and/or breeding
Cumulative impact / effect	Additional changes caused by a proposed development in conjunction with other developments or the combined effect of a set of developments taken together.

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Term	Definition
Degradation	The condition or process of degrading or being degraded.
Designated Sites	General term for sites which have been designated for nature conservation and for which legal protection has been conferred onto the sites. In Ireland, these included Special Areas of Conservation and Special Protection Areas. In addition to Natural Heritage Areas designated under national legislation.
Displacement	The action of moving something from its place or position.
Distribution	The geographical presence of a feature. This can depend on factors such as climate and altitude.
Disturbance	Disturbance is a temporary change in environmental conditions that causes a pronounced change in an ecosystem.
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit
Effect	Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow. See also 'Impact'.
EIAR	Environmental Impact Assessment Report
Endangered	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (Section V of IUCN Red List Categories and Criteria (2012) Version 3.1 2nd edn.), and it is therefore considered to be facing a very high risk of extinction in the wild.
Enhancement	The genuine enhancement of the natural heritage interest of a site or area because the project includes improved management or new habitats or features, which are better than the prospective management, or the habitats or features present there now. There is, therefore, a net or new benefit to the natural heritage
Environmental Impact Assessment (EIA)	Assessment of projects carried out under the EIA Directive and Regulations.
Environmental Impact Assessment Report	A document describing the effects of a project on the environment prepared during EIA
European sites	Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs) which comprise the Natura 2000 network which are designated under European legislation
Fauna	Fauna is all of the animal life of any particular region or time.
Favourable condition	Satisfactory condition of an ecological feature. In some cases, favourable condition is specifically defined (e.g. for some designated sites).
Flora	Flora is the plant life occurring in a particular region or time.
Flora Protection Order	The current list of plant species protected by Section 21 of the Wildlife Act, 1976 is set out in the Flora (Protection) Order, 2015, which supersedes orders made in 1980, 1987 and 1999.
Fragmentation	The breaking up of a habitat, ecosystem or land-use type into smaller parcels with a consequent impairment of ecological function.
Groundwater	Groundwater is the water found underground in the cracks and spaces in soil, sand and rock. It is stored in and moves slowly through geologic formations of soil, sand and rocks called aquifers.
Habitat	The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together
Hinterland	Area of surrounding landscape

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Term	Definition
Holts	Created or existing underground shelter used by Otter for resting and/or breeding
Hydrological	Associated with or related to the scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.
Impact	Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow. See also 'Effect'
Important ecological features	Ecological features requiring specific assessment within EclA. Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat / species rarity).
Larvae	Plural form of larva; The active immature form of an insect, especially one that differs greatly from the adult and forms the stage between egg and pupa
Life-cycle stages	In this context, the stages of a project; i.e. Construction, Operational and Decommissioning
Mitigation/Mitigation Measures	Measures taken to avoid or reduce negative impacts. Measures may include: locating the development and its working areas and access routes away from areas of high ecological interest, fencing off sensitive areas during the construction period, or timing works to avoid sensitive periods. An example of a reduction measure is a reed bed silt trap that is designed to minimise the amount of polluted water running directly into an ecologically important watercourse. See also compensation (which is separate from mitigation).
Natura Impact Statement	Under the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), an EclA report including the scientific assessment of a plan or project in relation to relevant Natura 2000 sites and other information required to enable a competent authority to carry out an Appropriate Assessment
Natural Heritage Area	The basic designation for wildlife in Ireland is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.
Non-native invasive species	Any non-native animal or plant that has the ability to spread causing damage to the environment, the economy, our health and the way we live. Equivalent of 'alien species' as used by the Convention on Biological Diversity
Non-Volant	Incapable of flight
Population	A collection of individuals (plants or animals), all of the same species and in a defined geographical area.
Precautionary Principle	The principle that the absence of complete information should not preclude precautionary action to mitigate the risk of significant harm to the environment.
Project Design Measure	Measures for environmental protection, incorporated into the design of the project.
Proposed Natural Heritage Area	Proposed NHAs (pNHAs) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats are subject to limited protection, in the form of agri-environmental farm planning schemes, NPWS approval for afforestation schemes on pNHA lands and recognition of the ecological value of pNHAs by Planning and Licencing Authorities
Qualifying Interest	Habitats listed on Annex I and Species listed on Annex II of the EU Habitats Directive for which Special Areas of Conservation have been designated.
Rarity	A measure of relative abundance
Receptors	Any ecological or other defined feature (e.g. human beings) that is sensitive to or has the potential to be affected by an impact.

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Term	Definition
Replacement	The creation of a habitat that is an acceptable substitute for the habitat which has been lost.
Restoration	The re-establishment of a damaged or degraded system or habitat to a close approximation of its pre-degraded condition.
Riparian	Relating to or situated on the banks of a river
Roost	Resting place for a bird or bat
SAC/cSAC	Site designated according to the habitats directive. Special area of conservation means a site of Community importance designated by the Member States through a statutory, administrative and/or contractual act where the necessary conservation measures are applied for the maintenance or restoration, at a favourable conservation status, of the natural habitats and/or the populations of the species for which the site is designated
Scoping	The process of determining the content and extent of the matters which should be covered in the environmental information (the EIA Report) to be submitted to a Competent Authority for developments which are subject to EIA.
Screening	Determination of whether or not an EIA is necessary.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Sett	Series of underground tunnels and chambers of varying complexity used by Badgers for resting and breeding
Significance	The importance of the outcome of the impact (or the consequence of change) for the receiving environment.
Source-Impact-Pathways	Method used to identify the source of any potential impacts, predicting any potential impacts and identifying the pathways by which the potential impacts can reach the sensitive receptor
SPA	Area classified under Article 4 of the birds directive (Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds).
Special Conservation Interest	Species listed on Annex I of the EU Birds Directive as well as wetland habitats for which Special Protection Areas have been designated for the conservation of birds.
Sustainable Development	Sustainable development is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations.
Taxa	Plural form of Taxon; a taxonomic group of any rank, such as a species, family, or class.
Tributary	A river or stream which flows into a larger river or lake
Turbary	Turf-cutting, the legal right to cut turf or peat for fuel on common ground or on another person's ground
Upland	Area of hilly or mountainous land. Upland habitats are defined as unenclosed areas of land over 150 m and contiguous areas of related habitat that extend below this altitude
Vulnerable	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V of IUCN Red List Categories and Criteria (2012) Version 3.1 2nd edn.), and it is therefore considered to be facing a high risk of extinction in the wild.
Zone(s) of Influence	The area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities.

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List of Abbreviations

Abbreviation	Full Term
AA	Appropriate Assessment
ABP	An Bord Pleanála
AMM	Ecopower Additional Mitigation Measure developed by members of the EIAR Team
BCI	Bat Conservation Ireland
BOCCI	Birds of Conservation Concern in Ireland
BPM	Ecopower Best Practice Measure developed by members of the EIAR Team
BWI	Birdwatch Ireland
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
DAHRGA	Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
DoEHLG	Department of Environment, Heritage and Local Government
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ERFB	Eastern Regional Fisheries Board
FPO	Flora Protection Order
GSI	Geological Survey of Ireland
IEEM	Institute of Ecology and Environmental Management
IFI	Inland Fisheries Ireland
IFM	Institute of Fisheries Management
JNCC	Joint Nature Conservation Committee
NBDC	National Biodiversity Data Centre
NGO	Non-Governmental Organisation
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
OSI	Ordnance Survey of Ireland
PD	Ecopower Project Design Environmental Protection Measure developed by members of the EIAR Team
PEA	Preliminary Ecological Appraisal
pNHA	Proposed Natural Heritage Area
RFI	Request for Further Information
SAC/cSAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SNH	Scottish Natural Heritage
SPA	Special Protection Area
UGC	Underground Cable
UWF	Upperchurch Windfarm

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8 Environmental Factor: Biodiversity

8.1 Introduction to the Biodiversity Chapter

8.1.1 What is Biodiversity?

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

8.1.2 Overview of Biodiversity in the Local Environment

The UWF Related Works are located within the Slievefelim to Silvermines mountains area. The receiving environment is representative of typical upland habitats, and includes lands under active management for agriculture and forestry. Features of the local environment on or around the works include the Bilboa River in the Lower River Shannon catchment and tributaries of the Multeen River such as the Clodiagh, Owenbeg and the Turraheen River which form part of the Lower River Suir catchment.

Birds, Bats and other mammals, amphibians, reptiles and invertebrates are present within the receiving environment.

European Sites such as the Slievefelim to Silvermines Mountains SPA, the Lower River Shannon cSAC, and the Lower River Suir cSAC, are found in the surrounding area. Both of the cSACs mentioned are designated for the protection of salmonids and freshwater aquatic species. The Slievefelim to Silvermines Mountains SPA is designated for the protection of Hen Harrier. NHAs and pNHAs are also found within the surrounding area.

The location of the UWF Related Works is illustrated on OSI Mapping on [Figure RW 8.1: UWF Related Works Location Map](#).

Figures and mapping referenced in this topic chapter can be found in [Volume C3 EIAR Figures](#).

8.1.3 Sensitive Aspects of the Biodiversity Environment included for further evaluation

Any sensitive receptor in the local environment which could be impacted by the project is a Sensitive Aspect. The following Sensitive Aspects are included in this topic chapter as they could be potentially impacted:

Sensitive Aspect No. 1	European Sites	Section 8.2
Sensitive Aspect No. 2	National Sites	Section 8.3
Sensitive Aspect No. 3	Aquatic Habitats & Species	Section 8.4
Sensitive Aspect No.4	Terrestrial Habitats	Section 8.5
Sensitive Aspect No.5	Hen Harrier	Section 8.6
Sensitive Aspect No.6	General Bird Species	Section 8.7
Sensitive Aspect No.7	Bats	Section 8.8
Sensitive Aspect No.8	Non-Volant Mammals	Section 8.9
Sensitive Aspect No.9	Amphibians & Reptiles	Section 8.10
Sensitive Aspect No.10	Marsh Fritillary	Section 8.11

Each of the above listed Sensitive Aspects are evaluated individually in Sections 8.2 to 8.11 of this Chapter.

To help readers navigate to individual sensitive aspect sections, the colour codes for each Sensitive Aspect used above are also used in the Sensitive Aspect sections Section 8.2 to 8.11. The colour-codes have been applied to section headings, tables and on side-tabs on the edge of the pages.

8.1.4 Sensitive Aspects excluded from further evaluation

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

General Invertebrates other than Marsh Fritillary	Effects evaluated as Neutral ¹ due to the scale of the works (construction, operational and decommissioning) and small number of machines/vehicles at any one location, in addition to the general low ecological value of habitats in the receiving environment in terms of Invertebrate diversity.
Natterjack toad (Bufo (Epidalea) calamita),	Effects evaluated as not likely, due to the location of the Elements of the UWF Whole Project beyond the geographical range of this species.
Slow worm (Anguis fragilis)	Effects evaluated as not likely, due to the location of the Elements of the UWF Whole Project beyond the geographical range of this legless lizard species.

8.1.5 Overview of the Subject Development

The UWF Related Works are the subject development, being the subject of a current application to Tipperary County Council. The main parts of the UWF Related Works are identified in Table 8-1 below.

Table 8-1: Subject Development – UWF Related Works

Project ID	The Subject Development	Composition of the Subject Development
Element 2	<u>The Subject Development</u> UWF Related Works (RW)	Internal Windfarm Cabling Realigned Windfarm Roads Haul Route Works Telecom Relay Pole RW Ancillary Works

Note: The UWF Related Works are ‘Element 2’ of the Whole UWF Project.

A description of the location, size and design, life-cycle stages, use of natural resources, emissions and wastes, and the vulnerability to major accidents and natural disasters is provided in **Chapter 5: Description of the Development – UWF Related Works (Volume C2 EIA Main Report)**.

This EIA Report is also available on www.upperchurchwindfarm.ie.

8.1.6 The Authors of the Biodiversity Chapter

This report was written by Howard Williams BSc CEnv MCIEEM CBiol MRSB MIFM (Senior Environmental Consultant); Christopher Cullen Dip. Eng. Dip. Ecol. ACIEEM (Senior Ecologist); Sarah Ingham BSc MSc ACIEEM (Project Ecologist/GIS); Peter O Connor MSc. (GIS) and John Deasy BSc. MSc. (Ecologist/GIS) of Inis Environmental Consultants: an established consultancy providing expertise in environmental project management and specialist ecological services.

¹ No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error”. See EPA, August 2017, and Table 8-9.

8.1.7 Sources of Baseline Information

The information sources outlined in Table 8-2 were reviewed during desktop studies and confirmed during fieldwork in order to gather information on the baseline environment. The recommendations in the guidelines listed in the table, have been considered during the preparation of this chapter.

Table 8-2: Sources of Baseline Information for Biodiversity

Type	Source
Consultation	<p>Feedback was received from</p> <ul style="list-style-type: none"> • An Bord Pleanála • Tipperary County Council • Developments Application Unit • National Parks and Wildlife Service • Inland Fisheries Ireland • Irish Peatland Conservation Council <p>See Chapter 3: The Scoping Consultations, and Appendices A3.1, A3.2.</p>
Guidelines	<p><u>Ecological Evaluation</u></p> <ul style="list-style-type: none"> • 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). • Barbour, M.T. and Stribling, J.B. (1991) Use of Habitat Assessment in Evaluating the Biological Integrity of Stream Communities. In: Methods in Stream Ecology (Eds. Hauer, F.R. and Lamberti, G.A. Academic Press. • Kelly & King (2001) A review of the ecology and distribution of three lamprey species, Lampetra fluviatilis (L.), Lampetra planeri (Bloch), and Petromyzon marinus (L.): A context for conservation and biodiversity considerations in Ireland. Biology and the Environment. 101B(3):165-185. • Kennedy, GJA & Strange, CD (1986) The effects of intra- and inter-specific competition on the distribution of stocked juvenile Atlantic salmon, Salmo salar L., in relation to depth and gradient in an upland trout, Salmo trutta L., stream. J. Fish. Biol., 29(2):199-214. • Greenberg, L.A. and Dahl, J. 1998. Effect of habitat type on growth and diet of brown trout (Salmo trutta L.) in stream enclosures. Fisheries Management & Ecology 5: 331-348. • Hatfield, T. & Bruce, J. (2000) Predicting Salmonid Habitat–Flow Relationships for Streams from Western North America. North American Journal of Fisheries Management 20:1005–1015, 2000 • O'Grady, M.F., Curtin, J (1993) The Enhancement of drained salmonid rivers in Ireland. A bioengineering perspective. Hydroecol. Appl., 5(2):7-26. • Collins, J. (ed.) (2016). Bat surveys for professional ecologists: good practice guidelines (3rd edn). The Bat Conservation Trust, London. • Billington, G.E. & Norman, G.M. (1997). The Conservation of Bats in Bridges Project – A report on the survey and conservation of bat roosts in bridges in Cumbria. • 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 <p><u>Hen Harrier</u></p>

Type	Source
	<ul style="list-style-type: none"> • Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. (Scottish Natural Heritage, 2014). • Raptors: A Field Guide for surveys and Monitoring, third Edition (Hardey <i>et al.</i>, 2014). <p><u>Other Birds</u></p> <ul style="list-style-type: none"> • Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. (Scottish Natural Heritage, 2014). • Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008). • Assessing the effectiveness of monitoring methods for Merlin Falco columbarius in Ireland: the Pilot Merlin Survey 2010. Lusby, J., Fernandez-Bellon, D., Noriss, D., Lauder, A. Kilcoole, Co. Wicklow. : BirdWatch Ireland, 2011, Irish Birds, Vols. Volume 9, Number 2, pp. 143-154. • Bibby CJ, Burgess ND, Hill DA and Mustoe SH (2000). Bird Census Techniques, 2nd Edition. Academic Press, London. • Birdwatch Ireland. An assessment of the effects of Arterial Drainage Maintenance on Kingfisher and other riparian birds. Wicklow: Birdwatch Ireland and OPW, 2010. • Cummins, S., Bleasdale, A., Douglas, C., Newton, S., O’Halloran, J. & Wilson, H.J. (2010) The status of Red Grouse in Ireland and the effects of land use, habitat and habitat quality on their distribution. Irish Wildlife Manuals, No. 50. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. <p><u>Terrestrial Habitats</u></p> <ul style="list-style-type: none"> • A Guide to the Habitats of Ireland. The Heritage Council, Kilkenny. (Fossitt, 2000). • Best Practice Guidance for Habitat Survey and Mapping (Smith <i>et al.</i>, 2011). <p><u>Bats</u></p> <ul style="list-style-type: none"> • Guidelines for the Treatment of Bats during the Construction of National Road Schemes (National Roads Authority, 2005). • Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority, 2005). • Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Ed.) Collins, 2016 <p><u>Badgers</u></p> <ul style="list-style-type: none"> • Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (National Roads Authority, 2005). • Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008). <p><u>Otters</u></p> <ul style="list-style-type: none"> • Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (National Roads Authority, 2006). • The Good Roads Guide: Nature Conservation Advice in Relation to Otters <i>Design Manual for roads and Bridges</i> (Highways Agency, 1999, HA 81/99). • Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008). <p><u>Aquatic Habitats & Species</u></p> <ul style="list-style-type: none"> • Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (National Roads Authority, 2005).

Type	Source
	<ul style="list-style-type: none"> • Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016). • Water Framework Directive (2000/60/EC). • UK Pollution Prevention Guidelines (PPG). • Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board, not dated). • CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648. London, 2006). • CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. (CIRIA Report No. C532. London, 2006). <p><u>Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008).</u></p>
Desktop	<ul style="list-style-type: none"> • NPWS website • National Biodiversity Data Centre website(NBDC); • Environmental Protection Agency website (EPA); • Inland Fisheries Ireland (IFI); • Birdwatch Ireland (BWI); • Bat Conservation Ireland (BCI); • Butterfly Ireland; • North Tipperary County Development Plan 2010-2016 (as varied), adopted in December 2015 • Draft North Tipperary Local Biodiversity Action Plan 2007 • North Tipperary Heritage Plan 2013-2018 • Tipperary Renewable Energy Strategy 2016 • South Tipperary Biodiversity Action Plan 2010-2015 <p><u>In co-ordination with and by review of the other EIA Report Chapters as follows:</u></p> <ul style="list-style-type: none"> • Chapter 10: Soils • Chapter 11: Water • Chapter 12: Air <p><u>Consented Upperchurch Windfarm planning documents</u></p> <ul style="list-style-type: none"> • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Environmental Impact Statement 13510003 • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Response to Further Information 13510003 • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Badger Sett Survey prepared by Malachy Walsh and Partners (MWP) • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Bat Survey prepared by Malachy Walsh and Partners (MWP) • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Ecological Management Plan prepared by Malachy Walsh and Partners (MWP) • An Bord Pleanála (2014) Inspectors Report for Upperchurch Windfarm PL22.243040 • An Bord Pleanála (2014) Grant of Permission for Upperchurch Windfarm PL22.243040

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Type	Source
	<p><u>Other Projects planning documents</u></p> <ul style="list-style-type: none"> • Castlewaller Woodland Partnership (2007) Castlewaller Windfarm Environmental Impact Statement prepared by Fehily Timoney and Company • Castlewaller Woodland Partnership (2007). Response to RFI from North Tipperary County Council prepared by Fehily Timoney and Company • ESB Wind Development Ltd. and Coillte (2013) Bunkimalta Wind Energy Project Environmental Impact Statement prepared by ESBI • An Bord Pleanála (2013) Inspectors Report for Bunkimalta Wind Energy Project PL22.241924
Fieldwork	<ul style="list-style-type: none"> • Field Walking • Habitat Surveys • Species specific surveys

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations.

Note: Information from the Upperchurch Windfarm planning documents listed above (2013 EIS, 2013 RFI, 2014 Inspectors report etc.) were used throughout this EIA Report chapter to describe the baseline and receiving environment and to describe the effects of the UWF on the environment.

Further detail on the information referenced in Table 8-2 above is provided in [Appendix 8-1: Section A8-1.2 Baseline Information](#). [Appendix 8-1](#) can be found at [in Volume C4 EIAR Appendices](#) and includes:

- Desktop Review Datasets
- Fieldwork methods per receptor
- Dates and Times of habitat surveys
- Dates and Times of other, species specific surveys

8.1.7.1 Certainty and Sufficiency of Information Provided

A clear documentary trail is provided throughout this chapter, and chapter appendix, Appendix 8-1, to the competency of data and methods used and the rationale for selection of same. The information used to compile this chapter is collated from reports and documents generated by local authorities and statutory agencies, including the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs and North Tipperary County Development Plan 2010 (as varied), with remit in the regulatory field. In all cases the most recent publications available are relied on. All documentation used is referenced at the end of the chapter.

In respect of Biodiversity no significant limitations of difficulties were encountered.

8.1.8 Methodology for Evaluating Effects

8.1.8.1 Determining the Importance of Biodiversity receptors (excluding birds) (NRA 2009)

Table 8-3 outlines the Guidance from which receptor/resource evaluations (excluding birds) have been derived.

Table 8-3: NRA Evaluation Guidance (NRA 2009)

<u>Resource Evaluation</u>	<u>NRA Criteria</u>
International Importance	<ul style="list-style-type: none"> • ‘European Site’ including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (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	<ul style="list-style-type: none"> • Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); • Statutory Nature Reserve; • Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. • Resident or regularly occurring populations (assessed to be important at the national level) 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	<ul style="list-style-type: none"> • Area of Special Amenity. • Area subject to a Tree Preservation Order.

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<u>Resource Evaluation</u>	<u>NRA Criteria</u>
	<ul style="list-style-type: none"> • 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. • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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.

8.1.8.2 Percival and NRA Evaluation Criteria for biodiversity receptors (birds)

8.1.8.2.1 Determining Bird Sensitivity (Percival 2007 & NRA 2009)

Table 8-4 outlines the Guidance from which avian (bird) receptor/resource evaluations have been derived.

Table 8-4: Bird Sensitivity Rating Equivalency (Percival 2007 and NRA 2009 Combined)

<u>Sensitivity of Bird receptor</u>	<u>Percival 2007 criteria</u>	<u>NRA Resource Evaluation</u>	<u>NRA Criteria</u>	<u>Combined Criteria</u>
Very High	<p>Species is cited interest of SPA.</p> <p>Species present in Internationally important numbers.</p>	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 and/or referred to in Article 4(2) of the Birds Directive	<p>Species is cited interest of SPA.</p> <p>Species present in Internationally important numbers.</p> <p>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</p>
High	<p>Other non-cited species which contribute to integrity of SPA.</p> <p>Ecologically sensitive species (<300 breeding pairs in UK) and less common birds of prey.</p> <p>Species listed on Annex 1 of the EU bird's directive.</p> <p>Regularly occurring relevant migratory species which are rare or vulnerable</p>	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	<p>Other non-cited species which contribute to integrity of SPA</p> <p>Ecologically sensitive species (<300 breeding pairs nationally) and less common birds of prey.</p> <p>Species listed on Annex 1 of the EU bird's directive.</p> <p>Regularly occurring relevant migratory species which are rare or vulnerable</p> <p>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</p>

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<u>Sensitivity of Bird receptor</u>	<u>Percival 2007 criteria</u>	<u>NRA Resource Evaluation</u>	<u>NRA Criteria</u>	<u>Combined Criteria</u>
				relevant Red Data list (in this case BOCCI Red list).
Medium	<p>Species present in regionally important numbers (>1% of regional population).</p> <p>Species occurring within SPA's but not crucial to the integrity of the site.</p> <p>Species listed as priority species in the UK BAP subject to special conservation measures</p>	County Importance	<p>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;</p> <p>County important populations of species.</p> <p>Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</p>	<p>Species present in regionally important numbers (>1% of regional population).</p> <p>Species occurring within SPA's but not crucial to the integrity of the site.</p> <p>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;</p> <p>County important populations of species.</p> <p>Species that are rare or are undergoing a decline in quality or extent at a national level.</p>
Low	<p>Species covered above which are present very infrequently or in very low numbers.</p> <p>Any other species of conservation interest not covered above, e.g. species listed on the red or amber lists of the BoCCI.</p>	Local Importance (High Value)	<p>Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;</p> <p>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</p>	<p>Locally important populations of priority species identified in the Local BAP, if this has been prepared;</p> <p>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.</p>

<u>Sensitivity of Bird receptor</u>	<u>Percival 2007 criteria</u>	<u>NRA Resource Evaluation</u>	<u>NRA Criteria</u>	<u>Combined Criteria</u>
			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.

8.1.8.2.2 Determining Magnitude of Effect to Birds (Percival 2007)

Table 8-5 outlines the definition of terms in respect of magnitude for avian receptor evaluations. This rating system has also been used as a general guide for magnitude quantification throughout.

Table 8-5: Birds - Definition of Terms relating to Magnitude (Percival 2007)

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

8.1.8.2.3 Determining Risk of Effect to Birds (Percival 2007)

Table 8-6 outlines probability rating definitions used to inform avian receptor impact appraisal.

Table 8-6: Birds - Risk classifications or likelihood that an impact will occur (Percival 2007)

<u>Probability</u>	<u>Description</u>	<u>Comments</u>
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

8.1.8.2.4 Determining Significance of Effect to Birds (Percival 2007 & EPA 2017 combined)

Table 8-7 outlines the significance matrix used for avian receptor impact appraisal.

Table 8-7: Birds - Significance Matrix for high probability impacts (Percival 2007 with equivalent EPA Significance Ratings).

<u>Significance</u>		<u>Sensitivity</u>			
		Very High	High	Medium	Low
<u>Magnitude</u>	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

8.1.8.3 EPA EIAR Guidance Definitions of Effects

Table 8-8 to 8-13 outline the EPA evaluation criteria utilised in this appraisal of the Environmental Factor, Biodiversity. This criteria is included in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, August 2017)

Table 8-8: Probability of Effects (EPA, August 2017)

<u>Likely Effects</u>	<u>Unlikely Effects</u>
The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Table 8-9: Quality of Effects (EPA, August 2017)

<u>Quality of Effect</u>	<u>Description</u>
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or removing nuisances or improving amenities)
Neutral Effect	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Table 8-10: Significance of Effects (EPA, August 2017)

<u>Significance of Effect</u>	<u>Description</u>
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Table 8-11: Duration of Effects (EPA, August 2017)

<u>Duration of Effect</u>	<u>Description</u>
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years
Medium-term Effects	Effects lasting seven to fifteen years
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years

Table 8-12: Types of Effects (EPA, August 2017)

<u>Type of Effect</u>	<u>Description</u>
Effect/Impact	A change resulting from the implementation of a project
Likely Effects	The effects that are specifically predicted to take place – based on an understanding of the interaction of the proposed project and the receiving environment.
Indirect Effects (a.k.a. secondary effects)	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
Cumulative Effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
‘Do Nothing’ Effects	The environment as it would be in the future should the subject project not be carried out.
‘Worst Case’ Effects	The effects arising from a project in the case where mitigation measures substantially fail
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Reversible Effects	Effects that can be undone, for example through remediation or restoration
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect
Synergistic Effects	Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

Table 8-13: Definition of Terms – Source, Pathway, Receptor (EPA, August 2017)

<u>Term</u>	<u>Description</u>
Source	The activity or place from which an effect originates
Pathway	The route by which an effect is conveyed between a source and a receptor.
Receptor	Any element in the environment which is subject to impacts
Effect/Impact	A change resulting from the implementation of a project

8.2 Sensitive Aspect No.1: European Sites

This Section provides a description and evaluation of the Sensitive Aspect - European Sites.

We note that findings in respect of Likely Significant effects on European Sites are fully considered and evaluated in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** (herein referred to as the NIS). This NIS is included in **Volume E: Appropriate Assessment Reporting** of the planning application for the UWF Related Works. In line with EIA Directive Guidance, findings are summarised herein; however, and for the avoidance of doubt, we refer the NIS for detailed examination and analysis of likely significant effects in respect of European Sites.

8.2.1 BASELINE CHARACTERISTICS of European Sites

8.2.1.1 STUDY AREA for European Sites

The study area for European Sites in relation to the UWF Related Works is described in Table 8-14 and illustrated on **Figure RW 8.2: European Sites within the UWF Related Works Study Area** (Volume C3 EIAR Figures).

Table 8-14: UWF Related Works Study Area for European Sites

Study Area for European Sites	Justification for the Study Area Extents
15km from the construction works area boundary.	An evaluation distance of 15km is currently recommended in the case of projects (DoEHLG, 2009).

8.2.1.2 Baseline Context and Character of European Sites in the UWF Related Works Study Area

European sites such as candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs) designated within the Natura 2000 network are herein considered. A total of 23 European or Natura Sites have been identified within 15km of the Whole UWF Project. Further detail on these sites, including conservation interest, magnitude, and proximity to the subject development are included in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** which can be found in **Volume E Appropriate Assessment Report..** European Sites and their respective distance to the Whole UWF Project are also summarised overleaf.

The UWF Related Works are mainly located in the Clodiagh (Tipperary²) River sub-catchment of the River Suir which drains downstream to the Lower River Suir cSAC, to the south of Holycross village (no works occur within the SAC). Some of the footprint of the UWF Related Works also drains downstream to the Lower River Shannon cSAC. The UWF Related Works location HW7 is located within the Slieve Felim to Silvermines Mountains SPA - however no works are required at this location..

We refer to **Volume E: Appropriate Assessment Reporting** of the planning application for the UWF Related Works for the detailed appraisal of likely significant effects on European Sites under consideration.

² We note that there are 2 River Clodiagh's within the River Suir catchment, the above sited Clodiagh (Tipperary) River but also the Clodiagh (Waterford) River (including the only designated Freshwater Pearl Mussel sub-catchment in the Suir catchment). There is no hydrological connection between the two Clodiagh Rivers.

The location of European Sites within 15km of UWF Related Works is outlined on Table 8-15 and illustrated on **Figure RW 8.2: European Sites within the UWF Related Works Study Area.**

Table 8-15: Summary of European Sites within the UWF Related Works Study Area

European Site	Distance from UWF Related Works
Anglesey Road SAC (002125)	2.9 km south of the <u>UWF Related Works</u>
Bolingbrook Hill SAC (002124)	7.2 km north west of the UWF Related Works
Keeper Hill SAC (001197)	10.9 km northwest of the UWF Related Works
Kilduff, Devilsbit Mountain SAC (000934)	13.7 km northeast of the UWF Related Works
Lower River Shannon SAC (002165)	1.5km west of the UWF Related Works
Lower River Suir SAC (002137)	3km east of the UWF Related Works
Philipston Marsh SAC (001847)	13.0 km south of the <u>UWF Related Works</u>
Silvermine Mountain SAC (000939)	11.5km northwest of the UWF Related Works
Silvermine Mountain West SAC (002258)	12.5 km north of the <u>UWF Related Works</u>
Slievefelim to Silvermines SPA (004165)	The <u>UWF Related Works</u> is within the boundaries of the Slievefelim to Silvermines SPA.

Features of Interest are summarised in Table 8-16. Further detail on the distinguishing aspects of these designated sites is provided in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** which can be found in **Volume E Appropriate Assessment Report.**, which accompanies the planning application.

Table 8-16: Features of Interest in respect of European Sites under consideration

European Site	Features of Interest
Anglesey Road SAC (002125)	Priority Annex I Habitats: Species-rich Nardus Grassland* (6230)
Bolingbrook Hill SAC (002124)	Priority Annex I Habitats: Species-rich Nardus Grassland* (6230) Annex I Habitats: Northern Atlantic Wet Heath (4010) / European Dry Heath (4030)
Keeper Hill SAC (001197)	Priority Annex I Habitats: Blanket Bogs (* if active bog) (7130) Annex I Habitats: Northern Atlantic Wet Heath (4010)
Kilduff, Devilsbit Mountain SAC (000934)	Priority Annex I Habitats: Species-rich Nardus Grassland* (6230) Annex I Habitats: European Dry Heath (4030)
Lower River Shannon SAC (002165)	Priority Annex I Habitats: Alluvial Forests* (91E0) / Coastal Lagoons* (1150) Annex I Habitats: Sandbanks (1110) / Estuaries (1130) /Mudflats and sand flats (1140)/Large shallow inlets and bays (1160)/Reefs (1170)/Vegetation of stony banks (1220)/Vegetated sea cliffs (1230)/Salicornia mudflats (1310) / Atlantic salt meadows (1330)/Mediterranean salt meadows (1410)/Floating river vegetation (3260)/Molinia meadows (6410) Annex II species: Freshwater Pearl-Mussel (<i>Margaritifera margaritifera</i>);Atlantic Salmon (<i>Salmo salar</i>);Sea Lamprey (<i>Petromyzon marinus</i>);Brook Lamprey (<i>Lampetra planeri</i>);River Lamprey (<i>Lampetra fluviatilis</i>);Bottlenose Dolphin (<i>Tursiops truncatus</i>);Otter (<i>Lutra lutra</i>)
Lower River Suir SAC (002137)	Priority Annex I Habitats: Alluvial forests* (91E0) / Yew woodlands* (91J0)

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European Site	Features of Interest
	Annex I Habitats: Atlantic salt meadows (1330) / Mediterranean salt meadows (1410) / Floating river vegetation (3260) / Hydrophilous tall herb fringe communities (6340) / Old sessile oak woods (91A0) Annex II species: Freshwater Pearl-Mussel (<i>Margaritifera margaritifera</i>); White-clawed Crayfish (<i>Austropotamobius pallipes</i>); Sea Lamprey (<i>Petromyzon marinus</i>); Brook Lamprey (<i>Lampetra planeri</i>); River Lamprey (<i>Lampetra fluviatilis</i>); Twait Shad (<i>Alosa fallax fallax</i>); Atlantic Salmon (<i>Salmo salar</i>); Otter (<i>Lutra lutra</i>)
Philipston Marsh SAC (001847)	Annex I Habitats: Transition mires and quaking bogs (7140)
Silvermine Mountain SAC (000939)	Priority Annex I Habitats: Species-rich <i>Nardus</i> Grassland* (6230) Annex I Habitats: Northern Atlantic Wet Heath (4010)
Silvermine Mountain West SAC (002258)	Annex I Habitats: Northern Atlantic Wet Heath (4010)/European Dry Heath (4030)/Calaminarian grasslands (6130)
Slievefelim to Silvermines SPA (001179)	Hen Harrier (<i>Circus cyaneus</i>)

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8.2.1.3 Importance of European Sites

The EU Habitats Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora formed a basis for the designation of Special Areas of Conservation (SACs). Similarly, Special Protection Areas are legislated for under the Birds Directive (Council Directive 79/409/EEC on the Conservation of Wild Birds). Collectively SACs and SPAs are referred to as Natura 2000 sites, or ‘European’ sites. In general terms, they are considered to be of exceptional importance in terms of rare, endangered or vulnerable habitats and species within the European Community.

8.2.1.4 Sensitivity of European Sites

SAC designated sites are sensitive to hydrological changes to groundwater and surface water quality which may affect water dependant ecosystems. Within individual Designated Sites (both SAC’s and SPA’s), specific species may be sensitive to disturbance, displacement, habitat loss or accidental mortality, which could reduce their favourable conservation status. Designated sites are also sensitive to encroachment by invasive species.

Further detail, including currently known threats and pressures on designated sites are included in the [Natura Impact Statement for Whole UWF Project Elements 1 to 5](#) which can be found in [Volume E Appropriate Assessment Report](#).

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8.2.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

8.2.1.5.1 Special Protection Areas (SPAs)

Trends in respect of taxa designated under the EU Birds Directive (SPA’s) are reported to the EU under Article 12³ of said directive. The most recently available trend information covers the period 2008-2012. Longer term trends in regard to wintering and breeding taxa across the SPA network are largely unknown⁴.

The 2014 Report covers 196 bird species, including species which live in Ireland all year round and others which migrate here for summer or winter. It provides a picture of both short-term and long-term trends for some species, and similarly a view of the breeding range trends in some species. However, there is an absence of long-term data for some species. The report was required to provide information on trends rather than a conclusive assessment of status, as is the case in the Article 17 report. In summary, 58% of species populations were stable or increasing in the short term, while 27% were decreasing. However, looking at long term data (where available) 36% were stable or increasing, while 28% were decreasing⁵.

8.2.1.5.2 Special Areas of Conservation (SACs)

Reporting on trends with regard to protected habitats and species under the EU Habitats Directive is provided to the EU under Article 17 of said directive. The most recently available trend information in respect of individual habitats and species was published in 2013⁶.

Habitats

In the cited 2013 report on the Habitats Directive, 9% of the 58 listed habitats are assessed as “favourable”, 50% as “inadequate” and 41% as “bad”. Since 2007 nine (16%) habitats demonstrate a genuine improving trend, 18 (31%) habitats are considered to be declining, no change is reported for 28 (48%) habitats and an unknown trend reported for 3 (5%) habitats. Many of the coastal habitats and lakes are assessed as “inadequate”, with ongoing declines. “Inadequate” but improving trends are noted for some marine habitats. Several of the peatland and grassland habitats remain in “bad” status with ongoing declines; however, improvements are noted in some woodland habitats. Fens are assigned a “bad” but unknown trend due to the lack of national data to support the assessments.

There is no evidence that there will be any major decline in pressures over the next 12 years. Some potential improvements however have been noted for the following:

1. A decline in invasive infestation of woodlands due to improved forestry management.
2. Management of aquaculture related pressures impacting Estuaries and Mudflats
3. A reduction in pollution from household waste, sewage systems and pollution arising from agricultural or forestry related activities. These improvements are likely to be observed in certain lake habitats.

There is some evidence that climate change is negatively impacting coastal habitats. Predictions indicate that degraded upland habitats, in particular, will become less resilient to the impacts of climate change in the

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³ https://circabc.europa.eu/sd/a/a211d525-ff4d-44f5-a360-e82c6b4d3367/IE_A12NatSum_20141031.pdf

⁴ http://cdr.eionet.europa.eu/Converters/run_conversion?file=/ie/eu/art12/envuvesya/IE_birds_reports-14328-144944.xml&conv=343&source=remote#A082_B

⁵ Summarised from “Evaluation study to support the Fitness Check of the Birds and Habitats Directives” available online at <https://www.npws.ie/sites/default/files/publications/pdf/Fitness%20Check%2015%204%2015.pdf>.

⁶ <https://www.npws.ie/article-17-reports-0/article-17-reports-2013>

immediate future. These predictions relate mainly to drier summers and higher levels of more intense rainfall which are likely to result in bog bursts and landslides which may indirectly impact other habitats e.g. lakes. Ecologically unsuitable grazing regimes were one of the highest impacting pressures reported. The grazing pressures noted were both intensive and non-intensive grazing. Non-intensive grazing is assigned as a pressure where a habitat has not recovered from the impacts of overgrazing and even a small amount of grazing is still considered to negatively impact the habitat. Abandonment and succession were also considered to negatively impact habitat quality.

The most prevalent pollution sources are from agricultural or forestry related activities and household sewage systems. Mechanical peat extraction is considered a High intensity pressure for Blanket bog and also indirectly impacts lake and river habitats. Peatlands were also significantly impacted by drainage.

Species

For the 61 resident species (including 3 species groups) 52% are assessed as “favourable”, 20% as “inadequate”, 12% as “bad” and 16% as “unknown” There are less unknowns than reported in 2007 (the previous reporting period), due to improved knowledge of cetaceans; in those cases, the “unknown” ratings were elevated to a “favourable” status in 2013. Therefore, with further improved knowledge of cetaceans it is likely that the proportion of species in “favourable” status will increase.

Since 2007 4 (6%) species demonstrate a genuine improving trend, 6 (10%) species are considered to be declining, with no genuine change reported for 50 species (82%).

Many species remain in “favourable” status. Population increases and Range expansion have been observed for Otter and Pine Marten respectively. Improvements in habitat extent for Natterjack toad have been achieved by conservation action. However, on-going declines are reported for all Vertigo and Pearl mussel species and Marsh fritillary.

Pollution is considered the biggest pressure and threat impacting the conservation status of species. Human intrusion and disturbances was reported frequently but never at a high intensity. Agricultural practices have a high impact on species that occur within agricultural systems, e.g. Vertigo species and Marsh Fritillary.

There is no evidence that there will be any major decline in the incidence of pressures over the next 12 years, however the impact of aquaculture related pressures on Maërl species should reduce. Invasive species are considered likely to increase as a threat to a number of species.

The do-nothing scenario is that in the absence of the subject development these trends would continue as documented above in respect of the species and habitats which form the basis for designation under the respective EU directives of the EU Sites under consideration.

8.2.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to designated sites, as identified above, will be the receiving environment at the time of construction due to the short separation period. Further trends in species and habitats as identified in reporting to Europe are likely overlap the operational phase, dependant on the occurrence of causal mechanisms such as identified pressures.

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8.2.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

UWF Related Works is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Related Works is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Related Works is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.2.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to European Sites considered all of the Other Elements of the Whole UWF Project. **A description of these Other Elements** is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.2.2.2.1](#) below. We also refer to the Natura Impact Statement which accompanies the planning application as Volume E.

The evaluation of cumulative impacts to European Sites also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to European Sites with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter.

The results of this scoping exercise are that: Bunkimalta Windfarm, Castlewaller Windfarm, Gortnahalla Wind Turbine, Newport Distributor Road, Killuragh Digester Plant, Housing Developments in Doon and Annacotty, Agricultural Developments – Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, , Slatted Shed in Gortussa, Industrial warehouse Units at Thurles, Thurles Regional Water Treatment Works and the Activities of Forestry, Agriculture, Turf-Cutting have been scoped in for evaluation of cumulative effects to European Sites.

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8.2.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Related Works Study Area along with the study areas for Other Elements and Other Projects or Activities which are described in Table 8-17.

Table 8-17: Cumulative Evaluation Study Area for European Sites

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	15km from the construction works areas/activity locations/afforestation lands	Professional judgement and as per Best Practice (CIEEM, 2016,NRA, 2008, Lusby et al.,2010,SNH 2014)
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
<u>Other Projects or Activities:</u> Bunkimalta Windfarm Castlewaller Windfarm Gortnahalla Wind Turbine Newport Distributor Road Killuragh Digester Plant Housing Developments in Doon and Annacotty, Agricultural Developments – Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, Slatted Shed in Gortussa, Industrial warehouse Units at Thurles, Thurles Regional Water Treatment Works Forestry Agriculture Turf-Cutting	The boundary of - the Slievefelim to Silvermines SPA plus 5km, and - the regional Mulkear River catchment, -the regional Clodiagh River catchment	Research on the spatial ecology of Hen Harriers has shown that foraging females spend most of their time within 1km of the nest, while males hunt mostly within 2km of the nest (Arroyo et al., 2009, Irwin et al., 2012, Arroyo et al., 2014). Therefore, landscape and habitat changes within 1km of the nest may impact on both male and female foraging, while changes up to 2km from the nest are more likely to affect males only (Arroyo et al., 2014). SNH (2014) also recommend a 2km study area extent from a proposal site within which data should be collected. A 5km area around the SPA in conjunction with a 2km area around the various elements of the Whole UWF Project will ensure all likely effects are evaluated in the context of the Species and the SPA. The Mulkear River is one of the regional catchments in which the Whole UWF Project is located. The Mulkear River catchment drains to the Lower River Shannon SAC. Extending the scoping area beyond the Mulkear River catchment would mean that the whole of the River Shannon catchment would be included and therefore at this vast scale, the effect of the Whole UWF Project would likely be Neutral (no effect) in relation to cumulative impacts. The Clodiagh River (Tipperary) is one of the regional catchments in which the Whole UWF Project is located. The Clodiagh River catchment drains to the Lower River Suir SAC. Extending the scoping area beyond the Clodiagh River catchment would mean that a much larger proportion of the River Suir catchment would be included and therefore at this scale, the effect of the Whole UWF Project would be Neutral (no effect) in relation to cumulative impacts.

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8.2.2.2.1 Potential for Impacts to European Sites

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect European Sites. The results of this evaluation are included in Table 8-18.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on **Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-18: Results of the Evaluation of the Other Elements and Other Projects or Activities

Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects
Other Projects or Activities	
Bunkimalta Windfarm Castlewaller Windfarm Gortnahalla Wind Turbine Development, Newport Distributor Road Killuragh Digester Plant Housing Developments in Doon and Annacotty, Agricultural Developments – Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, Slatted Shed (Pigs) in Gortussa, Industrial warehouse Units at Thurles, Thurles Regional Water Treatment Works Forestry Agriculture Turf-Cutting	<u>Yes, included</u> for the evaluation of cumulative effects

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8.2.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.2.2.3.1 Element 1: UWF Grid Connection

The UWF Grid Connection passes through the boundary of the Lower River Shannon cSAC at three locations, two of which occur in proximity to the Newport (Mulkear) River in the townland of Oakhampton (Watercourse Crossing W10 constitutes one instance in addition the 110kV UGC route utilises an *existing* trackway within the SAC boundary *en route* to the above crossing point). The third location is at the Bilboa River west of Kilcommon village (Watercourse Crossing W57). Drilling (Horizontal Directional Drilling) will be used to facilitate the above crossings; therefore no in-stream works will take place within the boundary of a cSAC. The footprint of the majority of the UWF Grid Connection drains downstream to the Lower River Shannon) cSAC, with a smaller area draining to the Lower River Suir cSAC (the easternmost 1.2km of the 110kV UGC).

The UWF Grid Connection traverses the Slievefelim to Silvermines Mountains SPA from the townland of Newross, east of Newport to the townland of Knocknabansha near Upperchurch village, and will require works within the SPA. We refer to **Volume E: Appropriate Assessment Reporting** for the detailed appraisal of likely significant effects on European Sites under consideration.

The location of European Sites within the UWF Grid Connection Study Area is outlined on Table 8-19 and illustrated on **Figure GC 8.2: European Sites within the UWF Grid Connection Study Area**, watercourse crossing locations are identified on **Figure GC 8.4: Aquatic Habitats & Species within the UWF within the UWF Grid Connection Study Area**. **Figure GC 8.2 and Figure GC 8.4** are part of the EIA Report for the UWF Grid Connection, and are included in **Volume F: Reference Documents** with this planning application.

Table 8-19: Summary of European Sites within the UWF Grid Connection Study Area

<u>European Site</u>	<u>Distance from UWF Grid Connection</u>
Anglesey Road SAC (002125)	3.3 km south of the UWF Grid Connection cable route
Bolingbrook Hill SAC (002124)	6.3 km north of the <u>UWF Grid Connection</u> cable route.
Clare Glen SAC (000930)	4.5 km south of the <u>UWF Grid Connection</u> cable route.
Glenomra Wood SAC (001013)	11.2 km west of the <u>UWF Grid Connection</u> cable route.
Glenstal Wood SAC (001432)	5.8 km south of the <u>UWF Grid Connection</u> cable route.
Keeper Hill SAC (001197)	2.0 km north of the <u>UWF Grid Connection</u>
Lough Derg (Shannon) SPA (004058)	10.4 km north of the UWF Grid Connection
Lower River Shannon SAC (002165)	0 km – The <u>UWF Grid Connection</u> cable route passes through the boundary of the Lower River Shannon SAC at three locations; 70m along a farm track on the northern side of the Mulkear river at Oakhampton and under the Mulkear River at Oakhampton/Newross, Co. Tipperary and under the Bilboa River at Laghile/Churchquarter, Co. Tipperary.
Lower River Suir SAC (002137)	4.4 km east of the <u>UWF Grid Connection</u> cable route.
Philipston Marsh SAC (001847)	13.1 km south of the <u>UWF Grid Connection</u>
Silvermine Mountain SAC (000939)	7.2 km north of the <u>UWF Grid Connection</u>
Silvermine Mountain West SAC (002258)	5.7 km north of the <u>UWF Grid Connection</u>
Slieve Bernagh Bog SAC (002312)	11.5 km west of the <u>UWF Grid Connection</u> cable route.
Slievefelim to Silvermines SPA (004165)	The <u>UWF Grid Connection</u> cable route is within the boundaries of the Slievefelim to Silvermines SPA.

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8.2.2.3.2 Element 3: UWF Replacement Forestry

UWF Replacement Forestry is located entirely in the Clodiagh (Tipperary) River sub-catchment which drains downstream to the Lower River Suir cSAC. The UWF Replacement Forestry is located in its entirety outside the Slieve Felim to Silvermine Mountains SPA.

The location of European Sites within 15km of the other elements of the UWF Replacement Forestry is outlined on Table 8-20 and illustrated on **Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area**. European Sites are also illustrated on **Figure RF 8.2: European Sites within the UWF Replacement Forestry Study Area**. **Figure RF 8.2** is part of the EIA Report for the UWF Replacement Forestry, and is included in **Volume F: Reference Documents** with this planning application.

Table 8-20: Summary of European Sites within the UWF Replacement Forestry Study Area

<u>European Site</u>	<u>Distance from UWF Replacement Forestry</u>
Anglesey Road SAC (002125)	5 km south of the UWF Replacement Forestry
Bolingbrook Hill SAC (002124)	8.1 km of the UWF Replacement Forestry
Keeper Hill SAC (001197)	12.1km northwest of the UWF Replacement Forestry
Kilduff, Devilsbit Mountain SAC (000934)	16.1 km northeast of the UWF Replacement Forestry
Lower River Shannon SAC (002165)	4.1km west of the UWF Replacement Forestry
Lower River Suir SAC (002137)	4.9km east of the UWF Replacement Forestry
Silvermine Mountain SAC (000939)	12.5km northwest of the UWF Replacement Forestry
Silvermine Mountain West SAC (002258)	13.6km north west of the UWF Replacement Forestry
Slievefelim to Silvermines SPA (004165)	1.4km west of the UWF Replacement Forestry

8.2.2.3.3 Element 4: Upperchurch Windfarm

The already consented Upperchurch Windfarm is located mainly in the Clodiagh (Tipperary) River sub-catchment which drains downstream to the Lower River Suir cSAC. Some of the footprint of the Upperchurch Windfarm drains downstream to the Lower River Shannon cSAC (we refer chapter 11 Water for further information). The Upperchurch Windfarm is located in its entirety outside the Slieve Felim to Silvermine Mountains SPA.

Table 8-21: Summary of European Sites within the UWF Study Area

<u>European Site</u>	<u>Distance from Upperchurch Windfarm</u>
Anglesey Road SAC (002125)	2.5 km south west
Bolingbrook Hill SAC (002124)	6.9 km north west
Keeper Hill SAC (001197)	10.7 km north west
Kilduff, Devilsbit Mountain SAC (000934)	13.3 km north east
Lower River Shannon SAC (002165)	2.7 km west
Lower River Suir SAC (002137)	2.8 km east and c.4.1km downstream
Philipston Marsh SAC (001847)	13.6 km south west
Silvermine Mountain SAC (000939)	11.0 km north west
Silvermine Mountain West SAC (002258)	11.2 km north west
Slievefelim to Silvermines SPA (004165)	Adjacent to the western boundary of turbines T17 to T21.

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8.2.2.3.4 Element 5: UWF Other Activities

The UWF Other Activities are partially located in the Clodiagh (Tipperary) River sub-catchment which drains downstream to the Lower River Suir cSAC, where Haul Route Activities HA21-23 and Upperchurch Hen Harrier Scheme exist in proximity to the Upperchurch Windfarm. Further Haul Route Activity locations such as tree trimming, overlaying of matting on verges and temporary street furniture removal extend northwards and then west before termination at Foynes. This brings a number of HA locations into closer proximity to European Sites such as the River Shannon and River Fergus SPA, and the Lower River Shannon SAC. No works however are proposed in respect of these activities in proximity to European Sites.

The location of European Sites within 15km of the UWF Other Activities is outlined on Table 8-22 and illustrated on **Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area**.

Table 8-22: Summary of European Sites within the UWF Other Activities Study Area

<u>European Site</u>	<u>Distance from Other Activities</u>
Anglesey Road SAC (002125)	2.5km south of UWF Other Activities
Askeaton Fen Complex SAC (002279)	7.3km west of UWF Other Activities
Barrigone SAC (000432)	3km east of UWF Other Activities
Bolingbrook Hill SAC (002124)	6.3km north of UWF Other Activities
Clare Glen SAC (000930)	4.5km south of UWF Other Activities
Curraghchase Woods SAC (000174)	9.3km west of UWF Other Activities
Glenomra Wood SAC (001013)	9.1km northwest of UWF Other Activities
Glenstal Wood SAC (001432)	5.8km south of UWF Other Activities
Keeper Hill SAC (001197)	2km north of UWF Other Activities
Kilduff, Devilsbit Mountain SAC (000934)	8.7km northeast of UWF Other Activities
Lough Derg (Shannon) SPA (004058)	8.1 km northwest of UWF Other Activities
Lough Derg, North-East Shore SAC (002241)	12.9km northwest of UWF Other Activities
Lower River Shannon SAC (002165)	0km of UWF Other Activities
Lower River Suir SAC (002137)	0m: The HA19 location on the R503 overlaps the Site boundary
Philipston Marsh SAC (001847)	13.9km southwest of UWF Other Activities
Ratty River Cave SAC (002316)	14.8km of UWF Other Activities
River Shannon and River Fergus Estuaries SPA (004077)	354m northwest of UWF Other Activities
Silvermine Mountain SAC (000939)	8.5km southwest of UWF Other Activities
Silvermine Mountain West SAC (002258)	9.5 km southwest of UWF Other Activities
Anglesey Road SAC (002125)	2.5km south of UWF Other Activities
Askeaton Fen Complex SAC (002279)	7.3km west of UWF Other Activities
Barrigone SAC (000432)	3km east of UWF Other Activities
Bolingbrook Hill SAC (002124)	6.3km north of UWF Other Activities

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8.2.2.3.5 Other Projects or Activities

Bunkimalta Windfarm: a consented windfarm located within the Slievefelim to Silvermines SPA, c.2.5km to the north of the UWF Grid Connection. The windfarm is also located upstream of the Lower River Shannon SAC.

Castlewaller Windfarm: a consented windfarm located within the Slievefelim to Silvermines SPA, immediately adjacent to the UWF Grid Connection. It is similarly located upstream of the Lower River Shannon cSAC.

Gortnahalla Wind Turbine Development: a consented single turbine development within the Clodiagh River catchment. The turbine development is also located upstream of the Lower River Suir cSAC.

Newport Distributor Road: a consented inner relief road located between the R503 and a local County Road, in Newport town, Co. Tipperary, is located c.150m from the Lower River Shannon SAC at its closest.

Killuragh Digester Plant: a digester plant to process farm slurry and other organic material, located in the Lower River Shannon catchment area, near Pallasgreen, County Limerick.

Housing Developments in Doon and Annacotty: construction of 25 No. houses at Doon, 288 no. houses in Annacotty, both developments located in the Lower River Shannon SAC catchment area.

Agricultural Developments: construction of milking parlours in Cappamore and Lisnagry County Limerick, and slatted sheds and stores in Pallasgreen. All of these developments are located in the Lower River Shannon SAC catchment area. A proposed change of use from hay storage to a slatted unit for pigs in Gortussa is located within the Clodiagh (Tipperary) Lower River Suir cSAC catchment area.

Forestry/Agriculture/Turf-Cutting occur within the Slievefelim to Silvermines SPA, and adjacent to, or in the case of Turf cutting, upstream of the Lower River Shannon cSAC/Lower River Suir cSAC.

8.2.2.4 Cumulative Information: Baseline Characteristics – Character

Features of Interest are summarised in Table 8-23. Further detail on the distinguishing aspects of these designated sites is provided in the [Natura Impact Statement for Whole UWF Project Elements 1 to 5](#) which can be found in [Volume E Appropriate Assessment Report](#).

Table 8-23: Features of Interest in respect of European Sites under consideration

European Site	Features of Interest
Anglesey Road SAC (002125)	Priority Annex I Habitats: Species-rich <i>Nardus</i> Grassland* (6230)
Askeaton Fen Complex SAC (002279)	Priority Annex I Habitats: <i>Cladium</i> Fens* (7210) Annex I Habitats: Alkaline Fens (7230)
Barrigone SAC (000432)	Priority Annex I Habitats: Orchid-rich Calcareous Grassland* (6210) /Limestone Pavement* (8240) Annex I Habitats: Juniper Scrub (5130) Annex II Species: Marsh Fritillary (<i>Euphydryas aurinia</i>)
Bolingbrook Hill SAC (002124)	Priority Annex I Habitats: Species-rich <i>Nardus</i> Grassland* (6230) Annex I Habitats: Northern Atlantic Wet Heath (4010) / European Dry Heath (4030)
Clare Glen SAC (000930)	Annex I Habitats: Old sessile oak woods (91A0) Annex II Species: Killarney Fern (<i>Trichomanes speciosum</i>)
Curraghchase Woods SAC (000174)	Priority Annex I Habitats: Alluvial Forests* (91E0) / Yew Woodlands* (91J0) Annex II Species: Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)
Glenomra Wood SAC (001013)	Annex I Habitats: Old sessile oak woods (91A0)
Glenstal Wood SAC (001432)	Annex II Species: Killarney Fern (<i>Trichomanes speciosum</i>)

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European Site	Features of Interest
Keeper Hill SAC (001197)	Priority Annex I Habitats: Blanket Bogs (* if active bog) (7130) Annex I Habitats: Northern Atlantic Wet Heath (4010)
Kilduff, Devilsbit Mountain SAC (000934)	Priority Annex I Habitats: Species-rich <i>Nardus</i> Grassland* (6230) Annex I Habitats: European Dry Heath (4030)
Lough Derg (Shannon) SPA (004058)	Cormorant (<i>Phalacrocorax carbo</i>); Tufted Duck (<i>Aythya fuligula</i>); Goldeneye (<i>Bucephala clangula</i>); Common Tern (<i>Sterna hirundo</i>); Wetland and Waterbirds
Lough Derg, North-East Shore SAC (002241)	Priority Annex I Habitats: <i>Cladium</i> Fens* (7210) / Limestone Pavement* (8240)/Alluvial Forests* (91E0)/Yew Woodlands* (91J0) Annex I Habitats: Alkaline Fens (7230) / Juniper Scrub (5130)
Lower River Shannon SAC (002165)	Priority Annex I Habitats: Alluvial Forests* (91E0) / Coastal Lagoons* (1150) Annex I Habitats: Sandbanks (1110) / Estuaries (1130) /Mudflats and sand flats (1140)/Large shallow inlets and bays (1160)/Reefs (1170)/Vegetation of stony banks (1220)/Vegetated sea cliffs (1230)/ <i>Salicornia</i> mudflats (1310) / Atlantic salt meadows (1330)/Mediterranean salt meadows (1410)/Floating river vegetation (3260)/ <i>Molinia</i> meadows (6410) Annex II species: Freshwater Pearl-Mussel (<i>Margaritifera margaritifera</i>);Atlantic Salmon (<i>Salmo salar</i>);Sea Lamprey (<i>Petromyzon marinus</i>);Brook Lamprey (<i>Lampetra planeri</i>);River Lamprey (<i>Lampetra fluviatilis</i>);Bottlenose Dolphin (<i>Tursiops truncatus</i>);Otter (<i>Lutra lutra</i>)
Lower River Suir SAC (002137)	Priority Annex I Habitats: Alluvial forests* (91E0) / Yew woodlands* (91J0) Annex I Habitats: Atlantic salt meadows (1330) / Mediterranean salt meadows (1410) / Floating river vegetation (3260) / Hydrophilous tall herb fringe communities (6340) / Old sessile oak woods (91A0) Annex II species: Freshwater Pearl-Mussel (<i>Margaritifera margaritifera</i>); White-clawed Crayfish (<i>Austropotamobius pallipes</i>); Sea Lamprey (<i>Petromyzon marinus</i>);Brook Lamprey (<i>Lampetra planeri</i>);River Lamprey (<i>Lampetra fluviatilis</i>);Twaite Shad (<i>Alosa fallax fallax</i>);Atlantic Salmon (<i>Salmo salar</i>);Otter (<i>Lutra lutra</i>)
Philipston Marsh SAC (001847)	Annex I Habitats: Transition mires and quaking bogs (7140)
Ratty River Cave SAC (002316)	Annex I Habitats: Caves (8310) Annex II Species: Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)
River Shannon and River Fergus Estuaries SPA (004077)	Cormorant (<i>Phalacrocorax carbo</i>);Whooper Swan (<i>Cygnus cygnus</i>);Light-bellied Brent Goose (<i>Branta bernicla hrota</i>);Shelduck (<i>Tadorna tadorna</i>);Wigeon (<i>Anas penelope</i>);Teal (<i>Anas crecca</i>);Pintail (<i>Anas acuta</i>);Shoveler (<i>Anas clypeata</i>) ;Scaup (<i>Aythya marila</i>) ;Ringed Plover (<i>Charadrius hiaticula</i>) ;Golden Plover (<i>Pluvialis apricaria</i>) ;Grey Plover (<i>Pluvialis squatarola</i>) ;Lapwing (<i>Vanellus vanellus</i>) ;Knot (<i>Calidris canutus</i>) ;Dunlin (<i>Calidris alpina</i>) ;Black-tailed Godwit (<i>Limosa limosa</i>) ;Bar-tailed Godwit (<i>Limosa lapponica</i>) ;Curlew (<i>Numenius arquata</i>);Redshank (<i>Tringa totanus</i>) ;Greenshank (<i>Tringa nebularia</i>) ;Black-headed Gull (<i>Chroicocephalus ridibundus</i>) ;Wetland and Waterbirds
Silvermine Mountain SAC (000939)	Priority Annex I Habitats: Species-rich <i>Nardus</i> Grassland* (6230) Annex I Habitats: Northern Atlantic Wet Heath (4010)
Silvermine Mountain West SAC (002258)	Annex I Habitats: Northern Atlantic Wet Heath (4010)/European Dry Heath (4030)/Calaminarian grasslands (6130)
Slieve Bernagh Bog SAC (002312)	Priority Annex I Habitats: Blanket Bogs (* if active bog) (7130) Annex I Habitats: Northern Atlantic Wet Heath (4010)/European Dry Heath (4030)
Slievefelim to Silvermines SPA (001179)	Hen Harrier (<i>Circus cyaneus</i>)

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European Site	Features of Interest
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	Hen Harrier (<i>Circus cyaneus</i>)
Tory Hill SAC (000439)	Priority Annex I Habitats: Orchid-rich Calcareous Grassland* (6210)/ <i>Cladium</i> Fens* (7210) Annex I Habitats: Alkaline Fens (7230)

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8.2.3 PROJECT DESIGN MEASURES for European Sites

At the conception of the UWF Related Works, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

These are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-24 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **European Sites**.

Table 8-24: UWF Related Works Project Design Measures relevant to European Sites

PD ID	Project Design Environmental Protection Measure (PD)
PD01	All construction works will be carried out during daylight hours.
PD05	Land reinstatement will not be carried out during very wet weather or when the soil is waterlogged.
PD06	If any compaction has occurred along the construction works area, these areas will be ploughed with a sub-soiler to loosen the subsoil layer.
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted
PD09	New permanent access roads will have a permanent surface water drainage network in place which will include check dams. These check dams will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD10	Only precast concrete culverts or structures will be used at watercourse crossing locations. No batching of wet cement will take place on-site.
PD11	Instream construction works will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer.
PD12	A phased approach will be undertaken in relation to watercourse crossing works, earthworks, forestry felling and excavation dewatering, where these works occur within 50m of a Class 1 or Class 2 watercourse. The phased approach will only permit one of main potential sediment producing activities, listed above, to be carried out within 50m of a Class 1 or Class 2 watercourse, at any one time.
PD13	All excavated material will be removed for temporary or permanent storage at a suitable location more than 50m away from all other Class 1 and Class 2 watercourses.
PD14	Temporary silt control methods such as silt fencing or containment berms will be placed around all overburden storage areas.
PD15	Permanent overburden storage berms will be graded and seeded immediately after emplacement.
PD16	For works within 50m of a Class 1 or Class 2 watercourse, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD17	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Siltbuster, as appropriate.

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European Sites	PD18	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse
	PD19	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound. All fuel will be stored in bunded, locked storage containers.
	PD20	Overnight parking of plant and machinery will only be permitted at locations which are greater than 50m from watercourses and where there is an existing hard-core surface in place.
	PD21	No refuelling of plant or equipment will be permitted within 100m of identified wells
	PD22	In-stream works at Class 1 and Class 2 watercourses will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
	PD23	In-stream works will not be undertaken without isolation of flow within the watercourse, any fish within the isolated section will be removed using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping, flume (pipe) or channel diversion methods.
	PD24	All new permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be a minimum of 900mm in diameter regardless of the anticipated flood flow.
	PD25	All new permanent culverts in Class 1 and Class 2 type watercourses will be bottomless or clear spanning.
	PD26	If works are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory hen harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the construction works area boundary. These surveys will be completed prior to the start-up of all construction activities, until construction is complete and for 3 years thereafter. No construction works will take place within 500m of an active hen harrier breeding attempt or active nesting activity, during the breeding season (March to August).
	PD27	During the hen harrier roosting season (October to February inclusive), construction works within 1000m of a roost will be limited to the period between one hour after sunrise to one hour before sunset.
	PD28	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season <i>i.e.</i> not during the period of March to August inclusive where possible. This includes hedgerow and scrub removal in addition to hedgerow trimming.
	PD29	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
	PD30	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
	PD31	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken <u>while cubs are present in the holt</u> and NPWS will be notified immediately
	PD32	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
PD33	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as 'out of bounds'. Fencing will be in accordance with Clause 303 of the NRA's Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.	
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8.2.4 EVALUATION OF IMPACTS to European Sites

As previously referenced, the likely effects of the UWF Related Works and then the cumulative effects of the UWF Related Works together with the other elements of the Whole UWF Project and together with Other Projects or Activities on European Sites are identified and evaluated in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** (herein referred to as the NIS). Conceptual Site Models were used to facilitate the identification of source-pathway-receptor links, between the project and the sensitive Biodiversity receptor - European Sites and is presented in Section 4.2 of the NIS.

As a result of the Conceptual Site Model exercise, a number of effects were screened in for evaluation at Stage Two of the Appropriate Assessment reporting process, and these impacts, are evaluated in **Section 5.3 Potential Impacts on Key Species and Habitats** of the NIS. Identified possible effects (alone or in combination) on Key Habitats or Species where source pathway linkage exists to a European Site(s) include effects on Aquatic Ecology and Fisheries, Otter and Hen Harrier.

We refer to the Natura Impact Statement for Whole UWF Project Elements 1 to 5, which is included in Volume E: Appropriate Assessment Reporting of the planning application for the UWF Related Works, for a full evaluation of the likely significant effects of the Whole UWF Project on European Sites under consideration.

8.2.4.1 Description and Rationale for Excluding (Scoping Out) Impacts

As a result of this Conceptual Site Model exercise, a number of effects were screened out from evaluation at Stage One of the Appropriate Assessment reporting process. We refer Section 4.2 of the accompanying NIS for detailed examination and analysis and **Section 4.3 Stage One Screening Conclusion** of the NIS.

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8.2.5 Mitigation Measures for Impacts to European Sites

Environmental protection measures were incorporated into the project design (Project Design Measures), and that design was subject to examination and analysis in the NIS (see **Volume E: Appropriate Assessment Reporting**), following Stage 1 Screening (wherein Project Design was not considered). The examination and analysis conducted at Stage Two of the Appropriate Assessment process has concluded that, following the consideration of Project Design measures at Stage 2, in the absence of additional mitigation, significant effects are likely in respect of the Lower River Shannon cSAC.

Additional Mitigation measures to be introduced in this regard (in particular, Additional Mitigation Measures AMM-01: Disturbance to or Displacement of Otter) are detailed in Section 5.3 of the NIS, along with information of the efficacy of both those additional measures and the considered Project Design in ensuring the avoidance of significant effects on the integrity of European Sites under consideration, in light of their respective Conservation Objectives.

8.2.6 Evaluation of Residual Impacts to European Sites

Potentially significant effects have been evaluated, and it is concluded that neither the UWF Grid Connection, nor the Whole UWF Project, nor any other Element of the Whole UWF Project, alone or in combination, will result in any effects that will adversely affect the integrity of the European Sites under consideration, having regard to their respective conservation objectives, in circumstances where “no reasonable scientific doubt” remains as to the absence of such adverse effects.

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8.2.7 Application of Best Practice and the EMP for European Sites

Best Practice Measures (BPM), although not part of the Project Design for the UWF Related Works, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of European Sites, by the authors of this topic chapter, using industry best practice:

RW-BPM-12	Monitoring of nesting and roosting Hen Harrier (<i>Circus cyaneus</i>)
RW-BPM-16	Monitoring of non-native invasive plant species
RW-BPM-17	Best practice measures for the removal of vegetation during construction
RW-BPM-19	Disturbance to and/or displacement of nesting Common Kingfisher (<i>Alcedo atthis</i>).
RW-BPM-21	Disturbance and/or physical injury to Other Mammals
RW-BPM-22	Management of general non-native invasive species

These Best Practice Measures are included in full at the end of this topic chapter, and also form part of the Environmental Management Plan for UWF Related Works, which is included as Volume D with the planning application.

8.2.7.1 Surface Water Management Plan

Water quality and the existing drainage regime will be managed under a Surface Water Management Plan (SWMP) which will be implemented by the appointed Contractor during the construction stage of the UWF Related Works.

The Surface Water Management Plan will provide the water management framework for construction works and will ensure that work is carried out with minimal impact on the surface water environment and in accordance with the Project Design and Best Practice Measures and environmental commitments made in this EIA Report.

The Surface Water Management Plan is part of the Environmental Management Plan for UWF Related Works, and accompanies this planning application as Volume D.

8.2.7.2 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan also forms part of the Environmental Management Plan for UWF Related Works, which is included as Volume D with the planning application.

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8.2.8 Summary of Impacts to European Sites

In summary it can be concluded that in light of the conservation objectives and rationale for designation of the European Sites under consideration; the potential for significant effects exists as a result of the Whole Upperchurch Windfarm Project. These potentially significant effects have been evaluated, and with the implementation of Additional Mitigation Measures AMM-01 in respect of Otter, it is concluded that neither the Other Element, UWF Grid Connection, nor the Whole Upperchurch Windfarm Project, nor any other Element of the Whole UWF Project, alone or in combination, will result in any effects that will adversely affect the integrity of the European Sites under consideration, having regard to their respective conservation objectives, in circumstances where “no reasonable scientific doubt” remains as to the absence of such adverse effects.

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8.3 Sensitive Aspect No.2: National Sites

This Section provides a description and evaluation of the Sensitive Aspect - National Sites, which relates to Irish designated sites of ecological importance and comprises both Natural Heritage Areas (NHAs) and proposed NHAs (pNHA's).

8.3.1 UWF RELATED WORKS – EVALUATED AS EXCLUDED

8.3.1.1 Baseline Characteristics of National Sites in relation to UWF Related Works Study Area

There are 4 No. NHAs and 17 No. pNHAs within 15km of the UWF Related Works. The location and spatial extent of these NHA's and pNHA's is illustrated on **Figure RW 8.3: National Sites within the UWF Related Works Study Area** (Volume C3 EIAR Figures).

The location of the NHA's in the UWF Related Works Study Area is described in Table 8-25, the distinguishing aspects of these sites are summarized in Table 8-26.

Table 8-25: List of NHAs within 15km of UWF Related Works

<u>Site name and code</u>	<u>Distance from nearest point of UWF Related Works</u>
Bleanbeg Bog NHA (Site Code: 002450)	12.1km West
Grageen Fen and Bog NHA (Site Code: 002186)	12.4km southwest
Mauherslieve Bog NHA (Site Code: 002385)	4.3km west
Gortacullin Bog NHA (Site Code: 002401)	6.5km north

Table 8-26: Features of Interest of NHAs within the UWF Related Works Study Area

<u>Site name and code</u>	<u>Feature of Interest</u>
Bleanbeg Bog NHA (Site Code: 002450)	Bleanbeg Bog NHA consists primarily of upland blanket bog and is located approximately 7 km east of Newport in south Tipperary. The site is situated in the townlands of Bleanbeg, Glencroe, Fiddane and Castlewaller. It incorporates a broad plateau of upland blanket bog habitat that grades into heath, upland grassland on peaty soil, and cutover bog. The western boundary of the site is defined by the transition from intact blanket bog to cutover bog, while the northern, eastern and southern sides of the site are bounded by conifer plantation. Peatlands are the feature of interest for this site. The red data book species Red Grouse and Irish Hare have been recorded on site. A pair of Hen Harriers, also a Red Data Book species, nest within 1 km of the site and are known to forage over the site.
Grageen Fen and Bog NHA (Site Code: 002186)	Peatlands are the feature of interest for this site. The site is an example of an upland blanket bog and fen habitat.
Mauherslieve Bog NHA (Site Code: 002385)	Peatlands are the feature of interest for this site. Irish Hare have been recorded on site. Mauherslieve Bog NHA is a site of considerable conservation value featuring intact upland blanket bog. Blanket bog habitat is a globally scarce resource. It is largely confined to coastal regions at temperate latitudes with cool, wet, oceanic climates. North-west Europe contains some of the best-developed areas of blanket bog in the world.
Gortacullin Bog NHA (Site Code: 002401)	Peatlands are the feature of interest for the site. The site contains a mosaic of upland bog and wet heath. Red Grouse has been recorded on the site.

Further detail on these sites (pNHA's), are included in **Appendix 8-1: Detailed Biodiversity Information and Data (Section A8-1.2.4.2)**. Appendix 8-1 can be found at Volume C4 EIAR Appendices.

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8.3.1.2 Evaluation of UWF Related Works

It is evaluated that the UWF Related Works has **no potential to cause impacts to National Sites**, for the following reasons:

- The UWF Related Works will not overlap any NHA or pNHA boundary, the nearest site is over 4km away, as outlined in Table 8-25.
- There is no potential for impacts to the Features of Interest of the National Sites due to distance and absence of any ecological connectivity, or source pathway links for hydrological effects (as evaluated in Chapter 11: Water, Section 11.7).

8.3.1.3 Cumulative Evaluation for the Other Elements of the Whole UWF Project (grey background)

UWF Related Works are part of a whole project which comprises the following other elements – Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF) and Element 5: UWF Other Activities. The Subject Development, UWF Related Works, is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

UWF Related Works has no potential to cause impacts to National Sites by itself, and therefore cannot have a cumulative effect. However, the Other Elements must be considered because the UWF Related Works are part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in Section 8.3.2 to Section 8.3.4 and included in the summary table in Section 8.3.8 in order to show the totality of the project.

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8.3.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.3.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to National Sites considered all of the Other Elements of the Whole UWF Project. **A description of these Other Elements** is included in this EIA Report at **Appendices 5.3, 5.4, 5.5 and 5.6**, in **Volume C4 EIAR Appendices**. Scoping of these Other Elements is presented in **Section 8.3.2.2.1** below.

The evaluation of cumulative impacts to National Sites also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to National Sites with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in **Appendix 2.3: Scoping of Other Projects or Activities (Section A2.3 .1 and Section A2.3. 8)**.

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Related Works or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to National Sites.

8.3.2.2 Cumulative Evaluation Study Area

The study area for the evaluation of cumulative effects is described in Table 8-27.

Table 8-27: Cumulative Evaluation Study Area for National Sites

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	15km from the boundary of construction works, afforestation lands, activity locations.	Professional Judgement
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities	Not Relevant – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects.	

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8.3.2.2.1 Potential for Impacts to National Sites

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect National Sites. The results of this evaluation are included in Table 8-28.

The location of the Other Elements in relation to National Sites is illustrated on **Figure CE 8.3: National Sites within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures). The Features of Interest for these sites are described in Section 8.3.2.4.

Table 8-28: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded</u>: No potential for effects</p> <p>2 No. NHA sites and 9 No. pNHA sites are located within 15km of the UWF Replacement Forestry. The NHA sites include: Bleanbeg Bog NHA and Mauherslieve Bog NHA. Mauherslieve Bog NHA is the closest NHA site, located 6.1km to the west of the UWF Replacement Forestry.</p> <p>It is evaluated that there is no potential for effects to these NHAs, or to the pNHAs within 15km or their Features of Interest due to:</p> <ul style="list-style-type: none"> • The UWF Replacement Forestry will not overlap any NHA or pNHA boundary, Mauherslieve Bog NHA is the closest NHA site, located 6.1km to the west. • There is no potential for impacts to the Features of Interest of the National Sites due to distance and absence of any ecological connectivity, or source pathway links for hydrological effects (as evaluated in Chapter 11: Water, Section 11.7).
Element 4: Upperchurch Windfarm (UWF)	<p><u>Evaluated as excluded</u>: No potential for effects</p> <p>The Upperchurch Windfarm is within 15km of the Bleanbeg Bog NHA, Mauherslieve Bog NHA, Grageen Fen and Bog NHA and Gortacullin Bog NHA.</p> <p>It is evaluated that there is no potential for effects to these NHAs, or to the pNHAs within 15km or their Features of Interest due to:</p> <ul style="list-style-type: none"> • The Upperchurch Windfarm will not overlap any NHA or pNHA boundary, Mauherslieve Bog NHA is the closest NHA site, located over 4km to the west, • There is no potential for impacts to the Features of Interest of the National Sites due to distance and absence of any ecological connectivity, or source pathway links for hydrological effects (as evaluated in Chapter 11: Water, Section 11.7).
Element 5: UWF Other Activities	<p><u>Evaluated as excluded</u>: No potential for effects/Neutral effects:</p> <p>8 No. NHA sites are and 60 No. pNHA sites are located within 15km of the UWF Other Activities. The NHA sites include: Bleanbeg Bog NHA, Grageen Fen and Bog NHA, Mauherslieve Bog NHA, Woodcock Hill Bog NHA, Moyreen Bog NHA, Carrigkerry Bogs NHA, Scohaboy Bog NHA and Gortacullin Bog NHA. Mauherslieve Bog NHA is the closest NHA site, located 4.8km to the northwest of the closest location of UWF Other Activities.</p> <p><u>UWF Other Activities</u> overlap a single pNHA (Inner Shannon Estuary – South Shore) where Haul Route Activities will involve street furniture removal and replacement on existing roadway roundabouts along the N69 (Dock Road, Limerick). Neutral effects are likely to this pNHA due the location of the activity within the public road corridor and the absence of drainage or excavation works.</p> <p>No potential for effects to any NHA or pNHA caused by other activities due the absence of construction excavations or drainage works and the separation distances to sites.</p>

8.3.2.3 Cumulative Information: Baseline Characteristics – Context & Character

Figure CE 8.3: National Sites within the Cumulative Evaluation Study Area illustrates the locations of all NHA’s and pNHA’s within 15km of the other elements of the Whole UWF Project.

8.3.2.3.1 Element 1: UWF Grid Connection

A total of 3 NHA’s and 21 No. pNHAs are found within 15km of the UWF Grid Connection. The location and spatial extent of these NHA’s and pNHA’s is illustrated on Figure GC 8.3: National Sites within the UWF Grid Connection Study Area (Figure GC 8.3 is part of the EIA Report for the UWF Grid Connection, and is included in Volume F: Reference Documents with this planning application).

The location of the NHA’s within 15km of the UWF Grid Connection is described in Table 8-29. The features of interest of the NHAs are described in Section 8.3.2.4.

Table 8-29: List of NHA’s within 15km of the UWF Grid Connection Study Area

<u>Site name and code</u>	<u>Distance from nearest point of UWF Grid Connection</u>
Bleanbeg Bog NHA (Site Code: 002450)	0 m The UWF Grid Connection overlaps the boundary of Bleanbeg Bog NHA in the townland of Castlewaller where the 110kV UGC will be located within an existing forestry track. The construction of the 110kV UGC does not require works in habitats for which the NHA is designated nor will it affect the hydrology of the NHA (the existing forestry track is located downslope of the bog- we refer Chapter 11 Water). No other aspects of the UWF Grid Connection works are within an NHA or pNHA boundary.
Grageen Fen and Bog NHA (Site Code: 002186)	4.9 km southwest of UWF Grid Connection
Mauherslieve Bog NHA (Site Code: 002385)	6.5 m north of UWF Grid Connection

Further detail on these sites (pNHA’s), are included in Appendix 8-1: Detailed Biodiversity Information and Data (Section A8-1.2.4.2). Appendix 8-1 can be found at Volume C4 EIAR Appendices.

8.3.2.3.2 Element 3: UWF Replacement Forestry

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.3 Element 4: Upperchurch Windfarm

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.4 Element 5: UWF Other Activities

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.5 Other Projects or Activities

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.3.2.1.

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8.3.2.4 Cumulative Information: Baseline Characteristics – Character

The features of interest of the NHA sites within 15km of the Elements of the Whole UWF Project are described in Table 8-30.

Table 8-30: Features of Interest in respect of National Sites within 15km of the Whole UWF Project

Site name and code	Feature of Interest
Bleanbeg Bog NHA (Site Code: 002450)	Bleanbeg Bog NHA consists primarily of upland blanket bog and is located approximately 7 km east of Newport in south Tipperary. The site is situated in the townlands of Bleanbeg, Glencroe, Fiddane and Castlewallar. It incorporates a broad plateau of upland blanket bog habitat that grades into heath, upland grassland on peaty soil, and cutover bog. The western boundary of the site is defined by the transition from intact blanket bog to cutover bog, while the northern, eastern and southern sides of the site are bounded by conifer plantation. Peatlands are the feature of interest for this site. The red data book species Red Grouse and Irish Hare have been recorded on site. A pair of Hen Harriers, also a Red Data Book species, nest within 1 km of the site and are known to forage over the site.
Grageen Fen and Bog NHA (Site Code: 002186)	Peatlands are the feature of interest for this site. The site is an example of an upland blanket bog and fen habitat.
Mauherslieve Bog NHA (Site Code: 002385)	Peatlands are the feature of interest for this site. Irish Hare have been recorded on site. Mauherslieve Bog NHA is a site of considerable conservation value featuring intact upland blanket bog. Blanket bog habitat is a globally scarce resource. It is largely confined to coastal regions at temperate latitudes with cool, wet, oceanic climates. North-west Europe contains some of the best-developed areas of blanket bog in the world.
Woodcock Hill Bog NHA (Site Code: 002402)	Peatlands are the feature of interest for this site. This site is an area of upland blanket bog and wet heath.
Moyreen Bog NHA (Site Code: 002361)	Peatlands are the feature of interest for this site. This site is a good example of lowland blanket bog. Red Grouse and Common Frog have been recorded on the site.
Carrigkerry Bogs NHA (Site Code: 002399)	Peatlands are the feature of interest for the site. Irish Hare and Red Grouse are plentiful. Also occurring are Snipe, Meadow Pipit and Fox Moth
Schoaboy Bog NHA (Site Code: 000937)	Peatlands are the feature of interest for this site. The site is a large raised bog. The Irish Red Data Book species Bird Cherry (<i>Prunus padus</i>) has been recorded from the site (in the past).
Gortacullin Bog NHA (Site Code: 002401)	Peatlands are the feature of interest for the site. The site contains a mosaic of upland bog and wet heath. Red Grouse has been recorded on the site.

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8.3.2.5 Cumulative Information Baseline Characteristics - Importance of National Sites

Natural Heritage Areas (NHA) are sites of national importance⁷ for nature conservation established under the Wildlife (Amendment) Act, 2000, and protected under the Wildlife Acts, 1976-2000, or through planning legislation.

Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation. Prior to statutory designation, pNHA's are subject to limited protection including but not limited to, Agri-environmental schemes, Forest Service requirements (in respect of the approval of lands for forestry) and due recognition by Planning and Licensing Authorities.

8.3.2.6 Cumulative Information Baseline Characteristics - Sensitivity of National Sites

Bleanbeg Bog NHA and other National Sites are sensitive to hydrological changes to groundwater and surface water quality which may affect water dependent ecosystems. Within individual Sites, specific species or features of interest may be sensitive to disturbance and/or displacement, which could reduce their conservation status. Sites are also sensitive to encroachment by invasive species and habitat loss or degradation from human activities such as turf cutting.

8.3.2.7 Cumulative Information Baseline Characteristics - Trends in the Baseline Environment (the 'Do-Nothing' scenario)

No trends are currently available in respect of NHA's or pNHA's. The do-nothing scenario is therefore that in the absence of the UWF Grid Connection that any existing trends would continue in respect of the features of interest which form the basis for designation.

8.3.2.8 Cumulative Information Baseline Characteristics - Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to National Sites, as identified above, will be the receiving environment at the time of construction (c.late 2018/2019) due to the short separation period. As longer terms trends are unavailable, it is considered that existing pressures (such as turf-cutting) are likely to continue into the operational stage; however, we note that longer term mitigating strategies such as the National Peatlands Strategy 2015 are in place, and may result in longer term positive trends.

⁷ Cited from "Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs Contribution and Observations to National Planning Framework - Ireland 2040, Our Plan Consultation Issues Paper & SEA Scoping Document" available online at <http://npf.ie/wp-content/uploads/2017/09/0633-Department-of-Arts-Heritage-Regional-Rural-and-Gaeltacht-Affairs.compressed.pdf>

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8.3.3 CUMULATIVE INFORMATION: Project Design Measures for National Sites

The potential for impacts to National Sites is limited to the UWF Grid Connection. Potential or likely significant impacts caused by the UWF Grid Connection were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection. These Project Design Measures are included in the description of the UWF Grid Connection which can found in this EIA Report in [Appendices 5.3](#) in [Volume C4: EIA Appendices](#).

8.3.4 CUMULATIVE INFORMATION: Evaluation Of Impacts to National Sites

It was evaluated, in Section 8.3.1, that UWF Related Works has no potential to cause impacts to National Sites.

This Section evaluates the likely cumulative effects of the Other Elements of the Whole UWF Project, which is limited to the UWF Grid Connection, and is based on the residual effects of the UWF Grid Connection.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the UWF Grid Connection project (source) and the sensitive aspect (receptor) - National Sites.

As a result of the exercise, **no impacts were included for evaluation.**

Table 8-31: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
No Impacts were Included	<i>Reduction in habitats for which site is designated, (construction stage)</i>
	<i>Blanket Bog habitat degradation from Surface water and groundwater quality effects resulting from leakages and spillage of oils, fuels and chemicals, (construction stage)</i>
	<i>Blanket Bog Habitat degradation as a result of Water Level Impacts from Excavations and Groundworks, (construction stage)</i>
	<i>Blanket Bog Habitat degradation resulting from Surface and Groundwater Contamination, (construction stage)</i>
	<i>Disturbance to species utilising the site, (construction stage)</i>
	<i>Operational Stage Impacts</i>
	<i>Decommissioning Impacts</i>

The source-pathway-receptor links and the rationale for excluded impacts are described in **Section 8.3.4.1**.

8.3.4.1 CUMULATIVE INFORMATION: Description and Rationale for Excluded Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-32 below.

Table 8-32: Description and Rationale for Excluded Impacts to National Sites

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Excavation works	1	Landcover	Reduction in habitats for which site is designated	Rationale for Excluding: No potential for impact No direct loss of habitat for which the site is designated
Oils, Fuels and Chemicals	1	Surface water and Groundwater Flowpaths	Blanket Bog habitat degradation from Surface water and groundwater quality effects resulting from leakages and spillage of oils, fuels and chemicals	Rationale for Excluding: Neutral impact Cross factor effects via habitat degradation are scoped out as: The route of the UWF Grid Connection through the NHA does not intersect blanket bog as it uses an existing forestry track on the verge of the bog. Therefore, there will be no excavation of peat or crossing overland on peat. Also, there will be no refuelling of vehicles or plant permitted within the NHA (Project Design Measure). Any small leaks would be limited to a short section of mineral subsoils underneath the existing access track. The access road exists downslope (down-gradient) of the bog and therefore there can be no surface water or groundwater flow from the works area towards the bog. The overall effects (if any) on the NHA will be Neutral.
Excavation works	1	Surface water and Groundwater Flowpaths	Blanket Bog Habitat degradation as a result of Water Level Impacts from Excavations and Groundworks	Rationale for Excluding: No potential for impacts Cross factor effects via habitat degradation are scoped out as: The route of the UWF Grid Connection through the NHA does not intersect blanket bog as it uses an existing forestry track on the verge of the bog. (Therefore, there will be no excavation of peat). In addition, no groundwater inflows were recorded within the mineral subsoil in any of the trial pits (3 no.) undertaken along the route of the grid connection 110kV UGC within the NHA (the trial pits were undertaken in March 2017 when conditions were seasonally wettest and a low groundwater table would not be expected at this time) and therefore there is no potential for increased groundwater drainage under the bog as a result of the temporary open trench. There was also no evidence of a potentially higher groundwater table in the mineral subsoils below the route within the NHA either. There will be no requirement for dewatering of the cable trench within the NHA. Due to the lack of groundwater seepage noted in the trial holes adjacent to the NHA and the absence of a groundwater table, there will be no potential for the temporary

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Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				trench to act as a preferential flow path for groundwater flow. Also, the trench will be backfilled after the works are complete and there will be no alteration of surface water or groundwater drainage within the NHA.
Cement Based Compounds	1	Soils Subsoil and Bedrock pore space	Blanket Bog Habitat degradation resulting from Surface and Groundwater Contamination	<p>Rationale for Excluding: Neutral impact</p> <p>Cross factor effects via habitat degradation are scoped out as:</p> <p>The route of the UWF Grid Connection through the NHA does not intersect blanket bog as it uses an existing forestry track on the verge of the bog. Therefore, there will be no excavation of peat or placement of cement within peat. There will be no contamination of blanket bog by cement as the proposed works is downslope of the bog and within mineral subsoil. Contact with the cement will be limited to a short section of mineral subsoils underneath the existing access track.</p> <p>The access road exists downslope (down-gradient) of the bog and therefore there can be no indirect effects as a result of contaminated surface water runoff or groundwater flow towards the bog) Only a temporary (and reversible) increase in the pH of the subsoil in direct contact with the cement is likely to occur. The cement will also not come in contact with groundwater as no groundwater table was found during the excavation of the 3 no. trial pits within the NHA. The effects, which will be localised to the cable trench will only persist until after the cement mix has hardened and the residual high alkalinity leachate flushed out / diluted by rainfall. The trench will be backfilled with natural material and therefore there will be no exposed cement material. The overall effects on the NHA will be Neutral</p>
Noise and Human Activity	1	Air and Visibility	Disturbance to species utilising the site	<p>Rationale for Excluding: Neutral effects predicted as:</p> <p>The scale of the machinery involved in the works is relatively minor and will comprise primarily of a tracked excavator to dig the trench where the cable will be laid.</p> <p>Levels of noise are not expected to be sufficient to disturb species within the NHA, will be located off the bog, of short duration, and reversible.</p>
Excavation works	1	Landcover	Mauherslieve Bog NHA - Reduction in	Rationale for Excluding: No potential for impact

<u>Source(s) of Impacts</u>	<u>Project Element</u>	<u>Pathway(s)</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
			habitats for which site is designated	No habitats for which the site is designated will be reduced nor will the extent of the NHA be reduced
Excavation works	1	Surface Water Groundwater	Mauherslieve Bog NHA - Habitat degradation resulting from Water Quality effects	Rationale for Excluding: No potential for cross factor impacts, as the NHA is upslope of construction works areas, therefore no impacts via surface water or groundwater are possible.
All other identified NHAs and pNHA's				Rationale for Excluding: No potential for impacts No direct or indirect impact on identified NHAs or pNHAs due to distance and absence of any ecological connectivity or source pathway links.
<u>Operational Stage</u>				
Operational Stage Impacts on Bleanbeg Bog NHA				Rationale for Excluding: No potential for impacts No works associated with the UWF Grid Connection are expected to take place within the NHA boundary, any infrequent operational maintenance will be carried out at joint bays, which are all located within existing or new access roads, outside of the NHA boundary, will not require any excavation of peat or any works within the NHA, and any works will be downslope of the Bleanbeg Bog NHA and Mauherslieve Bog NHA, therefore no impacts via surface water or groundwater are possible.
<u>Decommissioning Stage</u>				
The UWF Grid Connection will not be decommissioned; therefore there is no potential for this project to cause any effect on Bleanbeg Bog NHA.				

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8.3.5 Mitigation Measures for Impacts to National Sites

Mitigation measures are not relevant as, due to its location, there is **no potential for UWF Related Works to cause impacts** to National Sites.

8.3.6 Evaluation of Residual Impacts to National Sites

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. Mitigation measures are not relevant and thus the Residual Impact is the same as the Impact set out in the Evaluation of UWF Related Works (Section 8.3.1), i.e. **no potential for impacts**.

8.3.7 Application of Best Practice and the EMP for National Sites

No UWF Related Works Best Practice Measures have been developed specifically for National Sites.

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8.3.8 Summary of Impacts to National Sites

No impacts to National Sites are concluded by the topic authors as likely to occur.

The greyed out boxes in the summary table below relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Table 8-33: Summary of the impacts to National Sites

Impact to Bleanbeg Bog NHA:	No Impact
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Section 8.3.4.1</i>
<i>Project Life-Cycle Stage (for Other Elements only)</i>	<i>Construction Stage</i>
<u>UWF Related Works</u>	No Potential for Impacts - See Section 8.3.1
Element 1: UWF Grid Connection	No Potential for Impacts/ Neutral Impacts
Element 3: UWF Replacement Forestry	No Potential for Impacts
Element 4: Upperchurch Windfarm	No Potential for Impacts
Element 5: UWF Other Activities	No Potential for Impacts
<u>CUMULATIVE IMPACTS:</u>	
All Elements of the Whole UWF Project	No Potential for Cumulative Impacts

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to National Sites with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.3.2.1).

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8.4 Sensitive Aspect No.3: Aquatic Habitats & Species

This Section provides a description and evaluation of the Sensitive Aspect - Aquatic Habitats & Species.

8.4.1 BASELINE CHARACTERISTICS of Aquatic Habitats & Species

8.4.1.1 STUDY AREA for Aquatic Habitats & Species

The study area for Aquatic Habitats & Species in relation to the UWF Related Works is described in Table 8-34 and illustrated on [Figure RW 8.4: Aquatic Habitats & Species within the UWF Related Works Study Area](#) (Volume C3 EIAR Figures).

Table 8-34: UWF Related Works Study Area for Aquatic Habitats & Species

Study Area for Aquatic Habitats & Species	Justification for the Study Area Extents
Watercourse Crossing Locations	As per Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Scheme, NRA, (2008)

8.4.1.2 Baseline Context and Character of Aquatic Habitats & Species in the UWF Related Works Study Area

In respect of aquatic habitats and aquatic species, the existing environment comprises surface water bodies and their affected sub-catchment areas within the upper reaches of tributaries draining to the River Shannon and River Suir regional catchments.

The majority of the footprint of the UWF Related Works is located within the River Suir regional catchment – mainly in the Clodiagh (Tipperary) River sub-catchment, with the remainder within the Turraheen River (Multeen East) and Owenbeg River sub-catchments. A small proportion of the footprint of the UWF Related Works is located in the Bilboa River sub-catchment of the River Shannon. UWF Related Works will involve 32 no. watercourse crossings.

Watercourse crossing locations, watercourse classifications and the boundary of various sub-catchments are identified on [Figure RW 8.4: Aquatic Habitats & Species within the UWF Related Works Study Area](#).

Table 8-35: Summary of Watercourses within the UWF Related Works Study Area

Class	Watercourse Description	Watercourse Crossing ID	Total No.	Total With In-Stream Works
Class 1	EPA mapped blue line, major river or stream (fisheries value)	WW19	1	1
Class 2	Headwater Stream Equivalent to EPA blue line but not mapped (fisheries value)	WW2, WW4, WW7, WW22, WW28,	5	4
Class 3	Sub-optimal, heavily vegetated with low or no flow during dry periods (low fisheries value)	WW14, WW18,	2	2
Class 4	Drain (no fisheries value)	WW1, WW3, WW5, WW6, WW8, WW9, WW10, WW11, WW12, WW13, WW15, WW16, WW17, WW20, WW21, WW23, WW24, WW25, WW26, WW27, WW29, WW30, WW31, WW32	24	18
	Total		32	25

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8.4.1.3 Importance of Aquatic Habitats & Species

Both the Clodiagh (Tipperary) and Multeen sub-catchments are identified as Freshwater Pearl Mussel sensitive catchments⁸, containing other **extant** populations of this Annex II and Annex IV listed species; the Clodiagh River population is designated as a qualifying interest within the Lower River Suir SAC. In both the Clodiagh and Multeen rivers, Freshwater pearl mussel populations are located downstream and at a distance from the subject development (approximately 17 km and 16 km, respectively). The upper reaches of the Clodiagh and Multeen catchments within the study area provide important juvenile habitat for Atlantic salmon, contiguous with the populations within the Lower River Suir SAC downstream; resident Brown trout populations are also supported. Within the study area the tributaries of these sub-catchments are high gradient watercourses, generally of ‘Good’ status with ‘Good’ biological water quality. The upper reaches of these watercourses are therefore evaluated as being of National Importance. Additional minor watercourse crossings directly affected by the works are evaluated as being of local importance (higher value) where fisheries potential is identified, and in the absence of fisheries habitat, as local importance (lower value).

8.4.1.4 Sensitivity of Aquatic Habitats & Species

Aquatic ecological receptors, including fisheries, are dependent on prevailing good to high water quality conditions; this includes the chemical water quality character, as well as sediment and nutrient loadings within the affected streams. Both aquatic macroinvertebrates (Freshwater pearl mussel, White-clawed crayfish and pollution sensitive lotic communities generally) and fish communities are sensitive to suspended solids loading (turbidity), as well as the associated effects of siltation within the river channel. Siltation and turbidity 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). Suspended solids may be mobilised downstream and affect reaches remote from the source of the suspended solids. Furthermore, fish populations and macroinvertebrate communities may be sensitive to vibration affecting the aquatic environment, arising during construction activities such as drilling.

8.4.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

The UWF Grid Connection and the other elements of the Whole UWF Project are located in the Mulkear River catchment of the River Shannon, the Clodiagh (Tipperary) catchment and to a lesser degree the Multeen catchment of the River Suir. Both the Mulkear and Clodiagh river catchments were classified as ‘catch and release’ by IFI in 2017 (Salmon Angling Regulations: Management of the Wild Salmon Fishery 2017) for the conservation of Atlantic Salmon stocks, indicating the ongoing pressures on the salmon populations in these catchments. There is an ongoing and persistent decline in Atlantic Salmon stocks in Irish freshwaters overall, pertaining specifically to the European Sites which list this species as a qualifying interest (NPWS, 2013). Pressures and threats affecting the freshwater habitat of salmon correlate directly to those pressures affecting other aquatic ecological interests including lamprey species, aquatic invertebrates and other salmonids (siltation; channelization; drainage maintenance; invasive species and disease vectors; and direct/diffuse pollution from agriculture, forestry and direct discharges). Please refer to Chapter 11 – Water for details of trends relating to water quality and as such, also aquatic habitats and species, in summary the WFD status of watercourses within the Mulkear, Bilboa and Multeen catchments are evaluated as ‘Not at Risk’, while the WFD status of the Clodiagh is ‘At Risk’ due to morphological pressures arising from channelization.

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⁸ Sourced from online NPWS dataset, available at: <https://www.npws.ie/research-projects/animal-species/invertebrates/freshwater-pearl-mussel/freshwater-pearl-mussel-data>

8.4.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to Aquatic Habitats & Species, as identified above, will be the receiving environment at the time of construction, on the basis of the relative stability of the pertinent aquatic ecological receptors (identified in long-term trends) in the catchments under consideration herein. Identified trends will overlap the operational phase of the elements under consideration.

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8.4.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

UWF Related Works is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Related Works is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Related Works is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.4.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Aquatic Habitats & Species considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at **Appendices 5.3, 5.4, 5.5 and 5.6**, in **Volume C4 EIAR Appendices**. Scoping of these Other Elements is presented in **Section 8.4.2.2.1** below.

The evaluation of cumulative impacts to Aquatic Habitats & Species also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Aquatic Habitats & Species with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in **Appendix 2.3: Scoping of Other Projects or Activities (Section A2.3 .1 and Section A2.3. 8)**.

The results of this scoping exercise are that: no other projects or activities will cause cumulative effects to Aquatic Habitats & Species with UWF Related Works, however in order to present the totality of the project- Bunkimalta Windfarm and Newport Distributor Road (both consented) have been scoped in for evaluation of cumulative effects relating to the Other Elements.

8.4.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Related Works Study Area along with the study areas for Other Elements and Other Projects or Activities.

The Cumulative Evaluation Study Area comprises two different areas - one extent for cumulative evaluation of all of the Elements of the Whole UWF Project and a second extent for the cumulative evaluation of Other Projects or Activities, see Table 8-36.

Table 8-36: Cumulative Evaluation Study Area for Aquatic Habitats & Species

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Watercourse Crossing Locations	As per Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Scheme, NRA, (2008)
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		

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Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Other Projects or Activities: Bunkimalta Windfarm Newport Distributor Road <u>Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is no potential for cumulative effects with the UWF Related Works.</u>	The regional Mulkear River catchment The regional Clodiagh River catchment	The location of the Whole UWF Project drains into both the Mulkear River catchment and the Clodiagh River catchment. Due to the vast scale of the catchments into which the Mulkear and Clodiagh rivers drain (River Shannon catchment and the River Suir catchment respectively), Neutral cumulative effects are likely in the broader River Shannon and River Suir catchments.

8.4.2.2.1 Potential for Impacts to Aquatic Habitats & Species

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect Aquatic Habitats & Species. The results of this evaluation are included in Table 8-37.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on [Figure CE 8.4: Aquatic Habitats & Species within the Cumulative Evaluation Study Area](#) (Volume C3 EIAR Figures).

Table 8-37: Results of the Evaluation of the Other Elements and Other Projects or Activities

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded:</u> No potential for effects: The UWF Replacement Forestry is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment. One Class 1 stream flows through the UWF Replacement Forestry lands. Environmental protection measures which form part of the design of the UWF Replacement Forestry include planting by hand, no use of pesticide or fertilizer, no refuelling or storage of fuels onsite, a 10m water setback are, and the planting and management of the site in accordance with best practice.</p> <ul style="list-style-type: none"> • Neutral habitat deterioration impacts arising from the UWF Replacement Forestry, as there is no requirement for instream works and no sources of significant sediment creation as planting will be carried out by hand. • Neutral disturbance or displacement effects, as there is no requirement for instream works, and due to the scale of the works with planting being carried out by hand without the use of machines, and low levels of maintenance associated with the growth stage. • There is no potential for habitat quality impacts, as the riparian strips/grassland adjacent to the existing watercourse will be maintained as part of the forestry layout as a water quality protection measure. • There is no potential for the planting works to spread invasive species, as there are no instream works required. • There is no potential for aquatic habitat degradation due to nitrogen deposition, as the new forestry will be a permanent native woodland, therefore no tree-felling/harvesting will be carried out. • There is no potential for acidification effects during the growth stage, as the UWF Replacement Forestry will be deciduous in nature.

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	Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Sensitive Aspect	Element 5: UWF Other Activities	<p><u>Evaluated as excluded: no potential for adverse effects:</u> The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities.</p> <ul style="list-style-type: none"> • There is no potential for habitat effects as there are no instream works or sediment creating activities adjacent to watercourses required as a result of UWF Other Activities (including Overhead Line Activities, Haul Route Activities, and the Upperchurch Hen harrier Scheme). • No potential for disturbance effects due to the small scale of activities and no activities within the riparian corridor of Class 1 or Class 2 watercourses. The Upperchurch Hen harrier Scheme will include <u>planting of 1.4km of woody scrub species</u> along riparian corridors and fencing of watercourse corridors to prevent access to the watercourses by livestock, which will enhance the quality of riparian habitats. • No potential for impacts to aquatic habitat quality arising from the spread of invasive species, as there are no instream works or activities adjacent to watercourses required as a result of UWF Other Activities. • No potential for impacts to aquatic habitats due to tree felling, as no tree felling of conifer plantations is required.
Other Projects or Activities		
	Bunkimalta Windfarm Newport Distributor Road	<p><u>Yes, included</u> for the evaluation of cumulative effects relating to decreases in instream habitat quality.</p> <p><u>Excluded from evaluation</u> of cumulative effects in relation to the following impacts- changes in flow regime, disturbance/displacement and riparian habitat degradation, as any cumulative effects will be Neutral.</p> <p>Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. <u>There is no potential for cumulative effects with the UWF Related Works.</u></p>

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8.4.2.3 Cumulative Information: Baseline Characteristics – Context & Character

In respect of aquatic habitats and aquatic species, the existing environment comprises surface water bodies and their affected sub-catchment areas within the upper reaches of tributaries draining to the River Shannon and River Suir regional catchments.

8.4.2.3.1 Element 1: UWF Grid Connection

90 no. watercourses flow through the construction works area boundary associated with the UWF Grid Connection. The majority of the watercourses which occur within the UWF Grid Connection Study Area are located in the River Shannon regional catchment (W1 to W63, and W66 to W90), with just 2 No. watercourses located in the River Suir regional catchment (W64 and W65).

There are three main watercourses along the route of the 110kV UGC, all of which are within the Mulkear sub-catchment; the Newport (Mulkear) River (W10) itself, the Clare River (W36) and the Bilboa River (W57). At the proposed crossing locations all three watercourses are evaluated as containing good salmonid habitat, with good/high biological water quality and good ecological status.

The Newport (Mulkear) River (W10), Clare River (W36) and Bilboa River (W57), which flow through the study area, were generally 4 to 6 metres wide. The smaller Munnia River (W7), Reardnogy Beg River (W43 and W44) are c.1-2m wide, and the remaining Class 1 or Class 2 watercourses were generally shallow fast flowing streams which ranged between 0.5m and 2m wide.

All watercourse crossing locations were subject to a site visit by an aquatic ecologist and surveyed to evaluate fisheries habitat suitability, riparian and instream habitat and potential for protected aquatic species. In summary the majority of watercourse crossings for all project elements are minor streams and land drains, which have been subject to previous anthropogenic modification (arterial drainage, drainage maintenance, channel modification, abstractions, diversions, etc.). This has resulted in the reduction of ecological status and fisheries potential in the majority of cases. A number of watercourse crossing points are heavily poached by cattle and in poor condition due to effluent run-off. A summary of the results of the field surveys for the UWF Grid Connection is included in Table 8-38.

Table 8-38: Summary of Watercourses within the UWF Grid Connection Study Area

<u>Class</u>	<u>Watercourse Description</u>	<u>Watercourse Crossing ID</u>	<u>Total No. of Water-courses</u>	<u>Total With In-Stream Works</u>
Class 1	EPA mapped blue line, major river or stream (fisheries value)	W7, W8, W10 , W11, W12, W27, W32, W36 , W42, W47, W48, W55, W57 , W61 W66, W67, W74, W76, W84, W89,	20	9
Class 2	Headwater Stream Equivalent to EPA blue line but not mapped (fisheries value)	W1, W3, W4, W13, W38, W46, W50, W54, W56, W70, W72, W73, W75, W90	14	6
Class 3	Sub-optimal, heavily vegetated with low or no flow during dry periods (low fisheries value)	W2, W6, W35, W49, W62 W83, W85, W86, W87, W88	10	4
Class 4	Drain (no fisheries value)	W5, W9, W14, W15, W16, W17, W18, W19, W20, W21, W22, W23, W24, W25, W26, W28, W29, W30, W31, W33, W34, W37, W39, W40, W41, W43, W44, W45, W51, W52, W53, W58, W59, W60, W63, W64, W65, W68, W69, W71, W77, W78, W79, W80, W81, W82	46	19
	Total		90	38

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Note: UWF Related Works WW23 and UWF Grid Connection W63 are both crossings of one watercourse at one location.

Watercourse crossing locations, watercourse classifications and the boundary of various sub-catchments are identified on [Figure GC 8.4: Aquatic Habitats & Species within the UWF Grid Connection Study Area](#). [Figure GC 8.4](#) is part of the EIA Report for the UWF Grid Connection, and is included in [Volume F: Reference Documents](#) with this planning application.

Further details on the site visits and the fisheries appraisals for each watercourse are included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.4\)](#). [Appendix 8-1](#) can be found in [Volume C4 EIA Appendices](#).

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8.4.2.3.2 Element 3: UWF Replacement Forestry

Not applicable – This Element has been evaluated as excluded, see Section 8.4.2.2.1.

8.4.2.3.3 Element 4: Upperchurch Windfarm

The area of the [Upperchurch Windfarm](#) is predominantly situated in the River Suir regional catchment (Clodiagh (Tipperary) River and Multeen River sub-catchments).

The remaining proportion of the footprint of the Upperchurch Windfarm is located in the Bilboa River sub-catchment of the River Shannon.

As per the EIS 2013, the Upperchurch Windfarm involves 1 no. watercourse crossings, this watercourse is included in Table 8-38 as WW2 (Class 2).

8.4.2.3.4 Element 5: UWF Other Activities

Not applicable – This Element has been evaluated as excluded, see Section 8.4.2.2.1.

8.4.2.3.5 Other Projects or Activities

[Bunkimalta Windfarm](#) is located in the River Shannon regional catchment area, with 5 turbines located in the Clare River catchment and the remaining 11 turbines located in the Newport River (Mulkear) catchment. The construction of the consented windfarm will involve both instream works and works in close proximity to watercourses.

[Newport Distributor Road](#) is located within the Newport River catchment, c.150m from the Newport River and also located upstream of the Lower River Shannon SAC. No instream works are planned as part of this road development.

Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. [There is no potential for cumulative effects with the UWF Related Works.](#)

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8.4.3 PROJECT DESIGN MEASURES for Aquatic Habitats & Species

At the conception of the UWF Related Works, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-39 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Aquatic Habitats & Species**.

Table 8-39: UWF Related Works Project Design Measures relevant to Aquatic Habitats & Species

PD ID	Project Design Environmental Protection Measure (PD)
PD01	All construction works will be carried out during daylight hours.
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted
PD09	New permanent access roads will have a permanent surface water drainage network in place which will include check dams. These check dams will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD10	Only precast concrete culverts or structures will be used at watercourse crossing locations. No batching of wet cement will take place on-site.
PD11	Instream construction works will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer.
PD12	A phased approach will be undertaken in relation to watercourse crossing works, earthworks, forestry felling and excavation dewatering, where these works occur within 50m of a Class 1 or Class 2 watercourse. The phased approach will only permit one of main potential sediment producing activities, listed above, to be carried out within 50m of a Class 1 or Class 2 watercourse, at any one time.
PD13	All excavated material will be removed for temporary or permanent storage at a suitable location more than 50m away from all other Class 1 and Class 2 watercourses.
PD14	Temporary silt control methods such as silt fencing or containment berms will be placed around all overburden storage areas.
PD15	Permanent overburden storage berms will be graded and seeded immediately after emplacement.
PD16	For works within 50m of a Class 1 or Class 2 watercourse, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD17	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Siltbuster, as appropriate.
PD18	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse

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PD19	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound. All fuel will be stored in banded, locked storage containers.
PD20	Overnight parking of plant and machinery will only be permitted at locations which are greater than 50m from watercourses and where there is an existing hard-core surface in place.
PD21	No refuelling of plant or equipment will be permitted within 100m of identified wells
PD22	In-stream works at Class 1 and Class 2 watercourses will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD23	In-stream works will not be undertaken without isolation of flow within the watercourse, any fish within the isolated section will be removed using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping, flume (pipe) or channel diversion methods.
PD24	All new permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be a minimum of 900mm in diameter regardless of the anticipated flood flow.
PD25	All new permanent culverts in Class 1 and Class 2 type watercourses will be bottomless or clear spanning.
PD29	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
PD30	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
PD31	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken <i>while cubs are present in the holt</i> and NPWS will be notified immediately
PD32	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
PD33	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as 'out of bounds'. Fencing will be in accordance with Clause 303 of the NRA's Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Replacement Forestry and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4 and 5.5](#), in [Volume C4: EIAR Appendices](#).

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8.4.4 EVALUATION OF IMPACTS to Aquatic Habitats & Species

In this Section, the likely direct and indirect effects of the UWF Related Works are identified and evaluated. Then the likely cumulative effects of the UWF Related Works together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Aquatic Habitats & Species.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-40: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Decrease in instream aquatic habitat quality, (construction stage)	<i>Aquatic Habitat Degradation (as a result of increased nitrogen deposition) such as temporary oxygen shortages (construction stage)</i>
Changes to flow regime, (construction stage)	<i>Decommissioning Stage Effects</i>
Disturbance/displacement to fish and aquatic species, (construction stage)	
Riparian habitat degradation, (construction stage)	
Spread of aquatic invasive species, (construction stage)	

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.4.4.1 to 8.4.4.5.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.4.4.6.

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8.4.4.1 Impact Evaluation Table: Decrease in instream aquatic habitat quality

Impact Description:

Project Life Cycle Stage: Construction stage

Impact Source: Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Hydrocarbons; Reinstatement

Cumulative Impact Source: Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Hydrocarbons; Reinstatement; Earthworks and Groundwork

Impact Pathway: Soils; Surface water, Runoff and surface water, Flowpaths

Impact Description: Aquatic habitat relates to the instream features supporting aquatic biodiversity (bed substrate, morphology, water quality, etc.). Watercourses are highly sensitive to change, containing sensitive aquatic ecological receptors including salmonids, lamprey species, and a diverse macroinvertebrate community. Instream works at some watercourses will require direct excavation of the banks and bed of the watercourse, which can change the physical character of the watercourse and has the potential to degrade the quality of the baseline habitat which supports the structure, function and diversity of aquatic species. Although erosion and deposition are natural process in watercourses⁹, 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.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Decrease in instream aquatic habitat quality

Element 2: UWF Related Works

Impact Magnitude: There are 32 no. watercourse crossings required by the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works and in-stream works will be required at 25 no. of these locations. 26 no. of the total 32 no. crossings are located within the Clodiagh River catchment, 5 no. in the Owenbeg catchment and 1 no. in the Bilboa catchment. Of these crossings, which will be subject to instream works, a potential decrease in fisheries habitat quality is identified at 5 No. watercourse crossings evaluated as having fisheries value. The spatial extent of such effects will occur within the footprint of the instream works, and also downstream within the zone of sediment transport.

The effect on the physical instream habitat i.e. watercourse channel morphology, substrate, and flow character due to instream works has been evaluated as a Slight to Moderate adverse impact on availability, diversity and quality of habitat supporting aquatic species. This in line with the impact magnitude evaluation presented for instream works in Chapter 11 Water (taking account of instream works).

Significance of the Impact: Imperceptible to Moderate in the local context

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required (5 No.) are largely small headwater streams and therefore are likely to have relatively low flows during July to September;
- The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (we refer to outline OCM's as provided in Appendix 5.1 of the EIA Report for UWF Related Works). This will be completed by over pumping, flume (pipe) or channel diversion methods;

⁹ EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems,

- There will be no direct discharge of pumped water into the watercourse during the works (we refer to outline OCM’s as provided in Appendix 5.1 of the EIA Report for UWF Related Works);
- The spatial extent of effects to the watercourse channel is limited to the footprint of the instream works, and;
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat, and
- Impacts to the watercourse channel are temporary and reversible with reinstatement.
- The duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

General Impact Magnitude: Of the 90 No. watercourse crossings along the Grid Connection, 34 No. have been evaluated to have fisheries value. Of these 34 No. watercourses, 15 No. will be subject to instream works (the remaining crossings are over existing crossing structures which do not require any works and cables will be installed either under or over the structure).

The effect on the physical instream habitat i.e. watercourse channel morphology, substrate, and flow character due to instream works has been evaluated as a Slight to Moderate adverse impact on availability, diversity and quality of habitat supporting aquatic species. This in line with the impact magnitude evaluation presented for instream works in Chapter 11 Water (Moderate impact taking account of instream works).

Specifically in relation to the Clare River (see cumulative impacts with other Projects below): Approximately 7km of the 110kV UGC exists within the Clare River catchment. Effects on surface water are likely to arise mainly from trench excavation works and watercourse crossings in-stream works. There are 47 no. watercourse crossings (including haulage routes) within the Clare River catchment (W24-W49 and W67-W89).

Specifically in relation to the Newport River (see cumulative impacts with other Projects below): Approximately 8.7km of the 110kV UGC exists within the Newport River catchment (and Small River catchment) including the Mountphilips Substation site. Effects on surface water are likely to arise mainly from trench excavation, watercourse crossings in-stream works and overburden storage. There are 24 No. watercourse crossings (including haulage routes) within the Newport (and Small River) River catchment (W1-W23 and W66).

Significance of the Impact: Slight to moderate in the local context, Slight in the Clare River catchment, Slight in the Newport River catchment.

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September;
- The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (we refer to outline OCM’s as provided in Appendix 5.1 of the EIA Report for UWF Grid Connection). This will be completed by over pumping, flume (pipe) or channel diversion methods;
- There will be no direct discharge of pumped water into the watercourse during the works (we refer to outline OCM’s as provided in Appendix 5.1 of the EIA Report for UWF Grid Connection);
- The spatial extent of effects to the watercourse channel will occur within the footprint of the instream works, and;
- The frequency of such an event is once of for cables trenches with or without new permanent culverts and twice for temporary culverts (once for installation and once for removal),and;
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat.
- Impacts to the watercourse channel are temporary and reversible with reinstatement. The duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible.
- Clare River catchment:
- The majority of the watercourse crossings (32 of 47 no.) within the catchment are drains (Class 3 and Class 4 Watercourse) and therefore the potential for downstream water quality effects is much less due to their low or absent flows;

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	<p>Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.4.2.2.1.</p>
	<p>Element 4: Upperchurch Windfarm</p>
	<p><u>Impact Magnitude:</u> There is 1 no. watercourse crossing within the Upperchurch Windfarm Site, evaluated as having fisheries value (Class 1, WW2). This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Baseline conditions indicated that the aquatic species were present year-round, and impacts were evaluated as being of high magnitude for aquatic species. However, it was identified that significant impacts were not probable/likely post-mitigation. The 2013 EIS concludes that water quality effects will not be significant</p>
	<p><u>Significance of the Impact:</u> imperceptible</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> A clear-span bridge will be used where a natural stream (Class 1 watercourse) will be crossed and therefore no in-stream works are required; All effects were evaluated as reversible and temporary in the short-term and impacts were associated with construction phase works.
	<p>Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1.</p>
	<p>Cumulative Information: Individual Evaluations of Other Projects or Activities (Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is <u>no potential for cumulative effects with the UWF Related Works</u>)</p>
	<p>Other Project: Consented Bunkimalta Windfarm</p>
	<p><u>Impact Magnitude:</u> Clare River catchment: 5 no. of the 16 no. consented Bunkimalta Windfarm turbines are located within the Clare River catchment. Newport River catchment: 11 no. of the 16 no. consented Bunkimalta Windfarm turbines are located within the Newport River catchment</p>
<p><u>Significance of the Impact:</u> Not Significant residual effect</p>	
<p><u>Rationale for Impact Evaluation:</u> As per Bunkimalta WF EIS (2013)</p> <ul style="list-style-type: none"> Construction activities will be at least a minimum of 50m where possible; A Sediment Control Plan will be put in place during the construction phase to control runoff. 	
<p>Other Project: Newport Distributor Road</p>	
<p><u>Impact Magnitude:</u> Newport River catchment: Localised work adjacent to the Newport River downstream of Newport town. Road development includes surface water drainage system and attenuation tanks, and will be connected into existing sewers.</p>	
<p><u>Significance of the Impact:</u> No impact</p>	
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<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> As per planning conditions surface water controls will be in place
<p>Evaluation of Cumulative Impacts – Decrease in instream aquatic habitat quality</p>
<p>All Elements of the Whole UWF Project</p>
<p><u>Cumulative Impact Magnitude:</u> A potential decrease in aquatic habitat quality is identified at 20 No. watercourse crossings where instream works are required within watercourses evaluated as having fisheries value. The spatial extent of such effects will occur within the footprint of the instream works, dispersed between two regional catchments and within several local sub-catchments. Impact range is located downstream within the zone of sediment transport.</p>
<p>Significance of the Cumulative Impact: Imperceptible to moderate in the local context</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> The watercourse crossing works required for the UWF Grid Connection (110kV UGC) are largely located within the River Shannon catchment while the watercourse crossings required for the Upperchurch Windfarm and UWF Related Works are largely located in the River Suir surface water catchment; The presence of sensitive salmonid fish habitat within the works area and protected Annex II (and Annex IV listed) species within the affected catchments downstream. The spatial extent of effects to watercourse channels will occur within the footprint of the instream works, The frequency and duration is limited to the specific works period within or adjacent to the aquatic habitat. Impacts at the works site are temporary; however, downstream siltation effects are short-term and not reversible.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p><u>Cumulative Impact Magnitude:</u> In relation to cumulative effects within the Clare River catchment; Approximately 7km of the 110kV UGC exists within the Clare River catchment and 5 no. of the 16 no. consented Bunkimalta Windfarm turbines are located within the Clare River catchment. In relation to cumulative effects within the Newport River catchment; Approximately 8.7km of the 110kV UGC exists within the Newport River catchment including the Mountphilips Substation site, along with 11 no. of the 16 no. consented Bunkimalta Windfarm turbines and the consented Newport Distributor Road.</p>
<p>Significance of the Cumulative Impact: Slight for the Clare River catchment, and Slight to Moderate for the Newport River catchment.</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <p><u>Clare River:</u></p> <ul style="list-style-type: none"> The relatively small number of the Bunkimalta Windfarm turbines within the Clare River catchment; The relatively large surface water catchment area of the Clare River – 71km²; The short-term temporary nature of the 110kV UGC works within the Clare River catchment. <p><u>Newport River</u></p> <ul style="list-style-type: none"> The relatively small scale of the 110kV UGC works within the Newport River catchment (8.7km of temporary access roads); No new watercourse crossings are proposed for the Newport Distributor Road; The large surface water catchment area of the Newport River and Small River catchment – 126km²; The relatively large upstream distance of the Bunkimalta Windfarm site (~10km) from the 110kV works; The temporary and short-term nature of the proposed 110kV UGC works within the Newport River catchment; Sediment Control Plans will be in place at the Bunkimalta Windfarm

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8.4.4.2 Impact Evaluation Table: Changes to Flow Regime

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Sediment; Instream works; Machinery movement; new crossing structures

Cumulative Impact Source: Sediment; Instream works; Machinery movement, new crossing structures

Impact Pathway: Surface water; Land cover

Impact Description: Watercourse morphology relates to the shape of a watercourse channel, its bed and banks and how erosion, transportation of water, sedimentation and the composition of riparian vegetation changes this shape over time. As per Section 11.2.4.1 of Chapter 11: Water, direct impacts are identified to channel morphology and geomorphology (bed and banks of watercourses) due to instream works and sediment deposition. Aquatic species, which are likely to be present in fishery value watercourses at instream construction works locations, are reliant on instream 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. Any change in watercourse morphology which affects channel flow regimes can result in cross factor effects on aquatic ecological communities, which are likely to be present in fishery value watercourses at instream construction works locations, These communities are reliant on instream 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. Instream works are limited to the individual crossing points and include trenching works for underground cables, installation of temporary or permanent crossing structures and reinstatement works.

The reinstatement works will maintain the channel morphology, in line with IFI (2016) and will include site-specific bank stabilisation measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels where necessary; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles.

The creation of adverse flow conditions or habitat limitations due to changes to flow or morphology will be limited to the specific works period within or adjacent to the aquatic habitat.

Project Design Measures include the use of culverts at all new permanent watercourse crossings which will be a minimum of 900mm in diameter and will be bottomless or clear spanning on all Class 1 and Class 2 type watercourse and the use of reinstatement of the banks and beds at crossing locations. In addition in-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure).

Impact Quality: Negative

Evaluation of the Subject Development Impact – Changes to Flow Regime

Element 2: UWF Related Works

Impact Magnitude:

Construction works will take place in close proximity to 6 No. watercourses with fisheries value ((i.e. Class 1 or Class 2 watercourses). Instream works in watercourses with fisheries value will take place at 5 No. watercourse crossing locations, 3 of these crossings relate to temporary trenching works and/or the installation of a temporary crossing structure, while 2 No. relate to cable trenching and the installation of permanent crossing structures.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are mostly small headwater streams;

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- The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture);
- The limited extent of direct instream works potentially affecting flow, and the sensitive crossing designs to be implemented in consultation with IFI.
- The brief to temporary duration and reversibility of any effects.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Construction works will require crossings of 34 No. watercourses with fisheries value ((i.e. Class 1 or Class 2 watercourses); however, of these, instream works in watercourses with fisheries value will take place at 15 No. watercourse crossing locations, 9 of these crossings relate to temporary trenching works and/or the installation of a temporary crossing structure, while 6 No. relate to the installation of permanent crossing structures.

At the 9 no. crossing points, changes to the flow regime will be brief to temporary and for the duration of the immediate works. Any temporary alteration to flows or morphology will be reversible and will be subject to seasonal constraints during sensitive aquatic species life stages (Project Design Measure).

At the 6 no. new permanent crossing points, changes to the flow regime will be long-term and permanent; alteration to flow morphology will be subject to Project Design Measures including the reinstatement of watercourses at crossing locations.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are mostly small headwater streams;
- The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture);
- The limited extent of direct instream works potentially affecting flow, and the sensitive crossing designs to be implemented following consultation with IFI.
- The brief to temporary duration and reversibility of any effects.

Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.4.2.2.1.

Element 4: Upperchurch Windfarm

Impact Magnitude:

Construction works will take place in close proximity to 1 No. watercourses with fisheries value. No instream works are required at this location and this watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- No instream works are required on the watercourse crossing within the Upperchurch Windfarm site
- Implementation of the Sediment & Erosion Control Plan

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1.

Aquatic Habitats & Species	Evaluation of Cumulative Impacts – Changes to Flow Regime
	<p>All Elements of the Whole UWF Project</p> <p><u>Cumulative Impact Magnitude:</u> A potential decrease in aquatic habitat (via changes to flow regime) is identified at 20 No. watercourse crossings where instream works are required within watercourses evaluated as having fisheries value. The spatial extent of such effects will occur within the footprint of the instream works, dispersed between two regional catchments and within several local sub-catchments.</p> <p>Significance of the Cumulative Impact Slight</p> <p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Instream works potentially affecting the flow regime are required at a limited number of locations; the majority of which require temporary works and a smaller sub-set require permanent instream structures. • Implementation of Project Design Measures at all stream crossing and instream works locations to minimize effects • Implementation of the sensitive crossing designs to be implemented in consultation with IFI. Provision of reinstatement works including: site-specific bank stabilization measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels where necessary; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles.
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Note: There is no cumulative evaluation of Other Projects or Activities included in the table above, because all of the Other Projects or Activities were evaluated as excluded from this particular impact table (see Section 8.4.2.2.1).

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8.4.4.3 Impact Evaluation Table: Disturbance or Displacement

Impact Description	
Project Life Cycle Stage:	Construction stage
<u>Impact Source:</u> Instream works; Operating machinery; Excavation works; Noise and human disturbance; Drilling; Reinstatement	
<u>Cumulative Impact Source:</u> Operating machinery; Excavation works; Noise and human disturbance; Reinstatement	
<u>Impact Pathway:</u> Surface water; Direct contact; Ground and air vibrations	
<p><u>Impact Description:</u> Instream works and machinery operation within or in close proximity to any watercourse has the potential to directly disturb or displace salmonid fish and aquatic species within fish-bearing streams, or sensitive aquatic receptors such as white-clawed crayfish. 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 and are scoped out from evaluation of disturbance/displacement effects. The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the direct footprint of any instream works within watercourses which support anadromous Atlantic salmon and resident Brown trout populations – i.e. Class 1 or Class 2 watercourses. Disturbance or displacement effects will be brief to temporary in nature, lasting for the duration of works at or in close proximity to Class 1 or Class 2 watercourses.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation of the Subject Development Impact – Disturbance or Displacement	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Of the 32 No. watercourse crossings within the UWF Related Works construction works area boundary, 6 No. have been evaluated to have fisheries value. Of these 6 No. watercourses, 5 No. will be subject to instream works (the remaining 1 no. crossing WW2 will use a clear span structure with no requirement for instream works). Any fish present are likely to be affected for between 1 – 2 days during instream works. The frequency of these disturbance effects is once for half of the locations (cables trenches with or without new permanent culverts) and twice for the remaining locations (temporary culverts (once for installation and once for removal)).</p>	
Significance of the Impact: Slight	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure); • The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure); • The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure); • There will be no direct discharge of pumped water into the watercourse during the works (Project Design Measure); • The singular frequency of any disturbance events at half of the locations, and; • The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible. 	

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Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<u>Impact Magnitude:</u> Of the 90 No. watercourse crossings within the UWF Grid Connection construction works area boundary, 34 No. have been evaluated to have fisheries value. Of these 34 No. watercourses, 15 No. will be subject to instream works and 3 no. will be subject to drilling activities, any fish present are likely to be affected for between 1 – 2 days at instream works locations and c.1 week at drilling locations. The frequency of these disturbance effects is once of for drilling activities, once for cables trenches with or without new permanent culverts and twice for temporary culverts (once for installation and once for removal). The remaining crossings are over existing crossing structures which do not require any works and cables will be installed either under or over the structure, disturbance effects at this locations are Imperceptible.	
<u>Significance of the Impact:</u> Slight	
<u>Rationale for Impact Evaluation:</u>	
<ul style="list-style-type: none"> • In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure); • The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September; • The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure);; • There will be no direct discharge of pumped water into the watercourse during the works (we refer to outline OCM’s as provided Appendix 5.1 of the EIA Report for UWF Grid Connection); • The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the direct footprint of any instream works within watercourses which support anadromous Atlantic salmon and resident Brown trout populations. Additional disturbance effects will occur at the three river crossings, where the 110kV UGC will be installed using drilling techniques, where disturbance effects within the watercourse channel will be limited to the spatial extent of drilling activities. • The frequency of disturbance will be singular in the case of half of the locations • The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible. 	
Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.4.2.2.1	
Element 4: Upperchurch Windfarm	
<u>Impact Magnitude:</u> None: 1 No. watercourse with fisheries value occurs within the footprint of the Upperchurch Windfarm site. This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Disturbance effects are limited to the construction works for the new bridge along with the subsequent use of the new bridge throughout the construction period.	
<u>Significance of the Impact:</u> Imperceptible	
<u>Rationale for Impact Evaluation:</u>	
<ul style="list-style-type: none"> • The Upperchurch Windfarm impacts were evaluated as being of high magnitude for aquatic species; however, it was identified that significant impacts were not probable/likely post-mitigation. A clear-span bridge will be used where a natural stream (Class 1 watercourse) will be crossed and therefore no in-stream works are required; disturbance will be limited to the immediate works area. 	
Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1	

Evaluation of Cumulative Impacts – Disturbance or Displacement
All Elements of the Whole UWF Project
<p>Cumulative Impact Magnitude: Direct disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the footprint of any instream works and directly upstream and downstream of all crossings, temporary and permanent instream works structures and bank-side works. The watercourse crossings are dispersed between two regional catchments and within several local sub-catchments. In total there are 20 No. instream works locations where crossings of fish-bearing streams are required, all of which will be sensitive to disturbance. However, at the local level in the context of individual receptors, temporary displacement will be limited to the affected stretch of watercourse, without cumulative population-level impacts at a watercourse or catchment level. Additional disturbance effects within the watercourse channel will be limited to the spatial extent of drilling vibrations, trenching and ducting activities.</p>
Significance of the Cumulative Impact: Slight
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure); • The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure); • The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure); • There will be no direct discharge of pumped water into the watercourse during the works (Project Design Measure); • The singular frequency of any disturbance events at the half of the locations, and; • The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.

Note: There is no cumulative evaluation of Other Projects or Activities included in the table above, because all of the Other Projects or Activities were evaluated as excluded from this particular impact table (see Section 8.4.2.2.1)

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8.4.4.4 Impact Evaluation Table: Riparian habitat degradation

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> Movement of soils and machinery; Excavation works; Forestry felling; Reinstatement</p> <p><u>Cumulative Impact Source:</u> Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Reinstatement</p> <p><u>Impact Pathway:</u> Soils; Direct contact</p>	
<p><u>Impact Description:</u> The riparian corridor along a watercourse relates to the interface between the aquatic habitat, the bankside vegetation and terrestrial environment. An intact, semi-natural riparian zone has significant beneficial services in the protection of instream aquatic habitat quality, food/nutrient contributions, and temperature regulation. Existing riparian habitat quality within the study area is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works. The removal of, or damage to, riparian vegetation during instream works or excavation/ground clearance works in close proximity to any watercourse has the potential to impact on the quality of riparian habitats which in turn can affect watercourse morphology, shading, bank stability, and nutrient and sediment loading and result in indirect effects on aquatic species.</p> <p>Project design: following works at or in close proximity to watercourses (Class 1 or Class 2), reinstatement works will be carried out which will include site-specific bank stabilisation measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels where necessary; and replanting of riparian buffer zones with suitable native species to manage flood flows and buffer run-off.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation of the Subject Development Impact – Riparian habitat degradation	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Riparian habitat will be affected at 6 No. watercourse crossings identified as having fisheries value, out of a total of 32 watercourse crossings within the construction works area boundary associated with the UWF Related Works.</p> <p>The duration of any loss of well-structured riparian habitat impacts is evaluated with regard to the direct aquatic habitat services provided by the riparian zone (bank stabilization and erosion control, shading and temperature regulation), as well as the indirect inputs such as habitat for invertebrate food for fish and aquatic biota, reduction in light for aquatic flora, flood control and buffering effects in relation to run-off.</p> <p>Riparian habitat impacts will be reversible with reinstatement and will be temporary to short-term, limited to the construction phase and early operational stage until vegetation has re-established.</p>	
Significance of the Impact: slight to moderate	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations at watercourse crossing locations within minor watercourses; • The general context of the watercourses affected comprises managed agricultural lands and open uplands with poorly-developed riparian habitat, where well-developed riparian habitat occurs it comprises willow species which regenerate quickly; • Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible; 	

- Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations; alternatives to riparian clearance are not available.
- Impacts to the riparian habitat are temporary to short-term and reversible with reinstatement.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude: From a total of 90 No. watercourse crossings within the construction works area boundary associated with the UWF Grid Connection, riparian habitat will be affected at **34 No.** watercourse crossings identified as having fisheries value within the UWF Grid Connection construction works area boundary. The effect on the riparian and bankside habitat will be greatest at instream works locations (15 No.).

The duration of any loss of well-structured riparian habitat impacts is evaluated with regard to the direct aquatic habitat services provided by the riparian zone (bank stabilization and erosion control, shading and temperature regulation), as well as the indirect inputs such as habitat for invertebrate food for fish and aquatic biota, reduction in light for aquatic flora, flood control and buffering effects in relation to run-off. Riparian habitat impacts will be reversible with reinstatement and will be temporary to short-term, limited to the construction phase and early operational stage until vegetation has re-established.

Significance of the Impact: Slight to Moderate

Rationale for Impact Evaluation:

- Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations at watercourse crossing locations within minor watercourses;
- The general context of the watercourses affected comprises managed agricultural lands and open uplands with poorly-developed riparian habitat, where well-developed riparian habitat occurs it comprises willow species which regenerate quickly;
- Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations; alternatives to riparian clearance are not available.
- Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible;
- Impacts to the riparian habitat are temporary to short-term and reversible with reinstatement.

Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.4.2.2.1

Element 4: Upperchurch Windfarm

Impact Magnitude:

As per the 2013 EIS, **1 No.** watercourse with fisheries value will be crossed. The crossing method will use using a clear span bridge design, which will avoid the requirement for instream works; however, works within the riparian zone will be required.

Significance of the Impact: imperceptible

Rationale for Impact Evaluation:

- No requirement for instream works on fisheries value watercourses
- Limited scale of works within the riparian corridor at the 1 no. stream crossing
- All effects were evaluated as reversible and temporary in the short-term;
- Riparian habitats within the Upperchurch Windfarm which are directly affected by construction works were not identified as being of significant conservation value.

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1

Aquatic Habitats & Species	Evaluation of Cumulative Impacts – Riparian habitat degradation
	<p>All Elements of the Whole UWF Project</p> <p><u>Cumulative Impact Magnitude:</u> Riparian habitat will be affected at 40 No. watercourse crossings identified as having fisheries value (one watercourse, WW2 associated with both the UWF Related Works and the Upperchurch Windfarm). The effect on the riparian and bankside habitat with implications for the structure and function of the habitat services with regard to aquatic ecological receptors has been evaluated as a Slight to Moderate adverse. This in line with the impact magnitude evaluation presented for instream works in Chapter 11 Water. The spatial extent of such effects will occur within the footprint of the instream works, with the potential for direct impacts at the approach to watercourse crossing works areas.</p>
Sensitive Aspect	<p>Significance of the Cumulative Impact: Slight to Moderate</p> <p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The watercourse crossing works required for the 110kV UGC are largely located within the River Shannon catchment while the watercourse crossings required for the Upperchurch Windfarm and UWF Related Works are largely located in the River Suir surface water catchment; • The limited extent of instream works, within defined works areas will reduce the potential spatial area. • The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September; • Existing riparian habitat quality within the works areas is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works. • Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations; alternatives to riparian clearance are not available • The duration of the impact is evaluated with regard to the aquatic habitat services and buffering effects provided by riparian habitats at each discrete works location. Such impacts are limited to the specific works location and do not interact with riparian habitat communities within the watercourse as a whole, or at a catchment level, in view of cumulative or synergistic project effects. Riparian habitat impacts are once-off, restricted to the period of works within or adjacent to the aquatic habitat and are thus not subject to sequential project effects. • Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible; • Impacts to the riparian habitat are temporary to short-term and reversible with reinstatement.

Note: There is no cumulative evaluation of Other Projects or Activities included in the table above, because all of the Other Projects or Activities were evaluated as excluded from this particular impact table (see Section 8.4.2.2.1).

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8.4.4.5 Impact Evaluation Table: Spread of Aquatic Invasive Species

Impact Description	
Project Life Cycle Stage:	Construction stage
<u>Impact Source:</u> Instream works; Excavation works	
<u>Cumulative Impact Source:</u> Instream works; Excavation works	
<u>Impact Pathway:</u> Surface water; Movement of soils and machinery	
<p><u>Impact Description:</u> Invasive aquatic species include non-native, invasive flora and also fish and invertebrate fauna. Aquatic invasive species may be introduced to unaffected catchments or spread within infected watercourses during the course of instream works or transported via excavation material by site machinery. Aquatic invasive species have the potential for significant ecosystem disturbance, disrupting the predator/prey balance or affecting significant habitat disruption within aquatic systems. The spread of aquatic invasive species is not restricted in extent to the footprint of construction/instream works, but can be transported both upstream and downstream within a watercourse, potentially extending throughout the catchment.</p>	
<u>Impact Quality:</u> Negative	
Evaluation of the Subject Development Impact – Spread of Aquatic Invasive Species	
Element 2: UWF Related Works	
<u>Impact Magnitude:</u> There is the potential for introduction of non-native, invasive aquatic species at all 32 No. watercourse crossings associated with the UWF Related Works.	
Significance of the Impact: Slight to Moderate	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication. • In this respect, the spread of aquatic invasive species is evaluated as non-reversible. 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<u>Impact Magnitude:</u> There is the potential for introduction of non-native, invasive aquatic species at all 90 No. watercourse crossings associated with the grid connection works.	
<u>Significance of the Impact:</u> Slight to Moderate	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication. • In this respect, spread of aquatic invasive species is evaluated as non-reversible. 	
Element 3: UWF Replacement Forestry – <i>N/A, evaluated as excluded, see Section 8.4.2.2.1</i>	
Element 4: Upperchurch Windfarm	
<u>Impact Magnitude:</u> There is the potential for introduction of non-native, invasive aquatic species at the 1 No. watercourse crossing associated with the Upperchurch Windfarm works.	

Aquatic Habitats & Species	<p><u>Significance of the Impact:</u> Slight to Moderate</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The Upperchurch Windfarm impacts were evaluated as being of high magnitude for aquatic species, in the absence of mitigation. However, it was identified that significant impacts were not probable/likely. • Baseline conditions indicated that the aquatic species were present year-round and impacts were associated with construction phase works. • All effects were evaluated as reversible and temporary in the short-term; however, in the case of potential spread of aquatic invasive species, there is the potential for long-term, irreversible impacts
Sensitive Aspect	<p>Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1</p>
	<p>Evaluation of Cumulative Impacts – Spread of Aquatic Invasive Species</p>
	<p>All Elements of the Whole UWF Project</p>
	<p><u>Cumulative Impact Magnitude:</u> There is the potential for introduction of non-native, invasive aquatic species at the 121 No. stream crossing associated with the Upperchurch Windfarm works (1 no. occur on both the UWF Related Works and the Upperchurch Windfarm and 1 no. occurs on both the UWF Related Works and the UWF Grid).</p>
	<p>Significance of the Cumulative Impact: Slight to moderate</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication. • In this respect, the spread of aquatic invasive species are evaluated as non-reversible

Note: There is no cumulative evaluation of Other Projects or Activities included in the table above, because all of the Other Projects or Activities were evaluated as excluded from this particular impact table (see Section 8.4.2.2.1).

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8.4.4.6 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-41 below.

Table 8-41: Description and Rationale for Excluded Impacts to Aquatic Habitats & Species

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Storage of Brash	1,2,4,5	Nitrogen Deposition	Aquatic Habitat Degradation (as a result of increased nitrogen deposition) such as temporary oxygen shortages.	Rationale for Excluding: The scale of tree-felling is insufficient to result in additive nitrogen deposition effects – any effects will be Neutral
Operational Stage				
Rationale for Excluding: Access routes and permanent watercourse crossing structures will be in place. Operational Works will be minimal, with no works to watercourse crossing structures expected.				
Decommissioning Stage				
Rationale for Excluding: UWF Related Works, Upperchurch Windfarm: Access routes and permanent watercourse crossing structures will be in place. Works will be subject to best practice management measures. UWF Grid Connection will not be decommissioned.				

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8.4.5 Mitigation Measures for Impacts to Aquatic Habitats & Species

Mitigation measures were incorporated into the UWF Related Works project design including the Project Design Measures. No additional mitigation measures are required as **no significant adverse impacts** are concluded by the topic authors as likely to occur to Aquatic Habitats & Species as a consequence of the UWF Related Works.

8.4.6 Evaluation of Residual Impacts to Aquatic Habitats & Species

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for Aquatic Habitats & Species above (Section 8.4.4) – i.e. **no significant adverse impacts**.

8.4.7 Application of Best Practice and the EMP for Aquatic Habitats & Species

Best Practice Measures (BPM), although not part of the Project Design for the UWF Related Works, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Aquatic Habitats & Species**, by the authors of this topic chapter, using industry best practice:

RW-BPM-01	Measures for Protection of Surface Water Quality during Watercourse Crossing Open Trench Works where the Dam and Over Pump Method is used
RW-BPM-02	Measures for Protection of Surface Water Quality during Watercourse Crossing Open Trench Works where dam and Pipe/ Flume method is used
RW-BPM-04	Measures for Protection of Surface Water Quality during Widening or Replacing an Existing Culvert
RW-BPM-05	Surface Water Quality Protection Measures During Excavation Works Within 50m of a Watercourse
RW-BPM-06	Surface Water Quality Protection Measures During Tree Felling Works
RW-BPM-07	Protection of Surface Water and Groundwater Quality during use of Cement Based Compounds
RW-BPM-08	Protection of Surface Water and Groundwater Quality During Storage and Handling of Fuels, Oils and Chemicals
RW-BPM-09	Design of New Permanent Watercourse Crossing Structures to Prevent Flood Risk
RW-BPM-10	Surface Water Quality Protection Measures During Temporary Storage of Overburden
RW-BPM-11	Surface Water Quality Protection Measures during Permanent Storage of Overburden
RW-BPM-16	Monitoring of non-native invasive plant species
RW-BPM-17	Best practice measures for the removal of vegetation during construction
RW-BPM-19	Disturbance to and/or displacement of nesting Common Kingfisher (<i>Alcedo atthis</i>).
RW-BPM-22	Management of general non-native invasive species

These Best Practice Measures are included in full at the end of this topic chapter, and also form part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

8.4.7.1 Surface Water Management Plan

Water quality and the existing drainage regime will be managed under a Surface Water Management Plan (SWMP) which will be implemented by the appointed Contractor during the construction stage of the UWF Related Works.

The Surface Water Management Plan will provide the water management framework for construction works and will ensure that work is carried out with minimal impact on the surface water environment and in accordance with the Project Design and Best Practice Measures and environmental commitments made in this EIA Report. The Surface Water Management Plan is part of the **Environmental Management Plan for UWF Related Works**, and accompanies this planning application as **Volume D**.

8.4.7.2 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan also forms part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

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8.4.8 Summary of Impacts to Aquatic Habitats & Species

A summary of the Impact to Aquatic Habitats & Species is presented in Table 8-42.

Table 8-42: Summary of the impacts to Aquatic Habitats & Species

Impact to Aquatic Habitats & Species	Decrease in instream aquatic habitat quality	Changes to flow regime	Disturbance or displacement	Riparian habitat degradation	Spread of aquatic invasive species
<i>Evaluation Impact Table</i>	<i>Section 8.4.4.1</i>	<i>Section 8.4.4.2</i>	<i>Section 8.4.4.3</i>	<i>Section 8.4.4.4</i>	<i>Section 8.4.4.5</i>
Project Life-Cycle Stage	Construction	Construction	Construction	Construction	Construction
UWF Related Works	Imperceptible to Moderate	Slight	Slight	Slight to Moderate	Slight to Moderate
Element 1: UWF Grid Connection	Slight to Slight-Moderate	Slight	Slight	Slight to Moderate	Slight to Moderate
Element 3: UWF Replacement Forestry	No Potential for Impacts - Evaluated as Excluded, see Section 8.4.2.2.1				
Element 4: Upperchurch Windfarm	Imperceptible	Slight	Imperceptible	Imperceptible	Slight to Moderate
Element 5: UWF Other Activities	No Potential for Impacts - Evaluated as Excluded, see Section 8.4.2.2.1				
Cumulative Impacts:					
All Elements of the Whole UWF Project	Imperceptible to Moderate	Slight	Slight	Slight to Moderate	Slight to Moderate
All Elements of the Whole UWF Project <i>cumulatively with</i> Other Projects or Activities Bunkimalta Windfarm, Newport Distributor Road	Slight to Slight-Moderate	N/A - Evaluated as excluded from these impacts, see Section 8.4.2.2.1			

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is no potential for cumulative effects with the UWF Related Works.

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8.5 Sensitive Aspect No.4: Terrestrial Habitats

This Section provides a description and evaluation of the Sensitive Aspect - Terrestrial Habitats.

8.5.1 BASELINE CHARACTERISTICS of Terrestrial Habitats

8.5.1.1 STUDY AREA for Terrestrial Habitats

The study area for Terrestrial Habitats in relation to the UWF Related Works is described in Table 8-43 and illustrated on [Figure RW 8.5: Terrestrial Habitats within the UWF Related Works Study Area](#) (Volume C3 EIAR Figures).

Table 8-43: UWF Related Works Study Area for Terrestrial Habitats

Study Area for Terrestrial Habitats	Justification for the Study Area Extents
Construction works area boundary plus 50m in all directions	Professional judgement and as per Best Practice (CIEEM, 2016)

8.5.1.2 Baseline Context and Character of Terrestrial Habitats in the UWF Related Works Study Area

Terrestrial Habitats within the UWF Related Works Study Area comprise a mosaic of agricultural grassland, commercial forestry plantations, hedgerows, wet grassland, private roads and public roads.

Twenty-two habitat types (including six types of habitat mosaic) comprising 190.5Ha were recorded. The dominant habitats present are improved agricultural grassland (GA1) and conifer plantation (WD4) and Wet Grassland (GS4) which together make up 168Ha or 88% of all habitats present. Scrub (WS1), built land and artificial surfaces (BL3), Wet Heath (HH3) and Upland Blanket Bog (PB2) make up the most of the remaining habitats (7.3%). Linear habitats are primarily composed of Buildings and Artificial Surfaces (BL3), earth banks (BL2), and Eroding/Upland Rivers (FW1).

Respective areas of each habitat type (evaluated as of Local Importance (Higher Value) or above) are illustrated in [Figure RW 8.5: Terrestrial Habitats within the UWF Related Works Study Area](#) and presented in full in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.3.1.2\)](#), [Appendix 8-1](#) can be found in [Volume C4 EIAR Appendices](#)

No Flora Protection Order (FPO) species are present within the construction area boundary.

Non-native invasive plant species listed on the Third Schedule subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) are herein described.

Japanese knotweed or Himalayan knotweed infestations were recorded at 1 location during habitat assessments on the UWF Related Works. The infestation is located at a distance greater than 7 metres of the construction works area boundary.

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8.5.1.3 Importance of Terrestrial Habitats

Upland/Eroding Streams habitats present are evaluated as of National Importance based on connectivity to the Clodiagh (Tipperary) and Multeen River sub-catchments. Upland Blanket Bog (PB2) of County Importance is present. Terrestrial Habitats of Local Importance Higher Value are Wet Grassland (GS4), Scrub and Immature Woodland (WS1/2), Wet Heath (HH3), Dry-humid Acid Grassland (GS3), Dry Siliceous Heath (HH1) and Cutover Bog (PB4).

Linear hedgerow and treelines (or mosaics of both), are evaluated as of Local Importance, Higher Value.

8.5.1.4 Sensitivity of Terrestrial Habitats

Terrestrial Habitats are sensitive to direct land take, pollution, and environmental changes resulting from modification such as increased drainage. Groundwater dependant habitats such as bog and peatland habitats may be sensitive to changes in groundwater regimes or changes in ground water quality. The diversity of habitats is particularly sensitive to encroachment from invasive species which may out-compete local native species. Habitats are also sensitive to Human activities such as burning and recreational use.

8.5.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

The present survey forms a baseline classification of habitats on or near the subject development. No previous habitat information at a suitable scale is available from which trends can be identified or changes evaluated.

Reporting on trends with regard to protected habitats and species under the EU Habitats Directive is provided to the EU under Article 17 of said directive. Overall trends for some Annex quality habitats present within the receiving environment such as Wet Heath are included therein and evaluated nationally (stable in the case of Wet Heath for example). Availability of trends in respect of locally important habitats is limited (Browne, 2007). We would note that the onsite Wet Heath was subject to cattle grazing at the time of the windfarm EIS (2013), and this is still the case. Likewise, in respect of Upland Blanket Bog, the windfarm EIS has previously identified degradation from peat extraction, land reclamation, conifer planting, grazing and drainage. The latter 2 pressures are still present and therefore represent an ongoing trend.

As such, a scenario in which the Subject Development does not take place would result in a continuation of current trends relating to habitats within the study area.

8.5.1.6 Receiving Environment (the Baseline + Trends)

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 and during the operational phase.

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8.5.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations.

UWF Related Works is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Related Works is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Related Works is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.5.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Terrestrial Habitats considered all of the Other Elements of the Whole UWF Project. **A description of these Other Elements** is included in this EIA Report at **Appendices 5.3, 5.4, 5.5 and 5.6**, in **Volume C4 EIAR Appendices**. Scoping of these Other Elements is presented in **Section 8.5.2.2.1** below.

The evaluation of cumulative impacts to Terrestrial Habitats also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Terrestrial Habitats with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in **Appendix 2.3: Scoping of Other Projects or Activities (Section A2.3 .1 and Section A2.3. 8)**.

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Related Works or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to Terrestrial Habitats.

8.5.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Related Works Study Area along with the study areas for Other Elements which are described in Table 8-44.

Table 8-44: Cumulative Evaluation Study Area for Terrestrial Habitats

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	construction works area boundary/afforestation lands plus 50m in all directions	Professional judgement and as per Best Practice (CIEEM, 2016)
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		

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<u>Cumulative Project</u>	<u>Cumulative Study Area Boundary</u>	<u>Justification for Study Area Extent</u>
Other Projects or Activities	Not Relevant – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects.	

8.5.2.2.1 Potential for Impacts to Terrestrial Habitats

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Terrestrial Habitats. The results of this evaluation are included in Table 8-45.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on **Figure CE 8.5: Terrestrial Habitats within the Cumulative Evaluation Study Area**. (Volume C3 EIAR Figures).

Table 8-45: Results of the Evaluation of the Other Elements of the Whole UWF Project

<u>Other Element of the Whole UWF Project</u>	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded:</u> Neutral effect/No potential for effects: Seven habitat types comprising 11.6Ha were recorded. The dominant habitats present are improved agricultural grassland (GA1), Wet Grassland (GS4) and conifer plantation (WD4) which together make up 10.4Ha or 89% of all habitats present. Scrub (WS1) and built land and artificial surfaces (BL3) make up the majority of the remaining habitats (9%). Linear habitats are primarily composed of spoil and bare ground (ED2), tree lines (WL2), hedgerows (WL1) and earth banks (BL2). The total area of linear hedgerow and treelines (or mosaics of both), comprises 134m. No non-native invasive plant species were recorded. Terrestrial Habitats of Local Importance, Higher Value are broadleaf woodland (WD1) and Scrub (WS1). Linear hedgerow and tree lines (or mosaics of both) are evaluated as of Local Importance, Higher Value.</p> <ul style="list-style-type: none"> • Neutral habitat loss as no permanent land take will be required of Terrestrial Habitats evaluated as of Local Importance (Higher Value) or greater, • No potential for hedgerow severance impacts as zero hedgerow is to be removed, • No potential for loss of High Nature Value trees, as no mature trees will be removed, • No potential for cross factor habitat degradation effects, as effects to Local Surface Water Bodies will not be greater than imperceptible, and no likely effects to Local Groundwater Bodies is expected. • No direct loss of Flora Protection Order species, as none were recorded at the site, • No fragmentation is expected from UWF Replacement Forestry with positive effects likely to accrue, • No likely spread of invasive species as none recorded within the afforestation site. Notwithstanding this point a comprehensive Invasive Species Management Plan has been developed and will be implemented by all personnel at the UWF Replacement Forestry site during its planting and growth stages.
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects

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8.5.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.5.2.3.1 Element 1: UWF Grid Connection

Terrestrial Habitats within the UWF Grid Connection Study Area comprise a mosaic of agricultural grassland, commercial forestry plantations, peatlands, hedgerows, wet grassland, private roads and public roads. For the most part the landscape is dominated by the Slievefelim to Silvermine Mountain upland area with habitats recorded reflective of this.

Twenty habitat area types (including four types of habitat mosaic) comprising 407.5Ha were recorded along the survey corridor. The dominant habitats present are improved agricultural grassland (GA1) and conifer plantation (WD4) which together make up 74.8% of all habitats present. Wet grassland (GS4), scrub (WS1) and buildings and artificial surfaces (BL3) make up the majority of the remaining habitats (16.9%). Further detail is provided in [Appendix 8-1, Section A8-1.2.4.6](#).

Fourteen Linear habitat feature types including upland/eroding (FW1) and lowland/depositing rivers (FW2), Stone Walls/Earthen Banks (BL1/BL2), Hedgerows (WL1) and Tree lines (WL2) were also recorded. Further detail is provided in [Appendix 8-1, Section A8-1.2.4.6](#).

Habitats of Local Importance (Higher Value) include buildings and artificial surfaces (BL3) (based on importance to bats), mixed broadleaf woodland (WD1) (based on importance to birds/mammals), mixed broadleaf/conifer woodland (WD2) (based on importance to birds and mammals), hedgerows (WL1) (level of maturity and value to birds and mammals), tree lines (WL2) (local importance to birds and mammals), riparian Woodland (WN5) (Importance to local diversity) and scrub (WS1) (importance to local diversity). Upland Blanket Bog (PB2) of County Importance is present within the study area at Bleanbeg and at Laghile.

The total length of linear hedgerow and treelines (or mosaics of both) present within the study area comprises 13.6km.

Respective areas of each habitat type (evaluated as of Local Importance (Higher Value) or above) are presented in full in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.3.1.2\)](#), [Appendix 8-1](#) can be found in [Volume C4 EIAR Appendices](#), and illustrated in [Figure GC 8.5: Terrestrial Habitats within the UWF Grid Connection Study Area](#). [Figure GC 8.5](#) is part of the EIA Report for the UWF Grid Connection, and is included in [Volume F: Reference Documents](#) with this planning application.

No Flora Protection Order (FPO) species are present within the construction area boundary; however, Bog Rosemary was identified c. 120 m north of the construction area boundary at Bleanbeg.

Non-native invasive plant species listed on the Third Schedule subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) are herein described.

The greater area surrounding the UWF Grid Connection includes Giant Hogweed (*Heracleum mantegazzianum*), and Rhododendron (*Rhododendron ponticum*) at a number of locations such as at Bleanbeg Bog. Neither of these species occur within construction works areas or in close proximity (<=7m).

Japanese knotweed or Himalayan knotweed infestations were recorded at 5 locations during habitat assessments on the UWF Grid Connection. All infestations are located at distances greater than 7 metres of the construction works area boundary.

‘Medium impact’ non-native invasive plant species (Kelly *et al.*, 2013, O’ Flynn *et al.*, 2014) recorded included Sycamore (*Acer pseudoplanatus*), Butterfly bush (*Buddleja davidii*) and Himalayan honeysuckle (*Leycesteria Formosa*). Respective locations of non-native invasive plant species are illustrated in [Figure GC 8.5: Terrestrial Habitats within the UWF Grid Connection Study Area](#), with further, detailed mapping provided in [Appendix A8, Section A8-1.6](#).

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Terrestrial Habitats	8.5.2.3.2 Element 3: UWF Replacement Forestry
	Not applicable – Element evaluated as excluded. See Section 8.5.2.2.1.
Sensitive Aspect	8.5.2.3.3 Element 4: Upperchurch Windfarm
	<p>The terrestrial habitats present in the Upperchurch Windfarm have been previously described in the 2013 EIS and 2013 RFI and include 13 distinct classifications and 3 types of habitat mosaic. Habitats are broadly similar to that described elsewhere with the addition of upland blanket bog (PB2), acid grassland (GS3) and neutral grassland (GS1) in addition to the aforementioned mosaics.</p> <p>Total length of linear hedgerow/treeline/field boundary within the Upperchurch Windfarm study area is 25km, with grass dominated banks described as the dominant type of field boundary.</p> <p>Within the 2013 EIS, a single (roadside) record of Japanese Knotweed was recorded within the study area for the Upperchurch Windfarm.</p>
Biodiversity	8.5.2.3.4 Element 5: UWF Other Activities
	<p><u>Haul Route Activity Locations</u></p> <p>Fourteen habitat types comprising 36.4Ha were recorded. The dominant habitats present are improved agricultural grassland (GA1), Built Land and Artificial Surfaces (BL3), Mixed Broadleaf Woodland (WD1) and Dry Meadows and Grassy Verges (GS2) which together make up 30.2Ha or 83.2% of all habitats present. Scrub (WS1), Wet Grassland (GS4) and Amenity Grassland (GA2) make up the majority of the remaining habitats (11.3%). Linear habitats are primarily composed of spoil and bare ground (ED2), Dry Meadows and Grassy Verges (GS2), Hedgerows (WL1), Tree lines (WL2), Tree lines (WL2), Hedgerows (WL1) and Earth Banks (BL2).</p> <p>The total area of linear hedgerow and treelines (or mosaics of both) present comprises 2,031m.</p> <p>Japanese knotweed was recorded c.15m from the haul route location HA15 on the R503 east of Ballycahill. This was the only record of non-native invasive plant species associated with the UWF Other Activities survey corridor. The infestation is located at a distance greater than 7 metres (c.15m) to the activity location.</p> <p><u>Upperchurch Hen Harrier Scheme Area</u></p> <p>A total of 128 Hectares of land has been put forward as alternative habitat for the Upperchurch Hen Harrier Scheme. The habitat types are a mixture of wet grassland (GS4) and improved grassland (GA1), with some smaller areas of willow scrub. We refer to the (consented) Upperchurch Windfarm Ecological Management Plan (2013) for further information in this regard (contained in Volume F: Reference Documents).</p> <p><u>Overhead Line Activities</u></p> <p>A total of 18 habitats were recorded within a 50-metre buffer of the Overhead Line Activities. The majority of the study area was composed of improved agricultural grassland. See Appendix A8-1.2.4.6 Table 56 for further detail.</p>
	8.5.2.3.5 Other Projects or Activities:
Topic	Not applicable – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.5.2.1.

8.5.2.4 Cumulative Information Baseline Characteristics - Importance of Terrestrial Habitats

UWF Grid Connection:

Habitats of international conservation importance are located at two locations where the UWF Grid Connection passes through the boundary of the Lower River Shannon SAC. These rivers and riparian habitats support habitats and species listed on Annex I and II, respectively, of the EU Habitats Directive 92/43/EEC which are listed as qualifying interests for the Lower River Shannon SAC.

Aquatic habitats of National Importance include the Clare River, east of Bealaclave as it is hydrologically connected to the Lower River Shannon SAC and Clare Glen SAC.

Wet heath (HH3) habitat at Baurnadomeeny was assessed to correspond with EU Habitats Directive 92/43/EEC Annex I habitat 'Northern Atlantic wet heaths with *Erica tetralix* (4010)' and is of National Importance.

Upland blanket bog (PB2) habitat at Bleanbeg and Laghile corresponds to EU Habitats Directive 92/43/EEC Annex I habitat to 'Blanket bogs (priority if active)' and is of National Importance. In addition, the bog at Bleanbeg has been designated to be of National importance for peatland habitats under Natural Heritage Area (Bleanbeg Bog NHA 002450) Order 2005 (S.I. No. 497 of 2005).

A range of Terrestrial Habitats have been identified as being of Local Importance (Higher Value) due to their importance for local biodiversity and supporting bats, birds and mammal species. These habitats include buildings and artificial surfaces (BL3), mixed broadleaf woodland (WD1), mixed broadleaf/conifer woodland (WD2), hedgerows (WL1), tree lines (WL2), riparian Woodland (WN5) and scrub (WS1).

Due to their presence within an SPA designated for Hen Harrier, a number of habitats serve an important role in supporting the structure and function of the SPA. This primarily includes suitable breeding and roosting habitat. See [Sensitive Aspect Hen Harrier Section 8.6](#) for further information.

Upperchurch Windfarm

Upland Blanket Bog (PB3) of County Importance is described in the Upperchurch Windfarm EIS. Sixteen habitat types are present which are of Local Importance, Higher Value. All remaining habitats are of lesser importance.

UWF Other Activities

Haul Route Activity Locations

Habitats of Local Importance, Higher Value present within the previously identified study area (including areas within 50m of the public road network) are Eroding/Upland Rivers (FW1), Mixed Broadleaf woodland (WD1), Hedgerows (WL2) and Scrub (WS1). Linear hedgerow and treelines (or mosaics of both) present are of Local Importance, Higher Value.

Overhead Line Activities

Habitats of Local Importance (Higher Value) present at or within 50m of pole/structure locations includes Wet Grassland (GS4), Oak-ash-hazel Woodland (WN2), Riparian woodland (WN5), Wet willow-alder-ash woodland (WN6), Mixed Broadleaf/Conifer Woodland (WD2), Broadleaved Woodland WD1/Wet Grassland (GS4) mosaic, Cutover Bog (PB4), Hedgerows (WL1), and Treelines (WL2). The Newport (Mulkear) River, present as Depositing/Lowland Rivers (FW2) between structures is evaluated as of International Importance, based on its status as a cSAC.

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8.5.2.5 Cumulative Information Baseline Characteristics – Trends in the Baseline Environment

UWF Other Activities: We would note that the enhancement proposed as part of the Upperchurch Hen Harrier Scheme would have a beneficial effect on habitats present over the operational phase of the project and represents a positive trend in respect of habitat conservation.

8.5.2.6 Cumulative Information Baseline Characteristics – Receiving Environment

UWF Other Activities: The implementation of the Upperchurch Hen Harrier scheme will produce an upward trend in respect of habitat diversity and preservation.

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8.5.3 PROJECT DESIGN MEASURES for Terrestrial Habitats

At the conception of the UWF Related Works, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-46 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Terrestrial Habitats**.

Table 8-46: UWF Related Works Project Design Measures relevant to Terrestrial Habitats

PD ID	Project Design Environmental Protection Measure (PD)
PD02	Flag-men will be used at temporary site entrances rather than creating sightlines by the removal of roadside boundaries. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the local road network in a safe and efficient manner.
PD05	Land reinstatement will not be carried out during very wet weather or when the soil is waterlogged.
PD06	If any compaction has occurred along the construction works area, these areas will be ploughed with a sub-soiler to loosen the subsoil layer
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted
PD11	Instream construction works will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer.
PD19	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound. All fuel will be stored in bunded, locked storage containers.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in **Appendices 5.3 and 5.5**, in **Volume C4: EIAR Appendices**.

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8.5.4 EVALUATION OF IMPACTS to Terrestrial Habitats

In this Section, the likely direct and indirect effects of the UWF Related Works are identified and evaluated. Then the likely cumulative effects of the UWF Related Works together with the Other Elements of the Whole UWF Project are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Terrestrial Habitats.

As a result of the exercise, some impacts were included and some were excluded.

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Table 8-47: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Reduction in Terrestrial Habitats (construction stage)	<i>Habitat degradation (construction stage)</i>
Hedgerow Severance (construction stage)	<i>Direct loss of Flora Protection Order species (construction stage)</i>
Loss of High Nature Value Trees (construction stage)	<i>Landscape level Habitat fragmentation (construction stage)</i>
	<i>Introduction or spread of invasive species (construction stage)</i>
	<i>Introduction or spread of invasive species (operational stage)</i>
	<i>Introduction or spread of invasive species (decommissioning stage)</i>

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.5.4.1 to 8.5.4.3.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.5.4.4.

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8.5.4.1 Impact Evaluation Table: Reduction in Terrestrial Habitats

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> Excavation Works</p> <p><u>Cumulative Impact Source:</u> Excavation works</p> <p><u>Impact Pathway:</u> Land Cover</p> <p><u>Impact Description:</u> Land take during the construction stage may cause a direct reduction in habitats present. Whilst the majority of land use change is temporary in nature with immediate re-instatement for works such as cable trenching and temporary berms, land use change for project infrastructure such as permanent roads, permanent berms and other features may reduce the respective area of some higher value habitats or habitats which are important from a Biodiversity perspective.</p> <p>Some land use change associated with the project (and which overlaps the SPA) will be offset by the provision of concealed geocell roadways, which will be mainly be planted with vegetation (heathers or grass or a combination of both) to match the previously existing habitat. An example of this as part of Project Design, concealed geocell roadways will be constructed at Castlewaller on the 110kV UGC, and these will be replanted with native Irish or Scottish heather (propagated in Ireland or Scotland); this land cover change is considered a positive effect on Biodiversity. Project Design Measures such as the use of flagmen at entrances has also reduced land cover change. Permanent storage berms (8 in total), mainly located along the verges of roadways or forestry tracks will be re-instated immediately with native grasses or native heather as appropriate. All re-instatement will be overseen by the Project Ecologist. As per Best Practice all habitats described and evaluated herein are those evaluated as of Local Importance (Higher Value) and above - we note that no habitats evaluated as of County, National, or International Importance are affected by permanent land use change.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation of the Subject Development Impact – Reduction in Terrestrial Habitats	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Permanent habitat loss will comprise 0.07Ha, which will be limited to 2 no. habitat types (Wet Grassland (0.7Ha) and Scrub (.004Ha)) The magnitude of change represents 0.64% of the total habitat within the study area and 0.5% and 0.01% respectively of the habitats described.</p>	
Significance of the Impact: Not Significant	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The low sensitivity of the habitats for which change will occur (context), and; • The extent of Habitat Loss, with none of the individual habitat changes representing more than 1% of the respective habitat present, which is; • Only a minor shift away from baseline conditions, notwithstanding; • The long term duration, and; • Low reversibility with permanent land use change likely. 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<p><u>Impact Magnitude:</u> Permanent habitat loss will comprise 0.51Ha, limited to 4 no. habitat types (Wet Grassland (0.3Ha), Wet Grassland/Scrub mosaic (.04Ha), Deciduous woodland (.09Ha) and Scrub (.11Ha)) with an importance evaluation of Local Importance (Higher Value). The magnitude of change represents 5.6% of the total habitat within the study area, and 0.6%, 2.7%, 1.6% and 0.7% respectively of the habitats described.</p>	

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Terrestrial Habitats	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • The low sensitivity of the habitats for which change will occur (context), and; • The extent of Habitat Loss, with none of the individual habitat changes representing more than 2.7% of the respective habitat present, which is; • Only a minor shift away from baseline conditions, notwithstanding; • The permanent duration, and; • Low reversibility with permanent land use change likely
	Element 3: UWF Replacement Forestry – <i>N/A, evaluated as excluded, see Section 8.5.2.2.1</i>
	Element 4: Upperchurch Windfarm
	<u>Impact Magnitude:</u> “In terms of the habitat loss arising from the construction of roads, foundations and hardstandings, this was determined as 9.65Ha, primarily in the improved agricultural grass land and conifer plantations.”
	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • “In relation to the details submitted, I consider that the potential impact on habitats on the site is not therefore significant. The impacts largely occur on areas with a long history of human intervention through farming and forestry cultivation. I also consider that subject to the mitigation measures as outlined that the Whole UWF Project is not likely to result in significant impacts and effects on any designated sites.”
	Element 5: UWF Other Activities
	<u>Impact Magnitude:</u> None
	<u>Significance of the Impact:</u> Neutral Effect
Sensitive Aspect	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • No permanent land use change is proposed of Terrestrial Habitats evaluated as of Local Importance (Higher Value) or greater.
	Evaluation of Cumulative Impacts – Reduction in Terrestrial Habitats
	All Elements of the Whole UWF Project
	<u>Cumulative Impact Magnitude:</u> Habitat loss in respect of the UWF Grid Connection, the UWF Related Works, UWF Replacement Forestry and UWF Other Activities will be limited to 4 no. habitat types with an importance evaluation of Local Importance (Higher Value). The total magnitude of habitat loss is 0.58Ha, primarily associated with the UWF Grid Connection. Habitat loss from equivalent sources has already been described as not significant for the Upperchurch Windfarm.
	Significance of the Cumulative Impact: Not Significant
	<u>Rationale for Cumulative Impact Evaluation:</u> <ul style="list-style-type: none"> • The overall extent of Habitat Loss, and; • Changes from baseline conditions are very slight-minor, notwithstanding; • The long term to permanent duration, and; • Low reversibility with permanent land use change likely.
	Note: No cumulative evaluation of <u>Other Projects or Activities</u> is included in the table above, because <u>no</u> Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).
Topic	

8.5.4.2 Impact Evaluation Table: Hedgerow Severance

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Excavation Works

Cumulative Impact Source: Excavation Works

Impact Pathway: Land cover

Impact Description: Construction stage works will cause both temporary and permanent severance of existing field boundaries. This is primarily to facilitate the linear nature of project elements such as the UWF Grid Connection and cabling as part of UWF Related Works. Any temporary hedgerow loss, such as at field boundary crossings and at entrances, will be immediately re-instated once works are complete with like for like vegetation and therefore Neutral effects are considered likely. Project Design Measures such as the use of flagmen at entrances has reduced the extent of field boundaries to be removed, even if only temporarily. Permanent severance if of sufficient magnitude may affect habitat connectivity. As per Best Practice all habitats described and evaluated herein are those evaluated as of Local Importance (Higher Value) and above - we note that no hedgerows or field boundaries were evaluated as of County, National, or International Importance. This is reflective of the landscape present with many field boundaries comprising earthen banks, or lower value hedgerows.

The Upperchurch Hen Harrier Scheme is to incorporate significant planting of hedgerows (2.8km), and additional Hedgerows will be planted as part of the UWF Grid Connection (700m of new hedgerow), UWF Related Works (370m of new hedgerow) and Upperchurch Windfarm (360m as mitigation). Additionally bat mitigation measures as part of Project Design will involve enhancement of hedgerow severance locations by the further planting of like for like trees on either side of crossings.

Impact Quality: Negative and positive

Evaluation of the Subject Development Impact – Hedgerow Severance

Element 2: UWF Related Works

Impact Magnitude:
Habitat loss is limited to 170m of hedgerow comprising primarily earthen banks (only 1 mature tree and 3 immature trees are to be removed).

Significance of the Impact: Not Significant

- Rationale for Impact Evaluation:
- The extent of severance, with;
 - No individual severed sections evaluated as sufficient in magnitude to result in fragmentation effects, and;
 - A significant contrast with baseline conditions is not expected, notwithstanding;
 - The long term duration, and;
 - Low reversibility with land use change likely

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:
Permanent Habitat loss is limited to 45m of permanent hedgerow removal from 9 no. locations each of 5m in length. 700m of new hedgerow will be planted.

Significance of the Impact: Not Significant

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	<p>Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.5.2.2.1.</p>
	<p>Element 4: Upperchurch Windfarm</p>
	<p><u>Impact Magnitude:</u> As per the windfarm EIS, 980m of hedgerow will be removed. 980m of hedgerow will be replanted to mitigate this loss.</p>
	<p><u>Significance of the Impact:</u> Not Significant</p>
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • “However the extent is relatively low particularly as there is an abundance of this habitat and many of the hedgerows dividing fields have very little cover within the region. Therefore, it is near certain that the impact on this habitat will not be significant.”
	<p>Element 5: UWF Other Activities</p>
	<p><u>Impact Magnitude:</u> The Upperchurch Hen Harrier scheme activities will include improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs. Ongoing farming practices will also be restricted to preclude further hedgerow removal. No hedgerow loss is associated with Overhead Line Activities under consideration.</p>
	<p><u>Significance of the Impact:</u> Significant (positive)</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of new hedgerow to be planted, and; • The long-term duration equivalent to the lifetime of the project
Evaluation of Cumulative Impacts – Hedgerow Severance	<p>All Elements of the Whole UWF Project</p>
	<p><u>Cumulative Impact Magnitude:</u> Permanent hedgerow loss will be limited to total of 1045m within the Whole UWF Project study area. Temporary hedgerow/field boundary removal relates to a total of 710m (585m within the UWF Grid Connection study area and 145m within the UWF Related Works Study Area, 20m of which occur at the same locations) much of which comprises earthen banks.</p>
	<p>In total 3800m of new hedgerow will be planted within the Whole UWF Project study area. Habitat loss of Hedgerow has already been described as not significant for the Upperchurch Windfarm.</p>
	<p>Significance of the Cumulative Impact: Not Significant</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of Habitat Loss overall, with limited removal of trees and; • Individual severance locations will not result in any corridor fragmentation, and; • A significant contrast with baseline conditions is not predicted, additionally;
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- Significant positive effects from Hedgerow enhancement and planting of 2.8km of new hedgerows will occur as a result of the Upperchurch Hen Harrier Scheme, over the lifetime of the project, notwithstanding;
- The long-term duration, and;
- Low reversibility with land use change likely

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

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8.5.4.3 Impact Evaluation Table: Loss of High Nature Value Trees

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Excavation Works

Cumulative Impact Source: Excavation Works

Impact Pathway: Land cover

Impact Description: Habitats including mature trees such as hedgerows, deciduous woodland and scrub are herein evaluated for loss of mature trees of Biodiversity value. Construction stage works will cause both temporary and permanent loss of existing field boundaries, and other habitats which may contain or include mature trees of Biodiversity Value. Permanent loss of mature trees may affect connectivity / result in fragmentation and have secondary effects on other Biodiversity receptors which utilise mature trees for breeding or resting. Project Design Measures such as the use of flagmen at entrances has reduced the extent of trees to be removed. Trees evaluated herein are of Local Importance (Higher Value) in accordance with their respective habitat classification.

We note that the Upperchurch Hen Harrier Scheme is to incorporate significant planting of trees, in addition the UWF Replacement Forestry will comprise deciduous trees in its entirety. Further instatement of trees will occur at hedgerows evaluated as 'Bat Crossing' locations.

Impact Quality: Negative and positive

Evaluation of the Subject Development Impact – Loss of High Nature Value Trees

Element 2: UWF Related Works

Impact Magnitude:

Tree loss is limited to 1 no. mature tree and 3 immature trees- primarily from hedgerow crossing locations.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The extent of Loss is low overall, and;
- Will not result in any corridor fragmentation, and;
- A significant contrast with baseline conditions is not predicted, notwithstanding;
- The long term duration, and;
- Low reversibility with permanent loss likely

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Tree loss is limited to 26 no. mature trees and 4 immature trees.
25 of the 26 mature trees will be lost from a single plantation of beech.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The low magnitude of Loss overall, and;
- Will not result in any corridor fragmentation, and;
- A significant contrast with baseline conditions is not predicted, notwithstanding;
- The permanent duration, and;
- Low reversibility with permanent loss likely.

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<p>Element 3: UWF Replacement Forestry – <i>N/A, evaluated as excluded, see Section 8.5.2.2.1</i></p>	Terrestrial Habitats
<p>Element 4: Upperchurch Windfarm</p>	
<p><u>Impact Magnitude:</u> Tree loss is Medium and will be limited to 24 no. mature trees - primarily from hedgerow crossing locations and site entrances.</p>	
<p><u>Significance of the Impact:</u> Not Significant</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The low magnitude of loss, which; • Will not result in any corridor fragmentation, and; • A significant contrast with baseline conditions is not predicted, notwithstanding; • The long-term duration, and; • Low reversibility with permanent loss likely 	
<p>Element 5: UWF Other Activities</p>	Sensitive Aspect
<p><u>Impact Magnitude:</u> Neutral Effect for Haul Route Activity locations or Monitoring Activity locations as no permanent removal of trees is proposed in respect of these works. The Upperchurch Hen Harrier scheme does include the planting of 2.2 Ha of tree and shrub species in scrub areas, improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs. In addition, 1.4km of woody scrub species will be planted along riparian corridors. No trees will be removed to facilitate Overhead Line Activities as described.</p>	
<p><u>Significance of the Impact:</u> Moderate (positive)</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of replanting of trees, and; • A significant contrast with baseline conditions is predicted. • The long-term duration, and; • Low reversibility. 	
<p>Evaluation of Cumulative Impacts – Loss of High Nature Value Trees</p>	
<p>All Elements of the Whole UWF Project</p>	Biodiversity
<p><u>Cumulative Impact Magnitude:</u> Tree loss is limited to 51 no. mature trees and 7 immature trees.</p> <p>The Upperchurch Hen Harrier scheme does include the planting of 2.2 Ha of tree and shrub species in scrub areas, improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs. In addition, 1.4km of woody scrub species will be planted along riparian corridors.</p>	
<p>Cumulative Whole Project Impact Evaluation: Moderate (positive)</p>	
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of replanting of trees, and; • The duration which is long term and over the lifetime of the project, and; • A significant contrast with baseline conditions is predicted, with; • Limited reversibility 	
<p>Note: No cumulative evaluation of <u>Other Projects or Activities</u> is included in the table above, because <u>no</u> Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).</p>	

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8.5.4.4 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-48 below.

Table 8-48: Description and Rationale for Excluded Impacts to Terrestrial Habitats

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Movement of soils and machinery	1,2,4,5	Ground-water	Habitat degradation	Rationale for Excluding; No significant adverse impacts to Local Groundwater Bodies are likely to occur as a consequence of the development of the individual Elements or the implementation of all of the Individual Project Elements as the Whole UWF Project (refer Chapter 11 Water). Cross-factor effects by virtue of same are accordingly excluded from further evaluation.
Movement of soils and machinery	1,2,4,5	Surface Water	Habitat degradation	Rationale for Excluding; No significant adverse impacts to Local Surface Water Bodies are likely to occur as a consequence of the development of the individual Elements or the implementation of all of the Individual Project Elements as the Whole UWF Project (refer Chapter 11 Water). Cross-factor effects by virtue of same are accordingly excluded from further evaluation.
Excavation works	1,2,4,5	Soils	Direct loss of Flora Protection Order species	Rationale for Excluding; None were recorded within the Construction Works Boundaries.
Excavation works	1,2, 4,5	Landcover	Landscape Habitat fragmentation level	Rationale for Excluding: Neutral Landscape level effect is predicted. Permanent entrances to 1 will be re-instated; hedgerow crossings for 1 are narrowed to 5m to avoid/reduce fragmentation effects, Minimal trees are to be removed for element 2 which correlates with Upperchurch windfarm roads 4. 5. Upperchurch Hen Harrier Scheme will increase connectedness through planting of hedgerows/trees. No habitat removal is required for Overhead Line Activities.
Movement of soils and machinery	1,2,4,5	Soils	Introduction or spread of invasive species	Rationale for Excluding: All pertinent locations of Invasive Species are >7metres from any works areas. Notwithstanding this point a comprehensive Invasive Species Management Plan has been developed, and will be implemented by the Contractor to ensure that none of the identified Invasive Species infestations poses a risk to the environment. The Invasive Species Management Plan can be found in Volume D: Environmental Management Plan.

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Operational Stage				
Movement of soils and machinery	1,2,45	Soils	Introduction or spread of invasive species	Rationale for Excluding: All pertinent locations of Invasive Species are >7metres from any works areas. Notwithstanding this point a comprehensive Invasive Species Management Plan has been developed, and will be implemented by the Contractor to ensure that none of the identified Invasive Species infestations poses a risk to the environment. The Invasive Species Management Plan can be found in Volume D: Environmental Management Plan.
Decommissioning Stage				
Movement of soils and machinery	1,2,4,5	Soils	Introduction or spread of invasive species	Rationale for Excluding: All pertinent locations of Invasive Species are >7metres from any decommissioning works areas. Notwithstanding this point a comprehensive Invasive Species Management Plan has been developed, and will be implemented by the decommissioning Contractor to ensure that none of the identified Invasive Species infestations poses a risk to the environment. The Invasive Species Management Plan can be found in Volume D: Environmental Management Plan.

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8.5.5 Mitigation Measures for Impacts to Terrestrial Habitats

Mitigation measures were incorporated into the UWF Related Works project design including the Project Design Measures. No additional mitigation measures are required as **no significant adverse impacts** are concluded by the topic authors as likely to occur to Terrestrial Habitats as a consequence of the UWF Related Works.

8.5.6 Evaluation of Residual Impacts to Terrestrial Habitats

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for Terrestrial Habitats above (Section 8.5.4) - **no significant adverse impacts**.

8.5.7 Application of Best Practice and the EMP for Terrestrial Habitats

Best Practice Measures (BPM), although not part of the Project Design for the UWF Related Works, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Terrestrial Habitats**, by the authors of this topic chapter, using industry best practice:

RW-BPM-16	Monitoring of non-native invasive plant species
RW-BPM-17	Best practice measures for the removal of vegetation during construction
RW-BPM-18	Best practice for the protection and preservation of tree roots during the construction phase

These Best Practice Measures are included in full at the end of this topic chapter, and also form part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

8.5.7.1 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan also forms part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

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8.5.8 Summary of Impacts to Terrestrial Habitats

A summary of the Impact to Terrestrial Habitats is presented in Table 8-49.

Table 8-49: Summary of the impacts to Terrestrial Habitats

Impact to Terrestrial Habitats:	Reduction in Terrestrial Habitats	Hedgerow Severance	Loss of High Nature Value Trees
<i>Evaluation Impact Table</i>	<i>Section 8.5.4.1</i>	<i>Section 8.5.4.2</i>	<i>Section 8.5.4.3</i>
Project Life-Cycle Stage	Construction	Construction	Construction
UWF Related Works	Not Significant	Not Significant	Not Significant
Element 1: UWF Grid Connection	Not Significant	Not Significant	Not Significant
Element 3: UWF Replacement Forestry	Neutral	No Impact	No Impact
Element 4: Upperchurch Windfarm	Not Significant	Not Significant	Not Significant
Element 5: UWF Other Activities	Neutral	Significant (positive)	Moderate (positive)
Cumulative Impact:			
All Elements of the Whole UWF Project	Not Significant	Not Significant	Moderate (positive)

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

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8.6 Sensitive Aspect No.5: Hen Harrier

This Section provides a description and evaluation of the Sensitive Aspect - Hen Harrier.

8.6.1 BASELINE CHARACTERISTICS of Hen Harrier

8.6.1.1 STUDY AREA for Hen Harrier

The study area for Hen Harrier in relation to the UWF Related Works is described in Table 8-50 and illustrated on **Figure RW 8.6: Hen Harrier within the UWF Related Works Study Area** (Volume C3 EIAR Figures).

Table 8-50: UWF Related Works Study Area for Hen Harrier

Study Area for Hen Harrier	Justification for the Study Area Extents
Suitable habitat within 50m from the construction works area boundary in all directions	As per SNH (2014) guidance

8.6.1.2 Baseline Context and Character of Hen Harrier in the UWF Related Works Study Area

The location of the UWF Related Works includes habitat which may be used occasionally by foraging Hen Harrier as already established in the 2013 EIS for the Upperchurch Windfarm. No suitable breeding habitat is present. Similarly habitats may be utilised for foraging during the winter months, however no suitable winter roost habitat is present.

8.6.1.3 Importance of Hen Harrier

Hen Harrier is listed on Annex I of the EU Birds Directive 2009/147/EC. In 2007, six Special Protection Areas (including the Slieve Felim to Silvermines Mountains SPA) were designated across the country with breeding populations of Hen Harrier as the sole Special Conservation Interest to ensure the conservation of the species. The breeding population of Hen Harrier is Amber listed on the most recent Birds of Conservation Concern in Ireland 2014 – 2019 (Colhoun and Cummins, 2013). No areas are designated solely in respect of wintering populations. Both breeding and wintering Hen Harrier present are evaluated as Internationally Important and assigned a sensitivity rating of Very High (equivalent to NRA International Importance) for the purpose of evaluation, as per Table 8-3.

8.6.1.4 Sensitivity of Hen Harrier

Hen Harriers are known to be sensitive to disturbance (Masden 2010, Pearce-Higgins *et al.*, 2012). The effects of significant disturbance to Hen Harrier may be nest desertion, reduced incubation periods (resulting in embryo mortality), or additional stress on adult bird’s due to their propensity to alarm at intruders. Some or all of these effects may result in longer term abandonment of (traditionally held) nesting areas, with resultant local and/or population level effects. Whilst raptors in general may accept short infrequent disturbance events proximal to nests, and may even be highly tolerant of certain sources of disturbance, sudden changes during critical periods such as the start of the breeding season may provoke a higher level of response (Petty, 1998) with consequent effects on breeding success and local reproductive rates.

Research on the spatial ecology of Hen Harriers has shown that foraging females spend most of their time within 1km of the nest, while males hunt mostly within 2km of the nest (Arroyo *et al.*, 2009, Irwin *et al.*, 2012, Arroyo *et al.*, 2014). Therefore, landscape and habitat changes within 1km of the nest may impact on both male and female foraging; while changes up to 2km from the nest are more likely to affect males only (Arroyo *et al.*, 2014). Foraging habitat loss therefore, especially within 2km of nesting attempts may have negative effects on breeding success.

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Hen Harriers are positively sensitive to the creation of or sympathetic management of foraging and nesting habitat within their traditional range (Forrest *et al.*, 2011).

8.6.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

Four national surveys have been undertaken to assess the conservation status of Hen Harrier in Ireland (Norriss *et al.*, 2002; Barton *et al.*, 2006; Ruddock *et al.*, 2012; Ruddock *et al.*, 2016). The most recent survey recorded 108 to 157 breeding pairs (Ruddock *et al.*, 2016). This was lower than the breeding population estimate for 2010 of 128 to 172 breeding pairs (Ruddock *et al.*, 2012), similar to the estimate of breeding pairs in 2005 of 132 to 153 (Barton *et al.*, 2006) and slightly higher than the results of the first national survey which estimated 102 to 129 breeding pairs (Norriss *et al.*, 2002).

The Slievefelim to Silvermines Mountains SPA was one of only two SPAs to record an increase in breeding territories between 2005 and 2015. The remaining four SPAs designated for the conservation of Hen Harrier all showed reductions in the number of breeding territories recorded from 2005 to 2015 (Ruddock *et al.*, 2016).

8.6.1.6 Receiving Environment (the Baseline + Trends)

At a national level, 5-year interval trends show that the Hen Harrier population appears to be in decline, however the population in Slievefelim to Silvermines Mountains SPA is at least stable or on the increase. Changes in the supporting habitat, such as the maturation of 2nd rotation forestry (selected for nesting) or land management changes to further nesting and foraging habitat, are unlikely to produce a declining trend by the time the subject development is under construction. It is assumed in this report that the baseline environment in relation to Hen Harrier, as identified above, will be the receiving environment at the time of construction. Longer term trends have been identified with respect to Forestry, such as a declining trend in the amount of foraging habitat available, and are likely to overlap the operation phase. The following is cited directly from the document titled “Hen Harrier Conservation and the Forestry Sector in Ireland”, published by NPWS in 2015:

“Forests less than 15 years old constitute to varying degrees a potential foraging resource for Hen Harriers. In line with the forecasted reduction in the extent of the forest nesting resource, indicative future estimates of the extent of the potential *forest foraging* resource within the SPA network shows an acute declining trend over the next 10 years¹⁰” (emphasis added). This negative trend is also applicable to the Slieve Felim to Silvermines Mountains SPA.

In relation to forest nesting habitat, it is projected for the period 2012 – 2025 that all SPAs will undergo an acute reduction in the extent of forest that is of use to the Hen Harrier as a nesting resource. The overall decline is estimated to be 42% for this period when only 11% of the entire forest estate in the SPA network will constitute a potential nesting resource for forest nesting Hen Harrier. The projected decline of this resource varies between the SPAs from approximately 24% (Stack’s to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA) to 82% in Slieve Beagh SPA. Accordingly, it will likely be after 2035 before the net estimated usable forest nesting habitat will exceed present levels. Within the Slieve Felim to Silvermines SPA the estimated extent of forest within the SPA that is potentially usable as Hen Harrier nesting habitat is expected to decline from 23% (in 2012) to 11% within the period 2012-2025 and thereafter increase up to 44% by the year 2045.

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¹⁰ NPWS.2015. Hen Harrier Conservation and the Forestry Sector in Ireland.

8.6.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

UWF Related Works is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Related Works is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Related Works is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.6.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Hen Harrier considered all of the Other Elements of the Whole UWF Project. **A description of these Other Elements** is included in this EIA Report at **Appendices 5.3, 5.4, 5.5 and 5.6**, in **Volume C4 EIAR Appendices**. Scoping of these Other Elements is presented in **Section 8.6.2.2.1** below.

The evaluation of cumulative impacts to Hen Harrier also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Hen Harrier with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in **Appendix 2.3: Scoping of Other Projects or Activities (Section A2.3 .1 and Section A2.3. 8)**.

The results of this scoping exercise are that: Bunkimalta Windfarm, Castlewaller Windfarm (both consented) and the activities: Forestry, Agriculture and Turf-Cutting have been scoped in for evaluation of cumulative effects to Hen Harrier.

8.6.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Related Works Study Area along with the study areas for Other Elements and Other Projects or Activities which are described in Table 8-51.

Table 8-51: Cumulative Evaluation Study Area for Hen Harrier

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	2km from the construction works area boundary in all directions	As per SNH (2014) guidance
Element 3: UWF Replacement Forestry	Construction works area boundary or afforestation lands or activity location (plus 50m in all directions)	Published literature (e.g. Pearce-Higgins <i>at al.</i> 2009), and; Professional Judgement
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities: Bunkimalta Windfarm Castlewaller Windfarm Forestry Agriculture Turf-Cutting	The boundary of the Slievefelim to Silvermines SPA plus 5km in addition to the footprint of all Elements of the the Whole UWF Project plus 2km.	Research on the spatial ecology of Hen Harriers has shown that foraging females spend most of their time within 1km of the nest, while males hunt mostly within 2km of the nest (Arroyo <i>et al.</i> , 2009, Irwin <i>et al.</i> , 2012, Arroyo <i>et al.</i> , 2014).

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Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
		Therefore, landscape and habitat changes within 1km of the nest may impact on both male and female foraging, while changes up to 2km from the nest are more likely to affect males only (Arroyo <i>et al.</i> , 2014). SNH (2014) also recommend a 2km study area extent from a proposal site within which data should be collected. A 5km area around the SPA in conjunction with a 2km area around the various elements of the Whole UWF Project will ensure all likely effects are evaluated in the context of the Species and the SPA

8.6.2.2.1 Potential for Impacts to Hen Harrier

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect Hen Harrier. The results of this evaluation are included in Table 8-52.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on **Figure CE 8.6: Hen Harrier within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-52: Results of the Evaluation of the Other Elements and Other Projects or Activities

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects (with the exception of Haul Route Activities HA 1 to HA20, which are evaluated as excluded as these activities do not have potential to act as a source for impacts on Hen Harriers due again to their location on public roads and have been scoped out accordingly).
Other Projects or Activities	
Bunkimalta Windfarm Castlewaller Windfarm Forestry Agriculture Turf-Cutting	<u>Yes, included</u> for the evaluation of cumulative effects

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8.6.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.6.2.3.1 Element 1: UWF Grid Connection

Breeding Context

The 2km study area for the UWF Grid Connection comprises a range of habitats typical of the Slieve Felim to Silvermine Mountains SPA and includes forestry at differing age classes, open moorland and bog, in addition to rough grazing and improved agricultural lands. In general, and as expected given the overlap with a European Site designated for Hen Harrier, habitats within the 2km study area are considered of high quality for the species. In this regard however, it should be noted that no currently suitable breeding habitat overlaps the UWF Grid Connection construction works area.

Note: Following scoping and formal consultation with NPWS as described, it was established that, based on likely sensitivities, and source-pathways linkages in respect of disturbance and displacement, the primary objective of Hen Harrier surveys should be to identify all Hen Harrier breeding and winter roosting sites in suitable habitat within a 2km radius of the works (2km being the radius stipulated by SNH guidance)- with an emphasis on establishing the locations of any previously unknown nesting territories, given the information available on known and historical nest sites. This is further defined in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.3.3\)](#).

Breeding season surveys following Best Practice (Hardey et al., 2014) confirmed 3 no. Hen Harrier breeding attempts within 2km of the UWF Grid Connection in 2016. A further nesting attempt was confirmed at 2.15km from the UWF Grid Connection. Of the four breeding attempts described, 3 successfully fledged young. The distance from the UWF Grid Connection (construction area boundary) in respect of each nest location was 154m, 500m, 903m, and 2.15km respectively. Habitat types in which nests were located comprised Heath and Bog (1nests) and pre-thicket (pre-canopy closure) forestry (3 nests).

In 2017, one nesting attempt was confirmed ~500m from the UWF Grid Connection. A second nest was located 680m distant. In both instances, the nesting territory corresponded to a similar territory from the previous year (2016) which is typical of year to year fidelity shown by this species. Both nesting attempts described successfully fledged young in 2017. Habitat types in which nests were located comprised Heath and Bog (further details on see [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.3 Table 25\)](#). Appendix 8-1 can be found in [Volume C4 EIA Appendices](#).

Also in 2017 two additional breeding attempts were unconfirmed but are considered likely based on records of pairs in territorial display within ~2km. For the avoidance of doubt these are considered as valid nesting attempts for the purpose of the current appraisal however the outcome of the breeding attempt is classified as unsuccessful (only territorial pairs/activity observed). All nesting attempt locations in 2017 were again within the SPA and in similar locations to 2016.

Wintering Context

Hen Harrier winter roost surveys were undertaken to Best Practice (SNH) in the 2km hinterland of the UWF Grid Connection between September 2016 and February 2017, and also during the period September to February 2018, during which 3 no. winter roosts were identified – all within the SPA. One of these was situated within 500m of the UWF Grid Connection construction area boundaries and found to be utilised during both survey winters. The remaining 2 no. roosts were within 1km and 2km respectively of the UWF Grid Connection construction area boundaries and were more variable in their usage, used less frequently and only during the winter period of 2016/17. Roosting habitats in all instances comprised upland heath and bog, which is typical as birds mainly roost on the ground. Habitat types are described in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.3 Table 26\)](#).

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Based on studies conducted for the current appraisal the roost population of the UWF Grid Connection study area is estimated as 0-5 birds (based on a maximum of 5 birds recorded concurrently across all roosts on any given day, from 2 winter seasons of effort). This has the potential to increase or decrease dependent on inter-annual variation, weather or other factors. The maximum count of 5 birds at any individual roost (comprising 4 adult males and one female) was only recorded on a single occasion, in January 2018.

Further information on surveys and results are included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.3\)](#) and maps illustrating UWF Grid Connection sections with high sensitivity in respect of breeding Hen Harrier are provided in [Figure GC 8.6: Hen Harrier within the UWF Grid Connection Study Area](#) (the exact locations of Hen Harrier nesting attempts or communal roosting locations are not publically provided due to the sensitivity of this species to persecution/disturbance, as agreed in consultation with NPWS). [Figure GC 8.6](#) is part of the EIA Report for the UWF Grid Connection, and is included in [Volume F: Reference Documents](#) with this planning application.

Character

The harriers (genus *Circus*) are all fairly large hawks with long, broad wings, long tails and legs and slim bodies (Watson 1977). In Ireland the Hen Harrier *Circus cyaneus* is confined largely to heather moorland and young forestry plantations, where they nest on the ground. They are found mainly in Counties Laois, Tipperary, Cork, Clare, Limerick, Galway, Monaghan, Cavan, Leitrim, Donegal and Kerry. The current national breeding population is estimated at 108-157 breeding pairs (Ruddock *et al.*, 2016). The most recent estimate of the national wintering population, from Irelands Article 12 submission to the EU, is 269-349 individuals. Foraging habitat preferences are generally biased towards moorland, grassland mosaics and pre-thicket forest habitats which support larger numbers of prey species. Hen Harrier wintering grounds are typically lowland sites below 100m. During winter, Hen Harriers gather at communal or solitary roost sites. In Ireland the majority of these roost sites are located in reed beds, heather/bog and rank/rough grassland but also fen, bracken, gorse or saltmarsh. Approximately 20% of known roosting sites in Ireland occur within close proximity to core nesting areas. In 2014, approximately 96 confirmed solitary and communal roosts were known in Ireland.

8.6.2.3.2 Element 3: UWF Replacement Forestry

The Replacement Forestry location comprises primarily improved agricultural grassland, which is of low attractiveness for foraging Hen Harrier. No breeding or winter roost habitat is present.

8.6.2.3.3 Element 4: Upperchurch Windfarm

The Upperchurch Windfarm is the subject of a Hen Harrier Management Plan as part of the 2014 Grant of Permission, this Hen Harrier Management Plan is described in the 2013 RFI and sets out to enhance and promote habitat on lands close to the windfarm site to benefit foraging Hen Harrier. The Hen Harrier Management Plan is evaluated in this application as part of the UWF Other Activities and referred to as the 'Upperchurch Hen Harrier Scheme'.

With regard to the Upperchurch Windfarm Hen Harrier were not recorded as breeding within the study area for the 2013 EIS and the habitat was evaluated as sub-optimal for nesting. The Upperchurch Windfarm is outside the Slievefelim to Silvermines Mountains SPA. Foraging at low frequency during the summer months has been described in the 2013 EIS. Similarly habitats may be utilised for foraging during the winter months, however no suitable winter roost habitat is present.

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8.6.2.3.4 Element 5: UWF Other Activities

The Upperchurch Hen Harrier Scheme is located in Knockcurraghbola Commons, Coumnageeha, Foilnaman, Knockmaroe and Grousehall townlands on agricultural lands between the Slievefelim to Silvermines SPA and the Upperchurch Windfarm.

Haul Route Activities are also located outside the SPA. By their nature these locations are located on existing public roadways and roadside verges and do not comprise or include foraging or breeding habitat for Hen Harrier. Similarly, habitats are not suitable for foraging during the winter months, and no suitable winter roost habitat is present. Those locations in closest proximity to the already consented Upperchurch Windfarm (HA21-23) whilst unsuitable in themselves do occur adjacent to lands as part of the Consented Windfarm where foraging at low frequency has been recorded. Similarly Monitoring Activities during the construction of the Windfarm will take place on lands which may be utilized for foraging albeit at low frequency.

Suitable foraging habitat for Hen Harrier is present at locations of wet grassland along the route of the overhead line relating to Overhead Line Activities; in addition suitable foraging habitat is present at Shower Bog adjacent to the overhead line.

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8.6.2.3.5 Other Projects or Activities

Both the consented Bunkimalta Windfarm and the consented Castlewaller Windfarm are located within the Slievefelim to Silvermines SPA, c.2.5km to the north of the UWF Grid Connection (Bunkimalta Windfarm), and in the area of the UWF Grid Connection respectively (Castlewaller Windfarm). Both of these windfarms are located within areas containing suitable foraging and nesting Hen Harrier habitat and in close proximity to known historical and more recent nesting attempts. Both developments are or will be subject to significant management plans in respect of Hen Harrier.

Forestry is widespread within the SPA (approximately half of the site is afforested, including both first and second rotation plantations and clear fell areas) and is consequently listed as one of the most important activities with high effect on the SPA (High negative rank).

Agriculture (hill farming) constitutes roughly one half of the land use within the SPA, and is mainly based on the usage of rough grassland. Grazing is a medium ranked activity both in terms of negative and positive impacts on the SPA.

Turf-Cutting or Peat Extraction, both mechanically and by hand is also a medium ranked negative pressure on the SPA.

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8.6.3 PROJECT DESIGN MEASURES for Hen Harrier

At the conception of the UWF Related Works, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-53 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Hen Harrier**.

Table 8-53: UWF Related Works Project Design Measures relevant to Hen Harrier

PD ID	Project Design Environmental Protection Measure (PD)
PD26	If works are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory hen harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the construction works area boundary. These surveys will be completed prior to the start-up of all construction activities, until construction is complete and for 3 years thereafter. No construction works will take place within 500m of an active hen harrier breeding attempt or active nesting activity, during the breeding season (March to August).
PD27	During the hen harrier roosting season (October to February inclusive), construction works within 1000m of a roost will be limited to the period between one hour after sunrise to one hour before sunset.
PD28	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season <i>i.e.</i> not during the period of March to August inclusive where possible. This includes hedgerow and scrub removal in addition to hedgerow trimming.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection and UWF Replacement Forestry and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in **Appendices 5.3, 5.4 and 5.5** in **Volume C4: EIAR Appendices**.

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8.6.4 EVALUATION OF IMPACTS to Hen Harrier

In this Section, the likely direct and indirect effects of the UWF Related Works are identified and evaluated. Then the likely cumulative effects of the UWF Related Works together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Hen Harrier.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-54: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Reduction in or loss of Suitable Foraging Habitat (construction/operational stages)	Reduction in Prey Item Species (construction stage)
	Reduction in or Loss of Suitable Nesting Habitat, (construction stage)
	Mortality of Hen Harrier in or at Nest Sites, (construction stage)
	Reduction in or Loss of Winter Roosts, (construction stage)
	Mortality of Winter Roosting Hen Harrier, (construction stage)
	Disturbance/Displacement of Nesting or Roosting Hen Harrier, (construction stage)
	Additive mortality/disturbance, (construction stage)
	Disturbance/displacement, (construction stage)
	Disturbance/displacement, (construction stage)

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Table in the following Section 8.6.4.1.

The source-pathway-receptor links and the rationale for impacts excluded are described in the section directly after the Impact Evaluation Table in Section 8.6.4.2.

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8.6.4.1 Impact Evaluation Table: Reduction in or Loss of Suitable Foraging Habitat

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Impact Description	
Project Life Cycle Stage:	Construction/Operational stage
<p><u>Impact Source:</u> provision of new permanent access roads</p> <p><u>Cumulative Impact Source:</u> provision of windfarm access roads, turbine hardstanding areas and substation compounds; Land cover change from Agricultural Practices such as drainage, Direct habitat loss through peat extraction of intact bog, and habitat loss through forest maturation.</p> <p><u>Impact Pathway:</u> Land cover</p> <p><u>Impact Description:</u> Hen Harrier is a very high sensitivity receptor of International Importance. Land take or land use/cover change of foraging habitats such as grassland, scrub, bog and forestry during the construction stage may cause secondary effects for this Annex I species and SPA qualifying interest. Loss of foraging habitat at key periods of the breeding cycle can have knock on effects on breeding success of identified pairs nesting nearby, in particular where it occurs within 2km of a nest location. The spatial extent of habitat loss will be limited to roads, berms and other permanent features but also the width of the clear fell corridor at Castlewaller and along the UWF Grid Connection cable route. Temporary land use change for works such as cable trenching will be reinstated immediately following construction and therefore effects from this will be Neutral (equivalent to no effect or effects that are imperceptible), as will the loss of 45m of hedgerow from 9 no. locations. Temporary storage berms, (n=22) are located for along the UGC route; a project design measure is in place to ensure these are immediately re-instated to their previous condition. Permanent berms will be immediately re-seeded with heather. Harvester crossing points will be covered with topsoil and reseeded immediately as will any other temporary land-use change locations. Reinstatement will be overseen by the project Ecologist.</p> <p>Any impact is negated by the provision of concealed geocell roadways, planted with grass or heather, for all new permanent roads within the SPA. Felled commercial forestry at Castlewaller (1 ha) will be replaced within 1ha of deciduous woodland as part of the UWF Replacement Forestry element.. The felled area at Castlewaller will contain a concealed geocell roadway, which, along with the remainder of the corridor at that location, will be planted with native mature heather and grasses (Irish or Scottish sourced). Planting of geocell with mature plants along with a suitable grass nurse species will take place prior to construction, to avoid any time delay in the provision of habitat at source.</p> <p><u>Impact Quality:</u> Negative, positive and neutral (varies per project)</p>	

Evaluation of the Subject Development Impact– Reduction in or Loss of Suitable Foraging Habitat

Element 2: UWF Related Works	
<u>Impact Magnitude:</u>	Total permanent land take of foraging habitat is confined to improved agricultural grassland (0.12Ha); Wet Grassland (0.07Ha), upland blanket bog/Conifer mosaic (0.01Ha), Mature or closed canopy conifer plantation (0.28Ha) and scrub (0.004Ha) and totals 0.48Ha, and represent 0.28% of the available foraging habitat within the study area.
	Note: Within the Related Works, HW7 is the only location where the construction works boundary overlaps the Hen Harrier SPA, comprising 0.027Ha of scrub adjoining an existing yard at this location. All other UWF Related Works lands are located outside the SPA. No land use change will take place at this location, in line with the precautionary principle, to avoid effects on habitats possibly suitable for Hen Harrier.
Significance of the Impact: Slight (negative)	
<u>Rationale for Impact Evaluation:</u>	<ul style="list-style-type: none"> • The very high sensitivity rating of the species (context), and; • The extent of permanent habitat loss, evaluated as a very slight change from baseline condition, and; • The long term duration of permanent habitat loss, and;

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- The reversibility of the impact with the replanting and management of lands for the use of Hen Harrier at over the lifetime of the Project Element;

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Total permanent land take of foraging habitat is confined to improved agricultural grassland (2.47Ha); Wet Grassland (0.27Ha); Wet Grassland/Scrub mosaic (0.04Ha); Mature or closed canopy conifer plantation (2.14Ha), deciduous woodland (0.09Ha) and Scrub (0.11Ha) and totals 5.12Ha (2.44Ha of which is within the SPA). For the avoidance of doubt the calculation of permanent land take is based on all new permanent access roads, permanent berms (including overburden storage berms and notwithstanding seeding will take place immediately) and forestry felling (notwithstanding not all this habitat is suitable).

A proportion of the land take above, located within the boundary of the SPA, will be covered with concealed roads, planted with either native grass species or heather as appropriate to match the surrounding habitat- so as to avoid effects on the SPA itself. This comprises improved agricultural grassland (0.08Ha); Wet Grassland (0.09Ha); and Mature or closed canopy conifer plantation (0.4Ha at Castlewaller) and totals 0.6Ha. Permanent Berms (0.434Ha) within the SPA will be immediately reinstated as will all remaining locations comprising 0.855Ha.

As permanent habitat loss/exclusion is avoided within the SPA through this mitigation at source as part of project design, the net permanent loss is (5.12Ha -1.98Ha) which is 3.14Ha, in total from the study area.

Significance of the Impact: Moderate (negative)

Rationale for Impact Evaluation:

- The very high sensitivity rating of the species (context), and;
- The magnitude of effect, on the sensitive aspect Hen Harrier, following Percival *et al.* is evaluated as 'Low' (1-5% of habitat lost), equivalent to a minor shift away from baseline conditions however with the underlying character and composition remaining similar to pre-development circumstances;
- The permanent duration of permanent habitat loss, and ;
- The reversibility of effects with the use of concealed access roads at source within the SPA, and the further instatement of foraging habitat.

Element 3: UWF Replacement Forestry

Impact Magnitude:

Available foraging habitat for Hen Harrier currently within the land folio boundary comprises improved agricultural grassland (3.54Ha); Wet Grassland (0.44Ha) and Scrub (0.01Ha); in total 3.99Ha. This entire area will undergo landuse change to UWF Replacement Forestry (deciduous forestry) to be managed specifically for the use of Hen Harrier, including the incorporation of 'tried and tested' management measures which facilitate Hen Harrier foraging and usage.

Significance of the Impact: **very significant (positive)**

Rationale for Impact Evaluation:

- The demonstrated sensitivity of Hen Harriers to positive management (context), and;
 - The extent of lands to be managed for Hen Harrier, and;
 - The permanent duration, and;
- The Non-reversibility with lands to remain post decommissioning.

Element 4: Upperchurch Windfarm

Impact Magnitude: As per the 2013 RFI the magnitude of foraging habitat loss was calculated as 95Ha (actual loss plus effective loss through displacement effects). For completeness, given that the estimate of total displacement was based on 2017 as the construction year, an upwardly revised total estimate of 98.11Ha has been extrapolated from data provided in the RFI (Table 7 of the UWF Ecological Management Plan). This figure

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Hen Harrier	<p>corresponds with 2019 as the construction year – however it is still less than the 128Ha of lands to be provided as additional favourable foraging areas under the conditioned Upperchurch Hen Harrier Scheme (evaluated other ‘UWF Other Activities’).</p>
	<p>Significance of the Impact: Neutral Residual Impact</p>
Sensitive Aspect	<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The effective loss of 98.11Ha of habitat constitutes an effect of medium magnitude (5-20% of available habitat lost); • The implementation of the Upperchurch Hen Harrier Scheme, as conditioned; • Very High sensitivity of the species, and; • Long term duration.
	<p>Element 5: UWF Other Activities</p> <p>Impact Magnitude: Haul Route Activities will not result in loss of foraging habitat. Monitoring Activities will not result in a loss of Hen Harrier foraging habitat. Overhead Line Activities will not result in loss of foraging habitat. The consented Upperchurch Hen Harrier Scheme will result in 2.2Ha of trees, 1.4km of riparian habitat and 3.82.8km of new hedgerow being enhanced or created during initial activities. In total 128Ha of agricultural lands will be managed for the benefit of Hen Harrier, outside the turbine 250m buffer and the footprint of the development; as per the EMP. The net gain to Hen Harrier is 128Ha-98.11Ha which is 28.9Ha. The magnitude of this gain (an increase of 30% on the effective lands loss plus management of 128Ha) is evaluated as High as it constitutes a major alteration to the baseline features present.</p>
	<p>Significance of the Impact: Very significant (positive)</p>
	<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The demonstrated sensitivity of Hen Harriers to positive management (context), and; • The extent of lands to be managed for Hen Harrier, and; • The long term duration, and; • Low reversibility.
	<p>Cumulative Information: Individual Evaluations of Other Projects or Activities</p>
	<p>Other Project: Consented Castlewaller Windfarm</p> <p>Impact Magnitude: Effective Habitat Loss of Hen Harrier habitat within 250m of each turbine location, where harriers use second rotation aged 3-9 years-estimated at 47.9Ha.¹¹ However, it was also proposed to manage 47.9Ha of clear felled woodland for the lifetime of the windfarm for the benefit of Hen Harrier.</p>
	<p>Significance of the Impact: Neutral residual effect</p>
	<p>Rationale for Impact Evaluation:</p> <p>The impact is evaluated as neutral given the effective habitat loss is exactly equivalent to the area of clear felled woodland to be managed for the benefit of Hen Harrier, over the lifetime of the wind farm.</p>
	<p>Other Project: Consented Bunkimalta Windfarm</p> <p>Impact Magnitude: The Bunkimalta Windfarm SHMP acknowledges that Hen Harriers may show avoidance around 250m of each turbine. A total area of 162.76 hectares must be replaced by mitigation measures. DAHG cites this figure also.</p> <p>As the residual effects presented in the Windfarm EIS were subject to substantive discussion subsequent to decision, we do not cite these; rather we cite the relevant text from the inspectors Report. The comments below refer to the loss of foraging habitat within the context of Conservation Objectives for the (Hen Harrier) SPA, as cited in the Inspectors Report for Bunkimalta Wind Farm:</p>
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¹¹ Castlewaller Woodland Partnership (2007). Response to RFI from North Tipperary County Council prepared by Fehily Timoney and Company

<p>Pg. 34 “In summary therefore, I conclude that the relevant matter is that there is a total mitigatory habitat of 164.3 hectares which compares favourably with the 162.76 hectares lost. Subject to the Board being satisfied that the management of the 137.3 hectares of perpetual open canopy forest under the SHMP will provide suitable Hen Harrier habitat then the Board can be satisfied that the development would be in accordance with the conservation objective for the SPA.” and;</p> <p>Pg.41 “Based on the available information, which includes best scientific evidence and which is adequate for the purposes of Appropriate Assessment; I consider that the development would not result in net loss of Hen Harrier habitat. Therefore, I conclude that the Board can be satisfied that the development would not significantly affect the integrity of the SPA having regard to its Conservation Objective”</p>	<p style="text-align: center;">Hen Harrier</p>
<p><u>Significance of the Impact:</u> Neutral residual effect</p>	
<p><u>Rationale for Impact Evaluation:</u> • Based on an evaluation of “no net loss”</p>	<p style="text-align: center;">Sensitive Aspect</p>
<p>Activity: Forestry/Agriculture</p>	
<p><u>Impact Magnitude:</u> Hen Harrier in Ireland makes extensive use of both first and second rotation pre-thicket forest habitat during the breeding period. However, by its successional nature forests inevitably matures and become less suitable (Avery & Leslie, 1990; Madders, 2000; 2003; O’Donoghue, 2004).</p> <p>The following is cited directly from the document titled “Hen Harrier Conservation and the Forestry Sector in Ireland”, published by NPWS in 2015: “Forests less than 15 years old constitute to varying degrees a potential foraging resource for Hen Harriers. In line with the forecasted reduction in the extent of the forest nesting resource, indicative future estimates of the extent of the potential national <i>forest foraging</i> resource within the SPA network shows an acute declining trend over the next 10 years¹²”(emphasis added). This negative trend is also applicable to the Slieve Felim to Silvermines Mountains SPA.</p> <p>It is likely that some sites within the ‘wider countryside’ areas supporting breeding Hen Harrier that have been afforested will also experience forestry related changes both due to the maturation of existing forest habitat and the conversion of currently useful habitat (e.g. scrub, low intensity managed farmland) to a less stable state. In relation to Agriculture, in the absence of available information on trends it is evaluated as Neutral.</p>	
<p><u>Significance of the Impact:</u> Significant (negative)</p>	
<p><u>Rationale for Impact Evaluation:</u> • precautionary basis</p>	<p style="text-align: center;">Biodiversity</p>
<p>Other Project: Turf-cutting</p>	
<p><u>Impact Magnitude:</u> Habitats possibly subject to Peat Extraction such as Upland Blanket Bog (335Ha or 1.61% of the SPA) and Cutover Bog (507Ha or 2.42% of the SPA) occur within the SPA. Peat extraction by hand or through mechanical means is ranked as a medium level pressure in respect of Hen Harrier within the SPA¹³.</p> <p>Some of these habitats where they overlap the SPA are further protected through the provision of NHA’s wherein further turf cutting of intact areas is unlawful, or SAC’s wherein Conservation Objectives to protect Qualifying Interest bog are set out.</p> <p>In closer proximity to the Development, turf extraction forms part of the current baseline environment at Bleanbeg Bog but is limited to existing banks and further cutting of intact (uncut) areas, in addition to land take from other activities such as infrastructure, material removal etc. is, as already described unlawful¹⁴</p>	
<p><u>Significance of the Impact:</u> Neutral</p>	

¹² NPWS.2015. Hen Harrier Conservation and the Forestry Sector in Ireland.

¹³ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004165.pdf>

¹⁴ <http://www.irishstatutebook.ie/eli/2005/si/497/made/en/print>

Hen Harrier	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Restrictions on further turf cutting in intact areas/protected areas, and; • The limited extent of lands subject to turbarry (rights to cut turf) within the Hen Harrier SPA overall (4%), and; • The reversibility of any effect, (in the context of Hen Harrier) with birds expected to continue to utilize re-vegetating cutover bog <i>for foraging</i>.
	<p>Evaluation of Cumulative Impacts – Reduction in or Loss of Suitable Foraging Habitat</p>
Sensitive Aspect	<p>All Elements of the Whole UWF Project</p>
	<p><u>Cumulative Impact Magnitude:</u></p> <p>Both positive and negative quality effects occur with regard to Hen Harrier foraging Habitat loss across the Whole UWF Project. The negative effects of Upperchurch Windfarm, which is evaluated herein within the context of effective displacement based on a revised construction date (as per the Windfarm RFI); is effectively mitigated by the activities consented under the Upperchurch Hen Harrier Scheme, which as intended results in a net gain through design to Hen Harrier both in area and quality of habitat. Remaining negative effects primarily stem from the UWF Grid Connection; however the provision and management of UWF Replacement Forestry specifically for Hen Harrier, outside but adjacent to the SPA also contributes to a net gain overall to Hen Harrier of over 30.26Ha of actively managed foraging habitat.</p>
	<p>Significance of the Cumulative Impact: Significant (positive)</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The demonstrated sensitivity of Hen Harriers to positive management (context), and; • The extent of lands to be managed for Hen Harrier overall, and; • The long term to permanent duration, given that UWF Replacement Forestry will not be decommissioned, and; • The reversibility of negative effects with the application of the Upperchurch Hen Harrier Scheme and other measures as described.
Biodiversity	<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
	<p><u>Cumulative Impact Magnitude:</u></p> <p>The magnitude of foraging habitat loss resulting from the Whole UWF Project, Castlewaller Wind Farm and Bunkimalta Wind Farm is 312.39Ha. As 344.19Ha of land is additionally subject to management directly for the benefit of Hen Harrier, a net gain of 31.8Ha of foraging habitat will accrue. If Castlewaller WF and Bunkimalta are excluded from consideration, on the assumption that they may not be constructed or the mitigating effects from their respective management plans are merely neutralising effects, then the cumulative effect is in the order of the Whole UWF Project only, which is still a gain in actively managed Hen Harrier habitat of 30.26Ha, with no permanent exclusion of Hen Harrier from lands within the SPA portions of the development. A significant negative effect rating is utilised for predicted reductions in forestry based foraging habitat in the next 10 years, with the effects of peat extraction on foraging habitat evaluated as neutral.</p>
	<p>Significance of the Cumulative Impact: Neutral</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The net gain in terms of lands managed specifically for the use of Hen Harrier, and; • Extent of lands to be managed in total, notwithstanding, • The medium-term duration of a negative trend in respect of reductions in forestry based foraging habitat
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8.6.4.2 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-55 below.

Table 8-55: Description and Rationale for Excluded Impacts to Hen Harrier

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage / Planting Stage				
Land Take	1,2,3,4,5	Land cover	Reduction in Prey Item Species	Evaluated as Excluded: Neutral effects Neutral population level effects on prey item bird species are predicted, either from additive mortality or habitat loss. Neutral effect on the availability of small mammals as a result of habitat loss or additive mortality is expected. Therefore, Neutral secondary effects via a reduction in the availability of prey items as a result of project elements are likely.
Land Take	1,2,3,4,5	Land cover	Reduction in or Loss of Suitable Nesting Habitat	Evaluated as Excluded: No nesting habitat (i.e. <u>suitable bog</u> , pre-thicket forestry) overlaps the construction works area. All new permanent roads within the SPA will be concealed under a layer of rigid geocells, which will be planted with grass and heather species (Project Design).
Forestry Felling	1,2,3,4,5	Contact	Mortality of Hen Harrier in or at Nest Sites	Evaluated as Excluded as no works will take place within 500m of a nest March - August as part of Project Design.
Land Take	1,2,3,4,5	Land cover	Reduction in or Loss of Winter Roosts	Evaluated as Excluded: No winter roosts overlap works areas no land take is proposed as part of UWF Other Activities.
Land Take	1,2,3,4,5	Contact	Mortality of Winter Roosting Hen Harrier	Evaluated as Excluded as winter roosts are located outside the construction works areas. Measures to avoid disturbance to winter roosting harriers as part of Project Design will also prevent mortality.
Noise and human activity	1,2,3,4,5	Visibility	Disturbance/Displacement of Nesting or Roosting Hen Harrier	Evaluated as Excluded as no works will take place within 500m of an active breeding attempt as part of Project Design; Construction works within 1000m of a winter roost will be limited to the period between one hour after sunrise to one hour before sunset during the months of October to February inclusive, also as part of Project Design.
Operational Stage / Growth Stage				
Landuse Change, Telecom Relay Pole, new permanent access roads	1,2,3,4,5	Land cover, collision	Additive mortality/disturbance	Evaluated as Excluded: No potential for impacts. There will be no increase in accessibility. All new roads will have gates which will be locked on landholder boundaries. No potential for cumulative impacts with Upperchurch Windfarm. Upperchurch Windfarm: As per the 2014 ABP Inspectors Report no significant residual impact to Hen Harrier is expected to occur. There would be no

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Hen Harrier		Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
		Sensitive Aspect				
Biodiversity		Noise and human activity	1,2,3,4,5	Air and Visibility	Disturbance/displacement	<p>Evaluated as Excluded: No potential for impacts/Neutral effect;</p> <p>UWF Grid Connection and UWF Related Works (HW7): - Avoidance of annual inspections and Planned Maintenance works or activities within the SPA during the breeding season is built into design.</p> <p>UWF Grid Connection: Any unscheduled repair work, which may need to take place during the breeding season, will occur very infrequently, if at all, and where Unscheduled Repairs do occur, works will take place at joint bay locations using small 4 – 5 man crews and a small number of machines (excavator, cable pulling machine), these works if they do occur will take c.2weeks to complete. Due to the infrequent, reversible, and temporary duration, and location of any works from permanent roads, it is considered that disturbance/displacement effects to hen harriers will be Neutral during unplanned repairs, should they occur at all.</p> <p>UWF Replacement Forestry: Evaluated as Excluded: All works will be done by hand and equivalent to typical farming activities, therefore the magnitude of any noise or visual intrusion will be Negligible and any disturbance or displacement effects are likely to be Neutral.</p> <p>UWF Other Activities: Evaluated as Excluded: Element 4: HA1-HA20. These are excluded from further evaluation as works involve street furniture removal or activities on public roads with no significant source of noise or intrusion.</p>
		Decommissioning Stage				
Topic		Noise and human activity	5 (HA1-HA20)	Visibility	Disturbance /displacement	<p>Evaluated as Excluded: UWF Grid Connection – will not be decommissioned. Neutral effect.</p> <p>UWF Replacement Forestry – permanent, will not be felled. Neutral effect.</p> <p>Upperchurch Windfarm and UWF Related Works-decommissioning works will take place from hardcore areas, small number of machines required and brief duration of use (2 to 3 days) at each turbine location.</p>

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				UWF Other Activities: Haul Route Activities: Neutral effect as works involve street furniture removal or activities on public roads with no significant source of noise or intrusion. No requirement for activities associated with the remaining UWF Other Activities.

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8.6.5 Mitigation Measures for Impacts to Hen Harrier

Mitigation measures were incorporated into the UWF Related Works project design including the Project Design Measures.

No additional mitigation measures are required as **slight negative impacts** are concluded by the topic authors as likely to occur to Hen Harrier as a consequence of the UWF Related Works on its own; when considered cumulatively with the Other Elements of the Whole UWF Project - **significant positive cumulative impacts** are expected, and when Other Projects or Activities (in particular the **significant negative effect of Forestry**), the cumulative effect is expected to be **neutral**.

8.6.6 Evaluation of Residual Impacts to Hen Harrier

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required, and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table for Hen Harrier above (Section 8.6.4.1) –i.e. **no significant adverse impacts**.

8.6.7 Application of Best Practice and the EMP for Hen Harrier

Best Practice Measures (BPM), although not part of the Project Design for the UWF Related Works, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Hen Harrier**, by the authors of this topic chapter, using industry best practice:

RW-BPM-12	Monitoring of nesting and roosting Hen Harrier (<i>Circus cyaneus</i>)
RW-BPM-17	Best practice measures for the removal of vegetation during construction

These Best Practice Measures are included in full at the end of this topic chapter, and also form part of the **Environmental Management Plan for UWF Related Works**, which is included as Volume D with the planning application.

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8.6.8 Summary of Impacts to Hen Harrier

A summary of the Impact to Hen Harrier is presented in Table 8-56.

Table 8-56: Summary of the impacts to Hen Harrier

Impact to Hen Harrier:	Reduction in or Loss of Suitable Foraging Habitat
<i>Evaluation Impact Table</i>	<i>Section 8.6.4.1</i>
Project Life-Cycle Stage	Construction/Operation
UWF Related Works	Slight (negative)
Element 1: UWF Grid Connection	Moderate (negative)
Element 3: UWF Replacement Forestry	Very Significant (positive)
Element 4: Upperchurch Windfarm	Neutral residual effect
Element 5: UWF Other Activities	Very Significant (positive)
Cumulative Impact:	
All Elements of the Whole UWF Project	Significant (positive)
All Elements of the Whole UWF Project <i>cumulatively with</i> Other Projects or Activities: Bunkimalta Windfarm Castlewaller Windfarm Forestry, Agriculture, Turf-Cutting	Neutral

The greyed out boxes in the summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to present the totality of the project.

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8.7 Sensitive Aspect No.6: General Bird Species

This Section provides a description and evaluation of the Sensitive Aspect - General Bird Species.

8.7.1 BASELINE CHARACTERISTICS of General Bird Species

8.7.1.1 STUDY AREA for General Bird Species

The study area for General Bird Species in relation to the UWF Related Works is described in Table 8-57 and illustrated on **Figure RW 8.7: General Bird Species within the UWF Related Works Study Area** (Volume C3 EIAR Figures).

Table 8-57: UWF Related Works Study Area for General Bird Species

Study Area for General Bird Species	Justification for the Study Area Extents
50m area around and incorporating the construction works areas	Professional judgement and as per Best Practice (CIEEM, 2016, NRA, 2008, Lusby et al.,2010,SNH 2014)

8.7.1.2 Baseline Context and Character of General Bird Species in the UWF Related Works Study Area

All the species recorded the UWF Related Works EIA Report 2017 surveys are typical of the habitats present

General Breeding Birds

Given the overlap between Upperchurch Windfarm and UWF Related Works locations we refer to the species described within the EIS for Upperchurch Windfarm. As per the EIS 2013, surveys of breeding birds to inform the baseline evaluation of Upperchurch Windfarm recorded 37 species in total across ‘summer transects’ and vantage point surveys. All the species recorded are typical of the habitats present. Species recorded include Skylark, Kestrel, Peregrine Falcon, Stonechat and Crossbill. Additional species recorded on Upperchurch Windfarm, were Raven, Peregrine Falcon (Annex I), Sand Martin, Crossbill and Reed Bunting. Of these is it considered that Peregrine and Sand Martin do not nest within the study area as there is no suitable nesting habitat present. Many of the remaining species are typically representative of the land use present, and have strong associations with the type of activities present e.g. hill farming in respect of the quality of habitat present.

All of the above breed and forage in the receiving environment within suitable habitat. In general the receiving environment would be quiet with many species unlikely to undergo significant disturbance other than from day to day farming activities, and occasionally forestry operations.

General Wintering Birds

Studies for the 2013 EIS on Upperchurch Windfarm (which overlaps the locations of UWF Related Works) recorded a typical assemblage of wintering species (n=24). Of these one Red listed (Meadow pipit), 7 Amber (Skylark, Robin, Hen Harrier, Kestrel, Starling, Mistle thrush, Goldcrest and Linnet) and 15 Green listed species were present. In the interest of clarity, we note that the BOCCI status presented herein is the more current Cummins and Colhoun (2013) evaluation, published subsequent to Upperchurch Windfarm EIS.

Meadow Pipit

This is a very widespread species in Ireland, found in bogs, uplands and areas of scrub and pasture, with an estimated population of 500,000 to 1, 000, 000 pairs. Birds are ground nesting and typically feed on invertebrates such as crane flies, mayflies and spiders. This species is generally faithful sedentary in the

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summer but upland birds do move to lowland areas in the winter months. Meadow Pipit is present within the study area for UWF Related Works in suitable habitat (rough grassland and bog and mosaics of same).

Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

Golden Plover

Golden Plover were not recorded from the locations of the UWF Related Works, during any site visits and none were observed during studies to inform Upperchurch Windfarm 2013 EIS. Wintering Golden Plover are evaluated as Nationally Important and assigned a sensitivity rating of High.

Red Grouse

Optimal habitat for Red Grouse is not found within the locations of the UWF Related Works. No Red Grouse were recorded in studies to inform Upperchurch Windfarm. Although Upland Blanket Bog is present within the 50m habitat survey buffer it is sub-optimal for the species, and no evidence was recorded during e.g. habitat walkovers. Red Grouse are evaluated as of County Importance and assigned a sensitivity rating of medium.

Merlin

Merlin was not observed during studies to inform Upperchurch Windfarm 2013 EIS. None were recorded during site visits to inform the current evaluation. Merlin in the density recorded are evaluated as of Local Importance (low value) and assigned a sensitivity rating of Negligible.

Curlew

Curlew was not recorded from the locations of the UWF Related Works during any site visits and none were observed during studies to inform the (overlapping) Upperchurch Windfarm EIS. Breeding Curlew is evaluated as of National Importance and assigned a sensitivity rating of High.

Kingfisher

Kingfisher was not recorded during studies to inform Upperchurch Windfarm EIS. None were recorded in surveys to inform the current appraisal, including watercourse evaluations. Kingfishers are Amber listed in Ireland. A sensitivity rating of low is applied.

8.7.1.3 Importance of General Bird Species

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

Merlin, Hen Harrier and Golden Plover are listed on Annex I of the EU Birds Directive 2009/147/EC whilst Red Grouse is listed on Annex II. Curlew is now classified on the IUCN Red List as ‘near threatened’.

8.7.1.4 Sensitivity of General Bird Species

General breeding birds are sensitive to habitat loss and disturbance/displacement from noise and/or visual intrusion. Wintering birds are similarly sensitive.

Golden Plover are sensitive to changes in land cover or land use of suitable foraging or roosting habitat such as improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog, where land cover/use change may cause reductions in foraging success, increased exposure to predation through displacement to less viable feeding areas, and also reduction in survival rates of wintering birds. Wintering Golden Plover are also sensitive to disturbance or displacement effects due to noise, visual intrusion, and anthropogenic sources.

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Meadow Pipit are also sensitive to changes in land cover or landuse which results in a decrease of suitable nesting habitat (improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog), these changes can effect breeding numbers, foraging success, and increased exposure to predation through displacement to less viable feeding areas, and local population level declines.

Breeding waders such as Curlew are sensitive to habitat loss or fragmentation through afforestation, habitat loss from peat extraction, ground based predation, destruction from agricultural machinery and abiotic variables such as flooding.

Bird species are sensitive to suitable landscaping/reinstatement from which positive effects may accrue.

8.7.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

In trend analyses on General Breeding Birds undertaken on 53 species within the most recent Countryside Bird Survey report (Crowe *et al.*, 2014) some 20 species showed increasing trends over the 16-year period since 1998, while 17 species remained relatively stable.

The most recently published Atlas (Balmer *et al.*, 2013) has shown that the species with the largest winter range are still the Hooded Crow, Wren, Robin and Blackbird. In Ireland the Atlas found that 74% of species had increased their winter range.

The abundance and diversity of the bird species within the baseline environment is evaluated as following the general trend of species populations throughout Ireland as described in published literature such as cited above. Given this, a scenario in which the subject development does not take place would result in a continuation of current trends relating to general bird species within the study area.

8.7.1.6 Receiving Environment (the 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. Identified longer terms trends, such as declines in breeding Curlew is likely to overlap the operational phase, as are trends in respect of general breeding birds and wintering birds, identified in publications such as the 2013 Atlas.

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8.7.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

UWF Related Works is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Related Works is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Related Works is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.7.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to General Bird Species considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.7.2.2.1](#) below.

The evaluation of cumulative impacts to General Bird Species also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to General Bird Species with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: Bunkimalta Windfarm has been scoped in for evaluation of cumulative effects to General Bird Species.

8.7.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Related Works Study Area along with the study areas for Other Elements and Other Projects or Activities. The Cumulative Evaluation Study Area, comprises two different areas-one extent for cumulative evaluation of all of the Elements of the Whole UWF Project and a second extent for the cumulative evaluation of Other Projects or Activities, see Table 8-58.

Table 8-58: Cumulative Evaluation Study Area for General Bird Species

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	50m area around and incorporating the construction works areas, afforestation lands, activity locations	Professional judgement and as per Best Practice (CIEEM, 2016,NRA, 2008, Lusby et al.,2010,SNH 2014)
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities: Bunkimalta Windfarm	1km from construction works areas and activity locations.	General birds, due to their naturally smaller home ranges are unlikely to be cumulatively affected outside this distance.

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8.7.2.2.1 Potential for Impacts to General Bird Species

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Project to cause cumulative effects to the Sensitive Aspect General Bird Species. The results of this evaluation are included in Table 8-59.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on [Figure CE 8.7: General Bird Species within the Cumulative Evaluation Study Area](#) (Volume C3 EIAR Figures).

Table 8-59: Results of the Evaluation of the Other Elements and Other Projects or Activities

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects
Other Project or Activity	
Other Project: Bunkimalta Windfarm	<u>Yes, included</u> for the evaluation of cumulative effects

8.7.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.7.2.3.1 Element 1: UWF Grid Connection

The receiving environment in the UWF Grid Connection Study Area supports a wide variety of general bird species of open countryside and farmland, in addition to more specialist upland species. Some of these are afforded a higher conservation status due to their scarcity and for example, presence on Annex I of the Habitats Directive. Some species, such as Golden Plover are only present during the winter months within which they disperse widely over suitable habitat, whilst other sedentary species are present throughout the year and retain smaller more localised territories for foraging and breeding.

Detail is provided herein in respect of General Birds (both breeding and winter season) but also specific species evaluated as requiring further consideration. The requirement for further evaluation is based on a sensitivity rating as defined in Table 8-3, derived from survey results and the process of scoping. It infers a known sensitivity to effects from sources such as included within the current development, but is also reflective of the conservation status (locally/nationally/internationally) of the species within the study area overall.

Further detail on all species recorded is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.7\)](#) Appendix 8-1 can be found in [Volume C4 EIAR Appendices](#). Maps of transect locations for breeding and winter bird transects are illustrated in [Figure GC 8.7: General Bird Species within the UWF Grid Connection Study Area](#), maps of Golden Plover observations are also included in [Figure GC 8.7](#) which is part of the EIA Report for the UWF Grid Connection, and is included in [Volume F: Reference Documents](#) with this planning application

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General Breeding Birds

Breeding Bird surveys of the UWF Grid Connection represent a sample of habitats present within the receiving environment across 2 no. breeding seasons one each in 2016 and 2017.

A species list comprising 58 species was compiled. Many of these species are typically representative of the land use present, and have strong associations with the type of activities present e.g. hill farming in respect of the quality of habitat present. The most abundant species are typical birds of open countryside and hedgerows such as Wren, Rook, Chaffinch, Robin, Barn Swallow, Meadow Pipit and Blackbird. Typical migrant species recorded included Swift, Cuckoo, Barn Swallow, House Martin, and Grasshopper Warbler. All of the above breed and forage in the receiving environment within suitable habitat. In general the receiving environment would be quiet with many species unlikely to undergo significant disturbance other than from day to day farming activities, and occasionally forestry operations.

One 'Red-Listed' species (Meadow Pipit *Anthus pratensis* a species which favours rough pastures and uplands but is currently declining), 14 Amber and 41 Green listed species were recorded. Observations of raptors from transect locations, included single sightings of Sparrowhawk (*Accipiter nisus*) across both years and an observation of Hen Harrier in 2016.

For complete detail of breeding birds across transects and seasons, in addition to conservation importance please see [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.8\)](#). Maps of transect locations are illustrated in [Figure GC 8.7](#).

General Wintering Birds

Wintering bird transects of the UWF Grid Connection undertaken in 2016/17 and again in 2017/18 recorded 34 species of birds within or in close proximity to the construction works area boundary. The species assemblage included 3 Red listed species (Golden Plover, Meadow Pipit and Grey Wagtail), 8 Amber listed (Kestrel, Common Snipe, Robin, Stonechat, and Mistle thrush, Goldcrest, Starling and House Sparrow) and 19 Green listed species. Rook, Robin and Chaffinch were the three commonest species. The importance and sensitivity of all of the above species are provided in [Section A8-1.2.4.8 \(Appendix 8.1\)](#).

Meadow Pipit

Meadow Pipit is a very widespread species in Ireland, found in bogs, uplands and areas of scrub and pasture, with an estimated population of 500,000 to 1, 000, 000 pairs. Birds are ground nesting and typically feed on invertebrates such as crane flies, mayflies and spiders.

Of the general breeding bird species recorded, populations of the red-listed Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

Baseline results suggest that wet heath habitat such as present at Baurnadomeeny along the UWF Grid Connection supports the highest densities.

This species is generally faithful sedentary in the summer but upland birds do move to lowland areas in the winter months.

Golden Plover

Golden Plover breed in heather moors, blanket bogs & acidic grasslands. Their breeding distribution is limited to the uplands of northwest counties in Ireland and they do not breed within the study area. Throughout the winter, Golden Plovers are regularly found in large, densely-packed flocks, and in a variety of habitats, both coastal and inland. Their distribution is widespread in Ireland.

In inland areas, small numbers of birds are often widespread in suitable wintering habitat within a local area but often coalesce to form larger aggregations. Preferred winter habitats are typically low growing crops

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(winter cereal), ploughed land and grassland where birds feed nocturnally on invertebrates such as earthworms and beetles. The Irish wintering population, comprising mainly birds from Iceland, is estimated at c.100, 000 individuals nationally. Golden Plover was recorded on 2 occasions from winter transects at Knockabansha and Bauradomeeny. In each instance flock size was low (less than 7 individuals).

Further, incidental sightings (n=12) of Golden Plover outside the UWF Grid Connection construction works boundary over the wintering period 2016/17 are also described. The average flock size recorded was 29 (range 2-200), with the peak observation of 200 birds in the townland of Fiddane, to the north of the route corridor at Castlewaller, on 14/3/2017. It is clear that birds may utilise suitable habitats in proximity to the route corridor in low numbers (excluding the observation of 200 birds the average flock size observed is 12 birds), with increased aggregations occasionally over higher ground as is characteristic of the species in winter.

Golden Plover, as an Annex I, Red Listed species are assigned a sensitivity rating of High.

Red Grouse

The Red Grouse is a sub-species of Willow Grouse. It is resident in the west and north of Britain and in Ireland. In Ireland, it is a widespread breeding bird but nowhere is it numerous. Found on mountains, moorland and lowland blanket bogs and raised bogs, where it is associated with heather, which it requires for food, shelter and nesting.

Four individual calling male Red Grouse (Red-listed) were present in March 2017 on Bleanbeg Bog, in proximity to the UWF Grid Connection. Locations of Red Grouse observations are included in [Figure GC 8.7](#). The presence of this species has been previously described at Bleanbeg (Bleanbeg Bog NHA Site Synopsis). This species is dependent on heather dominated habitats such as (upland and lowland) blanket bog and raised bog and is unlikely to occur outside of same.

Red Grouse are evaluated as of County Importance and assigned a sensitivity rating of medium.

Merlin

Merlin is the smallest species of falcon. It is a rare breeding bird in Ireland. It nests on the ground on moorland, mountain and blanket bog. Also nests in woodland, isolated trees, and has taken to nesting in forestry plantations adjacent to moorland. More Merlin's are found in the west of the country but they are scattered across the midlands and the Wicklow Mountains also hold good numbers.

Merlin (Amber-listed) surveys to Best Practice in 2017 at Bleanbeg bog, in proximity to the UWF Grid Connection found no evidence to support breeding despite the location being scoped in for breeding status evaluation. Further detail with regard to Merlin surveys is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.7\)](#). There were 2 records of single birds during the winter period 2016/17 from VP surveys of the UWF Grid Connection.

Wintering Merlin records are not indicative of breeding as during the winter month's resident Merlin leave breeding sites and move to low-lying areas, in addition numbers in Ireland are swollen by immigrants. Merlin in the density recorded are evaluated as of Local Importance (low value) and assigned a sensitivity rating of Negligible.

Curlew

Curlews can nest in a range of habitats in Ireland, from wet grasslands such as the River Shannon Callows to marginal hill land. They favour damp pastures grazed lightly by cattle, with a scattering of rush tussocks for nesting in and some wet areas to provide insects for their chicks to feed on. Huge changes in the uplands, such as the destruction of peat bogs, afforestation, more intensive management of farmland and the

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abandonment of some lands, leading to encroachment by scrub, gorse and dense rushes, have all affected Curlew breeding habitat.

Curlew was recorded at Bleanbeg bog, in proximity to the UWF Grid Connection, in May 2017. On 30/5/17, a male and female were recorded in activity indicating a breeding attempt. The observation location is outside the nearest point of the construction works boundary at a distance of approximately 400m, but conservatively within the threshold established in the literature for disturbance related effects (800m) during the breeding season - albeit with regard to higher magnitude source stimuli established for wind farm construction.

Breeding Curlew is evaluated as of National Importance and assigned a sensitivity rating of High.

Kingfisher

Kingfishers breed in tunnels dug in vertical banks along streams and rivers. They are a very sedentary species, and rarely move from their territories. However, some may move to lakes and coasts during extended spells of poor weather. They are widespread in Ireland and found on streams, rivers and canals.

With regard to the UWF Grid Connection watercourses a distance band of 300m upstream and downstream of all watercourse crossing locations including the Newport (Mulkear), Clare and Bilboa Rivers were checked for Kingfisher nest holes. No nest holes or evidence of nesting were identified in the study area. No individuals were observed.

Kingfishers are Amber listed in Ireland. A sensitivity rating of low is applied.

8.7.2.3.2 Element 3: UWF Replacement Forestry

General Birds

Species recorded on site (during habitat surveys) included Wren, Robin, Meadow Pipit, House Martin, Blackbird, Stonechat, Hooded Crow, Chaffinch, Rook, Magpie and Woodpigeon. The importance and sensitivity of all of the above species are provided in [Section A8-1.2.4.8 of Appendix 8.1](#).

General Wintering Birds

Resident species recorded during current studies will also be present during the winter months.

Meadow Pipit

Meadow Pipits are present and were recorded during habitat surveys to inform the current evaluation. Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

Golden Plover

Golden Plover were not recorded from the locations of the UWF Replacement Forestry during any site visits and none were observed during studies to inform the adjacent Upperchurch Windfarm 2013 EIS. Wintering Golden Plover are evaluated as Nationally Important and assigned a sensitivity rating of High.

Red Grouse

Habitat for Red Grouse is not found within the locations of UWF Replacement Forestry.

Merlin

Merlin was not recorded from the locations of the UWF Replacement Forestry during any site visits and none were observed during studies to inform the adjacent Upperchurch Windfarm 2013 EIS. No breeding habitat is present. Merlin are evaluated as of Local Importance (low value) and assigned a sensitivity rating of Negligible

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Curlew

Curlew was not recorded from the locations of the UWF Replacement Forestry during any site visits and none were observed during studies to inform the adjacent Upperchurch Windfarm EIS. No breeding habitat is present for this species.

Kingfisher

Kingfisher was not recorded during any site visits to inform the current evaluation. Kingfisher was not recorded during studies to inform the adjacent Upperchurch Windfarm EIS. The watercourse which is present within the landholding is not suitable for breeding Kingfisher.

8.7.2.3.3 Element 4: Upperchurch Windfarm

All the species recorded during 2012 surveys for the Upperchurch Windfarm EIS are typical of the habitats present.

General Breeding Birds

As per the EIS 2013, surveys of breeding birds to inform the baseline evaluation of Upperchurch Windfarm recorded 37 species in total across ‘summer transects’ and vantage point surveys . All the species recorded are typical of the habitats present. Species recorded include Skylark, Kestrel, Peregrine Falcon, Stonechat and Crossbill. Additional species recorded on Upperchurch Windfarm, to that recorded at UWF Grid Connection locations, were Raven, Peregrine Falcon (Annex I), Sand Martin, Crossbill and Reed Bunting. Of these it is considered that Peregrine and Sand Martin do not nest on site as there is no suitable nesting habitat present at Upperchurch Windfarm.

General Wintering Birds

Studies on Upperchurch Windfarm (2013) recorded a typical assemblage of wintering species (n=24). Of these one Red listed (Meadow pipit), 7 Amber (Skylark, Robin, Hen Harrier, Kestrel, Starling, Mistle thrush, Goldcrest and Linnet) and 15 Green listed species were present. In the interest of clarity we note that the BOCCI status presented herein is the more current Cummins and Colhoun (2013) evaluation, published subsequent to the Upperchurch Windfarm EIS.

Meadow Pipit

Meadow Pipit is present in suitable habitat. Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

Golden Plover

Golden Plover were not observed during studies on Upperchurch Windfarm. Wintering Golden Plover are evaluated as Nationally Important and assigned a sensitivity rating of High.

Red Grouse

No Red Grouse were recorded in studies on Upperchurch Windfarm.

Merlin

Merlin was not observed during studies on Upperchurch Windfarm.

Curlew

No Curlew was observed during studies to inform the Upperchurch Windfarm EIS.

Kingfisher

Kingfisher was not recorded during studies to inform the Upperchurch Windfarm EIS.

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8.7.2.3.4 Element 5: UWF Other Activities

Haul Route Activity Locations

General bird species of Hedgerows are present. Resident Bird species described in respect of breeding are likely to be present during the winter months also. Meadow Pipit may be present in suitable fields adjacent to activity locations however habitats such as roadside verges do not comprise breeding habitat. Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation. Golden Plover were not recorded from the locations of the Activity locations during any site visits. The locations do not comprise suitable habitat for this species. Habitat for Red Grouse is not found at the locations of UWF Other Activities. Merlin may occasionally perch in roadside trees during the winter months, however the locations of activities do not comprise breeding or foraging habitat for this species.

Overhead Line Activity Locations

Bird species present during a site walkover (January 2018) to inform the current evaluation are described in **Appendix 8-1 Section A8-1.2.4.7**. Twenty three species were recorded, including 6 Amber listed species (Gold-crest, Stonechat, Starling, Common Snipe, Robin and House Sparrow).

8.7.2.3.5 Other Projects or Activities

Bunkimalta Windfarm: Thirty three species were recorded from breeding bird surveys of the Bunkimalta Windfarm site in 2009. Peregrine, a further Annex I species, has a traditional territory on Keeper Hill and occasional flight paths over the Bunkimalta site were recorded. Red grouse, a Red Data Book species, occurs above the western boundary of the Bunkimalta site on Keeper Hill and on the bog at Knockane.

Some of the other bird species which occur within the study area and in the areas that adjoin the development, such as kestrel, skylark and grasshopper warbler, are Amber listed species (i.e. of Medium conservation concern).

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8.7.3 PROJECT DESIGN MEASURES for General Bird Species

At the conception of the UWF Related Works, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-60 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **General Bird Species**.

Table 8-60: UWF Related Works Project Design Measures relevant to General Bird Species

PD ID	Project Design Environmental Protection Measure (PD)
PD02	Flag-men will be used at temporary site entrances rather than creating sightlines by the removal of roadside boundaries. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the local road network in a safe and efficient manner.
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted
PD28	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season <i>i.e.</i> not during the period of March to August inclusive where possible. This includes hedgerow and scrub removal in addition to hedgerow trimming.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Other Activities and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in **Appendices 5.3, 5.5 and 5.6**, in **Volume C4: EIAR Appendices**.

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8.7.4 EVALUATION OF IMPACTS to General Bird Species

In this Section, the likely direct and indirect effects of the UWF Related Works are identified and evaluated. Then the likely cumulative effects of the UWF Related Works together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - General Bird Species.

As a result of the exercise, some impacts were included and some were excluded.

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Table 8-61: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Golden Plover: Habitat Loss (construction stage)	<i>Habitat Loss – Merlin, Red Grouse, Eurasian Curlew, (construction stage)</i>
Golden Plover: Disturbance/Displacement (construction stage)	<i>Disturbance / Displacement: General Birds, Kingfisher, Red Grouse, Merlin, Meadow Pipit, Eurasian Curlew, (construction stage)</i>
Meadow Pipit: Habitat Loss (construction stage)	<i>Physical injury or destruction of nests/chicks, (construction stage)</i>
General Birds: Habitat Enhancement (construction stage)	<i>Disturbance / Displacement, (operational stage)</i>
	<i>Disturbance / Displacement, (decommissioning stage)</i>

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.7.4.1 to 8.7.4.4.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.7.4.5.

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8.7.4.1 Impact Evaluation Table: Golden Plover - Habitat Loss

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> Construction Works; Excavation; Movement of Soils and Machinery</p> <p><u>Cumulative Impact Source:</u> Construction Works; Excavation; Movement of Soils and Machinery, afforestation</p> <p><u>Impact Pathway:</u> Land Take</p> <p><u>Impact Description:</u> As an Annex I species Golden Plover is a High Sensitivity receptor. Land use change of suitable foraging or roosting habitat such as improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog, where construction works areas overlap may cause reductions in foraging success, increased exposure to predation through displacement to less viable feeding areas, and also reduction in survival rates of wintering birds. No breeding Golden Plover will be affected as all works are outside the Irish breeding range. In addition numbers of birds recorded and therefore potentially affected are low within the context of the Irish wintering population. Temporary land use change for works such as cable trenching will be reinstated immediately following construction and therefore effects will be Neutral.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation of the Subject Development Impact – Golden Plover: Habitat Loss	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Permanent land use change will comprise 0.2Ha of suitable foraging or roosting habitat for wintering Golden Plover as improved agricultural grassland (0.12ha) and wet grassland (0.07ha). The scale of habitat loss represents 0.16% of available suitable Golden Plover habitat (120Ha – comprising improved agricultural grassland, grassland mosaics, upland blanket bog and cutaway bog) within the study area boundary.</p>	
<p>Significance of the Impact: Not Significant</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of habitat loss (0.2Ha), is negligible(i.e. <1% of available habitat) and represents a very slight change from baseline conditions; • The availability of suitable foraging and roosting habitat (at minimum 119.8Ha) in the greater area, notwithstanding; • The long term duration, and; • Low reversibility with permanent land use change likely. 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<p><u>Impact Magnitude:</u> Permanent land use change will comprise 2.77Ha of suitable foraging or roosting habitat, in the form of grassland or grassland mosaic. The scale of habitat loss represents 1.4% of available, suitable Golden Plover habitat (198Ha comprising grassland/grassland mosaics/upland blanket bog and cutaway bog) within the study area boundary.</p>	
<p><u>Significance of the Impact:</u> Slight</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The high sensitivity rating of the species, based on conservation status, and; • The extent of habitat loss (1.4% of available suitable habitat) is low (i.e. within 1-5% of available habitat) and represents a minor shift away from baseline conditions; 	

General Bird Species

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General Bird Species	<ul style="list-style-type: none"> • The permanent duration, and; • Low reversibility
	Element 3: UWF Replacement Forestry
	<u>Impact Magnitude:</u> Permanent land use change of 3.98Ha of suitable foraging or roosting grassland habitat to deciduous woodland will occur. This represents 37% of the available habitats within the UWF Replacement Forestry study area (10.7Ha).
	<u>Significance of the Impact:</u> Slight
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • The extent of suitable habitat to be affected (3.98Ha or 37% of that available within the study area); • The permanent duration, and; • Low reversibility with land use change likely
	Element 4: Upperchurch Windfarm
	<u>Impact Magnitude:</u> None
	<u>Significance of the Impact:</u> Neutral impact
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • No Golden Plover were recorded during winter bird studies of the Upperchurch Windfarm
	Element 5: UWF Other Activities
<u>Impact Magnitude:</u> Negligible	
<u>Significance of the Impact:</u> Neutral impact	
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • No suitable habitat is present for roosting or foraging Golden Plover, and • Golden Plover are not known to utilize roadside verges/roundabouts for foraging or roosting, and; • Golden Plover were not recorded within the locations for the Upperchurch Hen Harrier Scheme; • Monitoring does not include land take or land use changes 	
Cumulative Information: Individual Evaluations of Other Projects or Activities	
Other Project: Consented Bunkimalta Windfarm	
<u>Impact Magnitude:</u> None	
<u>Significance of the Impact:</u> Neutral effect	
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • No Golden Plover Recorded in Baseline Studies to inform EIS. 	
Evaluation of Cumulative Impacts – Golden Plover: Habitat Loss	
All Elements of the Whole UWF Project	
<u>Cumulative Impact Magnitude:</u> Instances of landuse use change in respect of suitable foraging or roosting habitat will occur from works associated with the UWF Grid Connection (2.77Ha), UWF Related Works (0.2Ha), and UWF Replacement Forestry (3.99Ha).	
Significance of the Cumulative Impact: Slight	
Sensitive Aspect	
Biodiversity	
Topic	

<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The high sensitivity rating of the species, counterbalanced with; • The low numbers of birds recorded, within the context of the Irish wintering population (c.100, 000). • The extent of habitat loss overall, and; • The permanent duration, and; • Low reversibility
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p><u>Cumulative Impact Magnitude:</u> None</p>
<p>Significance of the Cumulative Impact: No Cumulative Impact</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Neutral effects caused by Bunkimalta Windfarm.

General Bird Species
Sensitive Aspect

Biodiversity
Topic

General Bird Species

Sensitive Aspect

8.7.4.2 Impact Evaluation Table: Golden Plover - Disturbance/Displacement

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: During Construction Noise and Visual and Intrusion

Cumulative Impact Source: During Construction Noise and Visual and Intrusion

Impact Pathway: Air

Impact Description: As an Annex I species Golden Plover is a High Sensitivity receptor. Disturbance to/displacement of wintering Golden Plover due to noise, visual intrusion, anthropogenic sources may occur during the period October to March when the highest proportion of birds are present within the receiving environment.

As works will only be conducted during daylight hours as part of Project Design, disturbance to birds foraging at night (when most foraging takes place) is avoided. Displacement during daylight hours, if of sufficient duration and from high value foraging areas may result in effective habitat loss with consequent effects on feeding success, winter survival and breeding capacity; dependant on numbers of birds affected and availability of alternative habitat. No breeding Golden Plover will be directly affected as all works are outside the Irish breeding range.

Sources of disturbance are likely; however the degree of avoidance/response may also vary from individual to individual and as flock size varies may be limited in spatial extent. The duration of disturbance events are assumed to be brief given the linear nature of most of the works – however as birds may range over wide areas there is the potential for sequential effects i.e. from multiple concurrent sources. In this instance birds displaced from one location may experience a second disturbance stimulus from e.g. another work crew.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Golden Plover: Disturbance/Displacement

Element 2: UWF Related Works

Impact Magnitude:

120ha of suitable habitat for wintering Golden Plover occurs within the study area for UWF Related Works. However no birds have been recorded utilising these locations in studies described herein. The magnitude of any disturbance is therefore negligible.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- No birds were recorded in baseline studies for the Upperchurch Windfarm, which overlaps the works locations for UWF Related Works, therefore;
- The probability of disturbance is significantly reduced (to an evaluation as low), notwithstanding suitable habitat is present.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Populations of wintering Golden Plover may experience disturbance related events, if feeding/roosting during daylight hours within locations comprising grassland, grassland mosaics or bog habitats. Sequential effects may occur along the UWF Grid Connection should multiple sources of disturbance occur simultaneously in grassland, grassland mosaics or bog habitats.

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<p><u>Significance of the Impact:</u> Not Significant</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The low numbers of birds recorded (avg. flock size 12 birds, excluding the one instance of a flock of 200 recorded in 2017), within the context of the Irish wintering population (c.100, 000), and; • Activities such as cable trenching will not contrast significantly from baseline activities such as farming related works, and; • The duration of individual disturbance events will be brief, and; • Reversible once works finish, with birds expected to return, and; • Any response is not expected to be permanent, based on studies of the species with regard to the construction of wind farms (Pearce-Higgins et al., study, published in 2012) and therefore unlikely to alter long term wintering trends;
<p>Element 3: UWF Replacement Forestry</p>
<p><u>Impact Magnitude:</u> None</p>
<p><u>Significance of the Impact:</u> Neutral effect</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • All planting will be done by hand and will not contrast to baseline agricultural activities.
<p>Element 4: Upperchurch Windfarm</p>
<p><u>Impact Magnitude:</u> None</p>
<p><u>Significance of the Impact:</u> Neutral effect</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No Golden Plover were recorded in studies to inform the EIS for the <u>Upperchurch Windfarm</u>
<p>Element 5: UWF Other Activities</p>
<p><u>Impact Magnitude:</u> None</p>
<p><u>Impact Evaluation:</u> Neutral effect</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The Haul Route Activity locations do not include suitable habitat to attract Golden Plover, and; • Activities will not contrast from baseline activities already present, such as farming related works and road maintenance. • Overhead Line Activities will be similar to existing maintenance which is undertaken; will occur during daylight hours and will not result in any contrast from the existing environment.
<p>Cumulative Information: Individual Evaluations of Other Projects or Activities</p>
<p>Other Project: Consented Bunkimalta Windfarm</p>
<p><u>Impact Magnitude:</u> None</p>
<p><u>Significance of the Impact:</u> Neutral effect</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No Golden Plover Recorded in Baseline Studies to inform EIS.

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General Bird Species	Evaluation of Cumulative Impacts – Disturbance/Displacement
	<p>All Elements of the Whole UWF Project</p> <p><u>Cumulative Impact Magnitude:</u> There is no potential for likely cumulative whole project effects, as Golden Plover were only recorded within the UWF Grid Connection Study Area. Therefore the whole project effect is in the order of the UWF Grid Connection, evaluated above.</p> <p>Significance of the Cumulative Impact: Not Significant</p> <p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The low numbers of birds recorded , within the context of the Irish wintering population (c.100, 000), and; • Activities such as cable trenching will not contrast significantly from baseline activities such as farming related works, even if multiple instances occur simultaneously, and; • The duration of individual disturbance events (including sequential) will be brief, limited to daylight hours and; • Reversible once works finish, with birds expected to return, and; • Any response is not expected to be permanent, based on studies of the species with regard to the construction of wind farms (Pearce-Higgins et al., study, published in 2012) and therefore unlikely to alter long term wintering trends;
Sensitive Aspect	<p>All Elements of the Whole UWF Project with Other Projects or Activities</p> <p><u>Cumulative Impact Magnitude:</u> None</p> <p>Significance of the Cumulative Impact: No Cumulative Impact</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Neutral effects caused by Bunkimalta Windfarm.

Biodiversity
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8.7.4.3 Impact Evaluation Table: Meadow Pipit – Habitat Loss

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> Construction Works; Excavation; Movement of Soils and Machinery</p> <p><u>Cumulative Impact Source:</u> Construction Works; Excavation; Movement of Soils and Machinery, Afforestation</p> <p><u>Impact Pathway:</u> Land Cover</p> <p><u>Impact Description:</u> As a red listed species Meadow Pipit is assigned a medium sensitivity rating. Land use change of suitable nesting habitat (improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog), where construction works areas overlap may cause reductions in breeding numbers, foraging success, increased exposure to predation through displacement to less viable feeding areas, and local population level declines. Temporary land use change for works such as cable trenching will be reinstated immediately following construction and therefore effects will be Neutral.</p> <p>Any impact is negated by the provision of concealed geocell roadways, planted with grass or heather, for all permanent roads within the SPA. Felled commercial forestry at Castlewaller (total area 1 ha) will be replaced by a concealed geocell roadway, which, along with the remainder of the corridor at that location, will be planted with heather (Irish or Scottish) – which will in turn benefit Meadow Pipit through the provision of nesting and foraging habitat.</p> <p>Meadow Pipit will also benefit from enhancement measures for Hen Harrier as part of the Upperchurch Hen Harrier scheme, wherein the management prescription has been specifically designed to benefit species such as Meadow Pipit, which are an important prey item for Hen Harrier.</p> <p><u>Impact Quality:</u> Negative and positive</p>	
Evaluation of the Subject Development Impact – Meadow Pipit: Habitat Loss	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Construction Works will include land take of 0.2Ha of suitable breeding habitat for Meadow Pipit in the form of grassland and grassland mosaic. The scale of habitat loss is 0.15% of available habitat within the Study area boundary (123Ha – where suitable habitats for Meadow Pipit include grassland, grassland mosaics, dry heath, upland blanket bog and cutaway bog).</p>	
<p>Significance of the Impact: Not Significant</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The extent of suitable habitat to be affected (0.2Ha), evaluated as negligible (<1% of available habitat lost), • Comprises a minor shift away from baseline conditions, notwithstanding; • The long-term duration (15-60 years), and; • Low reversibility with permanent land use change likely 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<p><u>Impact Magnitude:</u> Construction works will result in land use change of 2.77Ha of suitable breeding habitat for Meadow Pipit in the form of grassland and grassland mosaic. The total land use change comprises 1.38% of available habitat within the Study area boundary (201Ha – comprising improved agricultural grassland, wet grassland, grassland mosaics, and heath).</p>	

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General Bird Species	<p><u>Significance of the Impact:</u> Slight</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The extent of suitable habitat to be affected (2.77Ha), evaluated as low (i.e. 1-5% of available habitat), which; • Comprises a minor shift away from baseline conditions, notwithstanding; • The permanent duration, and; • Low reversibility.
Sensitive Aspect	<p>Element 3: UWF Replacement Forestry</p>
	<p><u>Impact Magnitude:</u> Construction Works will include permanent land use change of 3.98Ha of suitable breeding habitat (improved agricultural grassland (3.54ha) and wet grassland (0.44ha)) for Meadow Pipit. The scale of habitat loss represents 37% of available habitats (10.68Ha) within the UWF Replacement Forestry study area but is offset by the retention of suitable Meadow Pipit habitat within woodland rides to be established for foraging Hen Harrier.</p>
	<p><u>Significance of the Impact:</u> Slight</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The majority of land use change is from improved agricultural grassland, which is sub-optimal for Meadow Pipit, and; • Offset by the retention of rides (i.e. Meadow Pipit habitat) within the deciduous woodland to be planted, notwithstanding; • The extent of habitat subject to change, evaluated as high (20-80% of habitat lost), which; • Comprises a major alteration to the baseline conditions; • The permanent duration, and; • Low reversibility with land use change likely
	<p>Element 4: Upperchurch Windfarm</p>
<p><u>Impact Magnitude:</u> Construction Works will include land use change of 7.81Ha of suitable breeding habitat for Meadow Pipit in the form of grassland, grassland mosaic, and bog habitat. The scale of land use change is 2.39% of available habitat within the Study area boundary (128Ha).</p>	
<p><u>Significance of the Impact:</u> Slight</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The extent of habitat to be lost, is low (i.e. 1-5% of available habitat), which; • Comprises a minor shift away from baseline conditions, notwithstanding; • The long-term duration (15-60 years), and; • Low reversibility with permanent land use change likely 	
Biodiversity	<p>Element 5: UWF Other Activities</p>
	<p><u>Impact Magnitude:</u> The sensitive management of 128Ha of lands for Hen Harrier as part of the Upperchurch Hen Harrier Scheme will also increase the suitable habitat present for Meadow Pipit. No habitat loss of suitable breeding habitat is associated with other locations such as Haul route activities and Overhead Line Activities.</p>
	<p><u>Significance of the Impact:</u> Moderate (positive)</p>
Topic	

Rationale for Impact Evaluation:

- The medium sensitivity of the species, based on conservation status, and;
- The extent of lands to be sympathetically managed, evaluated as high (i.e. 20-80% of the 128Ha included in the Upperchurch Hen Harrier Scheme of habitat present), which;
- Comprises a major alteration to baseline features, and
- The long term duration, over the lifetime of the project, and;
- Low reversibility.

Cumulative Information: Individual Evaluations of Other Projects or Activities

Other Project: Consented Bunkimalta Windfarm

Impact Magnitude:
 During the construction period, the clearance of habitats will affect a range of passerine species that nest and feed within the forests. The significance of this impact can be minimised by clearance taking place outside of the main nesting season. All species which currently occur on site are expected to retain a presence within the site after the construction period (as similar habitats will still occur). Further, there may be beneficial effects for some species as recent research by Pearce-Higgins *et al.*, (2012) suggests potential positive effects of wind farm construction on skylarks, meadow pipits and stonechats. Such effects may result from vegetation disturbance during construction creating greater openness in the sward structure, known to benefit these species. It is noted that the Species and Habitat Management Plan will also be of value for a range of small birds for both nesting and foraging purposes¹⁵.

Significance of the Impact: No significant effects

Rationale for Impact Evaluation:
 Inspectors report¹⁶: “I conclude that the development would not give rise to significant residual ecological impacts.”

Evaluation of Cumulative Impacts – Meadow Pipit: Habitat Loss

All Elements of the Whole UWF Project

Cumulative Impact Magnitude:
 Instances of land use change in respect of suitable breeding habitat will occur from works associated with the UWF Grid Connection (2.77Ha), UWF Related Works (0.2Ha), UWF Replacement Forestry (3.99Ha) and the Upperchurch Windfarm (7.81Ha). Land Use change within the UWF Grid Connection (where it overlaps the SPA) is offset by the instatement of concealed access roads, and outside the SPA - the Upperchurch Hen Harrier Scheme (UWF Other Activities) measures will also enhance Meadow Pipit habitat.

Significance of the Cumulative Impact: Slight

Rationale for Cumulative Impact Evaluation:

- The medium sensitivity of the species, based on conservation status, and;
- The extent of land use change overall (14.77Ha), evaluated as low (1-5% of habitat lost) represents 2.24% of total suitable habitat present within the study areas (660Ha), comprising;
- A minor shift away from baseline conditions, which;
- Is ameliorated by the management of lands (128ha) as part of the Upperchurch Hen Harrier Scheme, over;
- A long-term duration (15-60 years), and with;
- Low reversibility with land use change permanent/ management already consented

¹⁵ ESB Wind Development Ltd. and Coillte (2013) Bunkimalta Wind Energy Project Environmental Impact Statement

¹⁶ An Bord Pleanala (2013) Inspectors Report for Bunkimalta Wind Energy Project PL.22.241924.

General Bird Species
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General Bird Species	<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
	<p><u>Cumulative Impact Magnitude:</u> Instances of land use change in respect of suitable breeding habitat will occur from works associated with both the Upperchurch Whole UWF Project and Bunkimalta Windfarm. As effects from the Upperchurch Whole UWF Project are only expected to be slight; and ameliorated by enhancement measures and management proposed in respect of Hen Harrier; it is consequently considered that the likelihood of synergistic effects on Meadow Pipit is low and consequently the resultant magnitude of cumulative effects is low. Sequential effects are unlikely to occur given the small home range of breeding Meadow Pipit; and widespread availability of alternative habitat surrounding both developments.</p>
Sensitive Aspect	<p>Significance of the Cumulative Impact: Slight</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The extent of land use change overall comprises; • A minor shift away from baseline conditions, which; • Is offset by the management of lands as part of the Upperchurch Hen Harrier Scheme and Bunkimalta Habitat and Species Management Plan, over; • A long-term duration (15-60 years), and with; • Low reversibility with land use change permanent/ management already consented.

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8.7.4.4 Impact Evaluation Table: General Birds - Habitat Enhancement

Impact Description	
Project Life Cycle Stage:	Construction Stage
<p><u>Impact Source:</u> Reinstatement and Replanting of construction works areas</p> <p><u>Cumulative Impact Source:</u> Reinstatement, Replanting, enhancement planting, maintenance of rush swards, Planting of Deciduous Trees</p> <p><u>Impact Pathway:</u> Land use Change</p> <p><u>Impact Description:</u> The planting of equivalent deciduous forestry for lower ecological value conifer plantation, as UWF Replacement Forestry, in addition to the incorporation into Project design of the planting of concealed access roads within the SPA with heather/grasses mix in geocell, the planting of the clear fell area in Castlewaller with native Irish or Scottish heather species, plus the use of locally sourced native hedgerow and tree species in all landscaping and reinstatement will constitute a land use change to higher value habitat for general birds. In addition the management measures as part of the Upperchurch Hen Harrier Scheme such as the maintenance of rush swards, enhancement and planting of hedgerows and riparian habitat, and promotion of semi-natural habitat will increase habitat quality for ground nesting birds such as Meadow Pipit and Skylark, and general birds of open countryside – this will have secondary positive effects not only on Hen Harrier but additionally other raptor species which may be present such as Kestrel. It is likely that the above will result in a net gain to overall bird diversity - with the duration being permanent in the case of the UWF Grid Connection and UWF Replacement Forestry, and long term in the case of the UWF Related Works, Upperchurch Hen Harrier Scheme and Upperchurch Windfarm.</p> <p><u>Impact Quality:</u> Positive</p>	
Evaluation of the Subject Development Impact – General Birds: Habitat Enhancement	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Equivalent lengths of native hedgerow and native trees will be replanted in lieu of hedgerow removal. In addition, c.370m of new hedgerow will be planted alongside the Realigned Windfarm Road RWR2.</p>	
<p>Significance of the Impact: Imperceptible (positive)</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The benefit to bird diversity, and; • Long term duration, and; • The low reversibility with proposed enhancement already incorporated into project design. 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<p><u>Impact Magnitude:</u> Felled commercial forestry at Castlewaller (1 Ha) will contain a concealed geocell roadway, which, along with the remainder of the corridor at that location, will be planted with heather (Irish or Scottish). Hedgerow crossing locations will be enhanced with equivalent numbers of native trees as part of Project Design. At Mountphilips, 700m of new hedgerow will be planted alongside the new access road between Site Entrance No. 1 and the new Mountphilips Substation.</p>	
<p><u>Significance of the Impact:</u> Slight (positive)</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The benefit to bird diversity, in particular within the SPA (a very high sensitivity receptor), and; 	

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General Bird Species	<ul style="list-style-type: none"> • The contrast with emerging trends in respect of land management and existing land cover, and; • The permanent duration, and; • The low reversibility with proposed enhancement already incorporated into project design
	Element 3: UWF Replacement Forestry
	<p><u>Impact Magnitude:</u></p> <p>In total, 6Ha of mixed species, native woodland will be created, which will comprise tall trees and understory shrubs, along with wide ride lines, and a mix of tall grasses and scrub land cover maintained during the growth stage. The existing riparian habitat will be enhanced through the planting of Hazel, alder and willow species, and protected through the placement of fencing.</p>
	<p><u>Significance of the Impact:</u> Slight (positive)</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The benefit to bird diversity, and; • The contrast with emerging trends in respect of land management, and; • The permanent duration, and; • The low reversibility with proposed enhancement already incorporated into project design.
	Element 4: Upperchurch Windfarm
	<p><u>Impact Magnitude:</u></p> <p>The planting of 360m of new hedgerow using native species, and the enhancement of existing hedgerows with native species will constitute a land use change to a higher value habitat for general birds.</p>
	<p><u>Significance of the Impact:</u> Imperceptible (positive)</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The benefit to bird diversity, and; • The low reversibility with proposed enhancement already incorporated into project design.
	Element 5: UWF Other Activities
<p><u>Impact Magnitude:</u></p> <p>The Upperchurch Hen Harrier scheme will result in 2.2Ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow being enhanced or created during initial activities. In total 128Ha of agricultural lands will be managed.</p> <p>The measures to be incorporated such as planting of scrub along riparian corridors, management of rush coverage, reductions in stocking levels, limiting of drainage, fertilizing, burning or hedgerow removal will constitute a land use change to a higher value habitat for general birds.</p>	
<p><u>Significance of the Impact:</u> Significant (positive)</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The benefit to bird diversity, and; • The contrast with emerging trends in respect of land management, and; • The duration proposed for management, and; • The low reversibility with proposed enhancement already consented 	
Biodiversity	Cumulative Information: Individual Evaluations of Other Projects or Activities
	Other Project: Consented Bunkimalta Windfarm
	<p><u>Impact Magnitude:</u></p> <p>A species and Habitat management plan is planned. This comprises both restoration of bog and heath habitats (41.2 ha) and sensitive management of second rotation forests (137.3 ha). Restoration is expected to increase</p>
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the area of open peatland. There is a high probability that these measures will result in positive Biodiversity effects on general birds.
<u>Significance of the Impact:</u> Slight (positive)
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> It is considered that positive ecological impacts will be derived by the restoration of areas of bog/heath and sensitive management of selected woodland plots¹⁷.
Evaluation of Cumulative Impacts – General Birds: Habitat Enhancement
All Elements of the Whole UWF Project
<u>Cumulative Impact Magnitude:</u> Instances of enhancement, and management of habitat specifically for the benefit of birds will occur as part of the UWF Grid Connection, UWF Related Works, UWF Replacement Forestry (by design), and Upperchurch Windfarm. Cumulative positive effects may accrue due to the proximity of the UWF Replacement Forestry to the Upperchurch Hen Harrier Scheme.
Significance of the Cumulative Impact: Slight (positive)
<u>Rationale for Cumulative Impact Evaluation:</u> <ul style="list-style-type: none"> The benefit to bird diversity, and; The contrast with emerging trends in respect of land management and land cover, and; The duration which is long term to permanent, and; The low reversibility.
All Elements of the Whole UWF Project with Other Projects or Activities
<u>Cumulative Impact Magnitude:</u> Instances of enhancement and management of habitat specifically for the benefit of birds will occur as part of the Upperchurch Windfarm Project. Habitat improvement and management measures for Bunkimalta Wind farm are also expected to result in positive Biodiversity benefits to General Birds. This may benefit species which use both sites e.g. wintering species (such as Fieldfare/Redwing etc.) in instances where birds are affected sequentially (through the availability of higher quality habitat) as they forage and move through the landscape. The in-combination effects may also provide more robust source populations of species such as Meadow Pipit, which may increase the overall population at a local or greater level.
Significance of the Cumulative Impact: Slight (positive)
<u>Rationale for Cumulative Impact Evaluation:</u> <ul style="list-style-type: none"> The scale of habitat management, in particular as part of the Upperchurch Windfarm Project and; Long term to Permanent duration, with; The low reversibility of measures to be implemented

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¹⁷ ESB Wind Development Ltd. and Coillte (2013) Bunkimalta Wind Energy Project Environmental Impact Statement prepared by ESBI.

8.7.4.5 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-62 below.

Table 8-62: Description and Rationale for Excluded Impacts to General Bird Species

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage/Planting Stage				
Land take	1,2,3,4,5	Land cover	Habitat Loss (Merlin, Red Grouse)	Merlin: Evaluated as Excluded - Neutral habitat loss within the context of wintering Merlin.
	1,2,3,4,5			Red Grouse: Evaluated as Excluded - No Habitat Loss at Bleanbeg in relation to Red Grouse (Element 1). No habitat loss from Other Elements (2, 3, 4, 5) including Overhead Line Activities as part of 'UWF Other Activities'.
	1,2,3,4,5		Habitat Loss (Eurasian Curlew)	Eurasian Curlew Evaluated as Excluded - A single breeding attempt was recorded in baseline studies, which was located outside the construction area boundaries associated with the UWF Grid Connection. No further evidence of Curlew was noted therefore it is considered that no currently used breeding habitat will be subject to land use change as a result of the Whole UWF Project. No habitat loss from Other Elements including Overhead Line Activities as part of 'UWF Other Activities'.
Noise and human activity	1,2,3,4,5	Visibility	Disturbance/ Displacement (General Birds, Kingfisher, Red Grouse, Merlin, Meadow Pipit, Eurasian Curlew)	General Birds: Evaluated as Excluded for remaining species with sensitivity rating of medium and lower.
	1,2,3,4,5	Air and Visibility		Kingfisher; Evaluated as Excluded - Neutral effects as no nest locations were identified within the zone of effect i.e. proximal to River Crossings on the Newport (Mulkear), Clare and Bilboa Rivers (Element 1). No nests were identified within the zone of effect at watercourse crossing locations associated with UWF Related Works/Upperchurch Windfarm. Best Practice measures are provided to ensure Neutral effects. No watercourse crossing works associated with either UWF Replacement Forestry or UWF Other Activities.
	1,2,3,4,5	Visibility		Red Grouse: Evaluated as Excluded - Brief-temporary duration of works at Bleanbeg, combined with habituation to activities such as peat extraction ensures Neutral effects (Element 1). No habitat loss from Other Elements including Overhead Line Activities as part of 'UWF Other Activities'.
	1,2,3,4,5			Merlin: Evaluated as Excluded - Low numbers of wintering birds will not be measurably affected by the scale of visual intrusion or disturbance. This

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Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				includes Overhead Line Activities as part of 'UWF Other Activities'.
	1,2,3,4,5			Meadow Pipit: Evaluated as Excluded - Most passerine (perching) species and general lowland 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 <i>et al.</i> 2012 ¹⁸) and operation (Pearce-Higgins <i>et al.</i> 2009 ¹⁹) have found little evidence of significant disturbance effects on passerine species.
	1,2,3,4,5			Eurasian Curlew: Evaluated as Excluded - Neutral effect as Project Design measures will avoid works within 800m of a confirmed breeding attempt. No Eurasian Curlew recorded within the study areas for Elements 2,3,4,5.
Movement of soils and machinery	1,2,3,4,5	Direct Contact	Physical injury/destruction of nests or chicks – General Birds	Evaluated as Excluded - Hedgerow trimming and felling will occur outside the bird nesting season. Effects on ground nesting birds including Meadow Pipit from works such as cable trenching will be overseen by Project Ecologist and therefore effects will be Neutral.
Hedgerow trimming Forestry Felling	1,2,3,4,5	Direct Contact	Physical injury/destruction of nests or chicks – General Birds	Evaluated as Excluded; all trimming /felling will occur outside the bird nesting season.
Operational Stage/Growth Stage				
Maintenance Noise/ Visual intrusion	1,2,3,4,5	Air and Visibility	Disturbance/ displacement – (Golden Plover, Eurasian Curlew, Red Grouse, Merlin, Meadow Pipit)	Golden Plover: Evaluated as Excluded - Neutral disturbance/displacement effects are expected due to maintenance activities because; in relation to UWF Grid Connection (1), Maintenance visits will be conducted annually, by 1-2 people travelling in light vehicles in to joint bays, In relation to Other Elements, all maintenance works will be carried out from hardcore surfaces (2, 3, 4), from public road (5), or on foot (3,5).
	1,2,3,4,5			Eurasian Curlew: Evaluated as Excluded; Neutral effects predicted
				Red Grouse: Evaluated as Excluded; Neutral effects predicted
				Merlin: Evaluated as Excluded; Neutral effects predicted
				Meadow Pipit: Evaluated as Excluded t; Neutral effects predicted.

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¹⁸ Greater Impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site 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

¹⁹ 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.)

		Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
General Bird Species	Sensitive Aspect	Decommissioning Stage				
		Noise and human activity	1,2,3,4,5	Visibility	Disturbance/ Displacement (Golden Plover, Eurasian Curlew, Red Grouse, Merlin)	Golden Plover: Evaluated as Excluded - No significant decommissioning activities for elements 1, 2, 3 and 5. No Golden Plover were recorded in studies for Upperchurch Windfarm (Element 4).
1,2,3,4,5	Disturbance/Displacement Mortality of ground nesting birds – Meadow Pipit		Eurasian Curlew: Evaluated as Excluded as no decommissioning relative to nesting location (Element 1)			
					Red Grouse: Evaluated as Excluded as no decommissioning will take place at Bleanbeg (Element 1).	
					Merlin: Evaluated as Excluded - decommissioning is not likely to affect low numbers of wintering Merlin measurably.	
					Meadow Pipit: Evaluated as Excluded as there are no decommissioning activities associated with either the UWF Grid Connection or UWF Replacement Forestry, and no significant decommissioning activities associated with the UWF Related Works or UWF Other Activities.	
					In relation to Upperchurch Windfarm (Element 4), Activities will only take place at existing hard stand locations within Upperchurch Windfarm, will be temporary in duration, reversible, and occur primarily in habitats of low value for Meadow Pipit. Studies on the impacts of wind farms during both construction (Pearce-Higgins <i>et al.</i> 2012) and operation (Pearce-Higgins <i>et al.</i> 2009) have found little evidence of significant disturbance effects on passerine species. This is also applicable to decommissioning.	

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8.7.5 Mitigation Measures for Impacts to General Bird Species

Mitigation measures were incorporated into the UWF Related Works project design including the Project Design Measures. No additional mitigation measures are required as **no significant adverse impacts** are concluded by the topic authors as likely to occur to General Bird Species as a consequence of the UWF Related Works.

8.7.6 Evaluation of Residual Impacts to General Bird Species

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for General Bird Species above (Section 8.7.4) - **no significant adverse impacts**.

8.7.7 Application of Best Practice and the EMP for General Bird Species

Best Practice Measures (BPM), although not part of the Project Design for the UWF Related Works, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **General Bird Species**, by the authors of this topic chapter, using industry best practice:

RW-BPM-17	Best practice measures for the removal of vegetation during construction
RW-BPM-19	Disturbance to and/or displacement of nesting Common Kingfisher (<i>Alcedo atthis</i>).
RW-BPM-22	Management of general non-native invasive species

These Best Practice Measures are included in full at the end of this topic chapter, and also form part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

8.7.7.1 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan also forms part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

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8.7.8 Summary of Impacts to General Bird Species

A summary of the Impact to General Bird Species is presented in Table 8-63.

Table 8-63: Summary of the impacts to General Bird Species

Impact to General Bird Species:	Golden Plover: Habitat Loss	Golden Plover: Disturbance /Displacement	Meadow Pipit: Habitat Loss	General Birds: Habitat Enhancement
<i>Evaluation Impact Table</i>	<i>Section 8.7.4.1</i>	<i>Section 8.7.4.2</i>	<i>Section 8.7.4.3</i>	<i>Section 8.7.4.4</i>
Project Life-Cycle Stage	Construction	Construction	Construction	Construction
<u>UWF Related Works</u>	Not Significant	Not Significant	Not Significant	Imperceptible (positive)
Element 1: UWF Grid Connection	Slight	Not Significant	Slight	Slight (positive)
Element 3: UWF Replacement Forestry	Slight	Neutral	Slight	Slight (positive)
Element 4: Upperchurch Windfarm	Neutral	Neutral	Slight	Imperceptible (positive)
Element 5: UWF Other Activities	Neutral	Neutral	Moderate (positive)	<u>Significant positive</u>
<u>Cumulative Impact:</u>				
All Elements of the Whole UWF Project	Slight	Not Significant	Slight	Slight (positive)
All Elements of the Whole UWF Project <i>and</i> Other Projects or Activities Bunkimalta Windfarm	No Cumulative Impact	No Cumulative Impact	Slight	Slight (positive)

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to present the totality of the project.

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8.8 Sensitive Aspect No.7: Bats

This Section provides a description and evaluation of the Sensitive Aspect - Bats.

8.8.1 BASELINE CHARACTERISTICS of Bats

8.8.1.1 STUDY AREA for Bats

The study area for Bats in relation to the UWF Related Works is described in Table 8-64 and illustrated on **Figure RW 8.8: Bats within the UWF Related Works Study Area** (Volume C3 EIA Figures).

Table 8-64: UWF Related Works Study Area for Bats

Study Area for Bats	Justification for the Study Area Extents
<ul style="list-style-type: none"> • Buildings within 150m of the construction works area boundary • Mature trees within 50m of the construction works area boundary; • Linear vegetation features (e.g. hedgerows) of high suitability for foraging bats within the construction works area boundary • Bridges within the construction works area boundary and along material haulage routes on the local road network between the concrete suppliers and the works locations. 	Professional Judgement and as per Best Practice: Bat Surveys for Professional Ecologists: Good Practice Guidelines, Collins, (2016), and The Conservation of Bats in Bridges Project – A Report on the survey and conservation of bat roosts in bridges in Cumbria, Billington and Norman (1997).

8.8.1.2 Baseline Context and Character of Bats in the UWF Related Works Study Area

The UWF Related Works will be located in the Slievefelim to Silvermine Mountains upland area in County Tipperary. The landscape present is predominantly improved agricultural/forestry landscape, interspersed with hedgerows and low-density houses and farm buildings. Mature trees are also present within hedgerows and along public roads.

Bats are common and widespread throughout Ireland, and occupy a wide variety of habitats. In a regional context, the following is noted in the (Draft) North Tipperary Biodiversity Plan 2007: “Many bat species forage in woodland and over water, and the combination of both habitats within North Tipperary makes the area valuable for bat species. Built structures, such as bridges, that occur close to water are of particular value as roosts. Six of Ireland’s bat species are known to occur in North Tipperary common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Leisler’s bat *Nyctalus leisleri*, Natterer’s bat *Myotis nattereri* (records from www.batconservationireland.org), Brown long-eared bat *Plecotus auritus* and Daubenton’s bat *Myotis daubentonii* (pers comm. S. Jones, S. Geraghty²⁰)”. In addition, the author has recorded Nathusius’ pipistrelle *Pipistrellus nathusii* and whiskered bat *Myotis mystacinus* in the north Tipperary. Ireland’s only other regularly-occurring bat species – the lesser horseshoe bat *Rhinolophus hipposideros* – can occasionally be found on the Limerick – Tipperary border, but in general the county is just outside the range of this species.

Online national landscape suitability maps for Irish bat species (Lundy *et al.*, 2010) were reviewed and indicate that the suitability index for the ‘all bats combined’ layer is moderate within the environs of UWF Related Works.

²⁰ As cited in the ‘draft North Tipperary Biodiversity Plan 2007’

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When considered at the level of individual bat species, the UWF Related Works Study Area has high suitability for common pipistrelles; moderate suitability for soprano pipistrelles, Leisler’s bat, Whiskered Bat and natterer’s bat, low suitability for Daubenton’s and brown long-eared bats, and negligible suitability for Nathusius’ pipistrelles and lesser horseshoe bats.

Further information on context such as known roosts identified from desktop review is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.2.1\)](#).

Survey Results – UWF Related Works:

Roosts

Preliminary ecological appraisals were carried out for 35 buildings within the study area, and presence / absence surveys and/or roost characterisation surveys were carried out in 2016 and 2017 for features of high or moderate roost suitability that were considered to be at risk of direct or indirect effects.

Four bat roosts were identified, all of which were located in dwelling houses and farm buildings. None of the roosts were located within the construction area boundaries. Two roosts are of County Importance, with the closest 5m from the UWF Related Works construction works area. One roost is of Local importance, located 130m from the construction works area. We note that two of the roosts identified are also discussed within the context of the UWF Grid Connection and Upperchurch Windfarm.

Table 8-65: Identified Bat Roosts in the UWF Related Works study area

<u>Code</u>	<u>Type</u>	<u>Evidence of bats</u>	<u>Valuation</u>	<u>Proximity to UWF Related Works</u>
BR14	Dwelling house	Day roost / satellite roost: 1 common pipistrelle	Negligible	15m
BR15	Dwelling house and traditional farm buildings	Maternity roost: 50 - 60 common pipistrelles Maternity roost: 5 soprano pipistrelles.	Local	130m
BR16	Dwelling house and traditional farm buildings	Maternity roost: 4 - 5 natterers bats. Transitional / mating roosts: 5 - 10 natterers bats, 20 common pipistrelles, 3 brown long-eared bats. Summer non-breeding / day roost: 2 common pipistrelles, 1 Leisler’s bat. Hibernation roost: natterer’s bats, common pipistrelles, Leisler’s bat.	County	10m
BR17	Dwelling house	Maternity roost: 2 – 3 natterers bats	County	5m

Activity

Activity levels (from two sampling locations within the study area) were relatively high, with an average of one bat pass every three minutes throughout the survey period (a Bat Activity Index of 20.8). The only species recorded in significant numbers was common pipistrelles; all other species had negligible activity. Lesser-horseshoe bats were not recorded. One habitat feature was considered to be of County Importance as a commuting route / feeding area.

Table 8-66: Bat Activity Sampling Results in the UWF Related Works study area

<u>Site</u>	<u>Habitat</u>	<u>Month</u>	<u>Characterisation of activity</u>	<u>Ecological value</u>
SD26	Farmyard	Jun	Near-constant CP	County
		Sept	Occasional CP	
SD27	Edge of conifer plantation	Jun	Occasional CP	Negligible
		Sept	Negligible	

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Further information on activity and roost surveys and results are included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.5\)](#) and maps showing the preliminary ecological appraisals of in respect of bats buildings, trees and bridges are provided in [Figure RW 8.8: Bats within the UWF Related Works Study Area](#).

Note: The locations of bat roosts are not shown in Figure RW 8.8, but detailed descriptions and coordinates of each roost are provided in a confidential annex to Appendix 8-1 (Section A8-1.7), which will be provided to the planning authority and key statutory consultees but will not be made publicly available.

8.8.1.3 Importance of Bats

All bat species, as listed in the Fifth Schedule to the Wildlife Act 1976 (as amended in 2000), and their resting places are legally protected in Ireland. The Wildlife Act, 1976, is the principal national legislation providing for the protection of wildlife and the control of some activities, which may adversely affect wildlife. For the purpose of the current evaluation, importance levels are as described under Context, above in respect of both roosts and locations of activity.

All bats are listed on Annex IV of the EU Habitats Directive 92/43/EEC which was transposed into national law through the European Communities (Natural Habitats) Regulations 1997 (S.I. 94/97) as amended in 1998 (S.I. No. 233/1998), 2005 (S.I. No. 378/2005) and 2011 (SI No. 477/2011). This legislation further protects bats both inside and outside of the Natura 2000 site network. Furthermore, lesser horseshoe bat is listed on Annex II of the EU Habitats Directive 92/43/EEC which requires Special Areas of Conservation (SACs) to be designated within the Natura 2000 site network to ensure the maintenance of their conservation status.

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention, 1982) ensures that governments take into account the conservation needs of species during the formulation of planning and development policies. It also seeks the protection of endangered species and in relation to bats, it stipulates that all bat species and their habitats are conserved.

8.8.1.4 Sensitivity of 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). During the day, bats roost in man-made structures (typically houses, farm buildings and bridges), mature trees and caves. 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). They are most sensitive to effects during their maternity and hibernation periods, which are from May to August and November to March, respectively.

After sunset, bats ‘commute’ fly from their roosts to a suitable feeding area (referred to as ‘commuting’ behaviour), and spend most of the night foraging for insect prey. They typically favour linear habitat features (e.g. hedgerows and forest edges) for commuting and foraging, and usually avoid brightly-lit areas (Lundy *et al.*, 2011). They may travel several kilometres from their roost, and may use different feeding areas on different nights.

8.8.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

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 2013), all Irish bat species are considered to be of favourable conservation status, although the status of Nathusius’ pipistrelle is listed as unknown, because there is some uncertainty about their range and breeding status. Most bat species are listed as ‘least concern’ on the all-Ireland red list of mammals (Marnell *et al.*, 2009), including the

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Nathusius' pipistrelle. Leisler's bat is listed as 'near-threatened' because Ireland supports an internationally-important population, but the overall population status of this species is known to stable or increasing.

The abundance of Irish bats is monitored by Bat Conservation Ireland (Roche *et al.*, 2012) using annual public surveys such as the 'Car-Based Monitoring Scheme', the 'All-Ireland Daubenton's Bat Waterways Survey', and roost monitoring assessments for brown long-eared bats and lesser horseshoe bats. In combination, these projects monitor all Irish species with the exception of Natterer's bat and whiskered bat. **To date the populations of all monitored species appear to be stable or increasing.**

If the subject development does not proceed, the site is expected to remain in the baseline condition and to be used by bat species on an occasional to regular basis. Based on the national trends of these species, the abundance of bats in the surrounding landscape is expected to remain stable, or to increase at a slow rate.

8.8.1.6 Receiving Environment (the Baseline + Trends)

As the conservation status of all Irish bat species is considered to be stable, it is expected that the baseline levels of bat activity recorded in 2016 / 2017 will not change significantly by the time of construction or operation and decommissioning.

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8.8.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

UWF Related Works is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Related Works is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Related Works is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.8.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Bats considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.8.2.2.1](#) below.

The evaluation of cumulative impacts to Bats also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Bats with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Related Works or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effect to Bats.

8.8.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Related Works Study Area along with the study areas for Other Elements which are described in Table 8-67.

Table 8-67: Cumulative Evaluation Study Area for Bats

<u>Cumulative Project</u>	<u>Cumulative Study Area Boundary</u>	<u>Justification for Study Area Extent</u>
Element 1: UWF Grid Connection	<ul style="list-style-type: none"> • Buildings within 150m of Element construction works areas or activity locations • Mature trees within 50m of Element construction works areas or activity locations; • Hedgerow severance locations • Bridges within construction works locations or along concrete/aggregate haulage routes for Elements of the Whole UWF Project. 	Professional Judgement and as per Best Practice: Bat Surveys for Professional Ecologists: Good Practice Guidelines, Collins, (2016), and The Conservation of Bats in Bridges Project – A Report on the survey and conservation of bat roosts in bridges in Cumbria, Billington and Norman (1997).
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities:	Not Relevant – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects	

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8.8.2.2.1 Potential for Impacts to Bats

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Bats. The results of this evaluation are included in Table 8-68.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on **Figure CE 8.8: Bats within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-68: Results of the Evaluation of the Other Elements of the Whole UWF Project

<u>Other Element of the Whole UWF Project</u>	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded</u>: No potential for effects due to no sources of impacts – During surveys, no bat roosts were recorded at the UWF Replacement Forestry lands, one low suitability roost was recorded within 150m of the existing entrance to the afforestation lands,</p> <ul style="list-style-type: none"> • There is no potential for destruction or disturbance of bat roosts in trees, as there is no requirement to fell or prune trees for the UWF Replacement Forestry, no requirement to upgrade bridge structures, and no requirement for renovations, alterations or use of buildings during either the planting or growth stages, therefore there is no source of impact; • No potential for severance of commuting routes or feeding area, as there is no requirement to remove any hedgerows or other linear features for the UWF Replacement Forestry. Woodland edge habitat will be created for foraging bats, as the UWF Replacement Forestry matures; • No potential for disturbance effects due to lighting, as lighting will not be required for the UWF Replacement Forestry, • No potential for disturbance or displacement effects due to noise or vibration as no significant sources of noise and no sources of vibration will be present onsite during planting or management activities • No potential for mortality of bats due to collision due to the absence of moving structures, • No potential for effects due to harvesting, as the UWF Replacement Forestry will be a permanent woodland and will not be harvested.
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects

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8.8.2.3 Cumulative Information: Baseline Characteristics – Context & Character

Bats are common and widespread throughout Ireland, and occupy a wide variety of habitats. In a regional context, the following is noted in the (Draft) North Tipperary Biodiversity Plan 2007: “Many bat species forage in woodland and over water, and the combination of both habitats within North Tipperary makes the area valuable for bat species. Built structures, such as bridges, that occur close to water are of particular value as roosts. Six of Ireland’s bat species are known to occur in North Tipperary common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Leisler’s bat *Nyctalus leisleri*, Natterer’s bat *Myotis nattereri* (records from www.batconservationireland.org), Brown long-eared bat *Plecotus auritus* and Daubenton’s bat *Myotis daubentonii* (pers comm. S. Jones, S. Geraghty²¹”). In addition, the author has recorded Nathusius’ pipistrelle *Pipistrellus nathusii* and whiskered bat *Myotis mystacinus* in the north Tipperary. Ireland’s only other regularly-occurring bat species – the lesser horseshoe bat *Rhinolophus hipposideros* – can occasionally be found on the Limerick – Tipperary border, but in general the county is just outside the range of this species.

8.8.2.3.1 Element 1: UWF Grid Connection

The UWF Grid Connection will be located in the Slievefelim to Silvermine Mountains upland area in County Tipperary. The landscape present is predominantly forestry and improved agricultural landscapes, interspersed with hedgerows and low-density houses and farm buildings. Mature trees are also present within hedgerows and along public roads.

Online national landscape suitability maps for Irish bat species (Lundy *et al.*, 2010) were reviewed and indicate that the suitability index for the ‘all bats combined’ layer varies across the length of the UWF Grid Connection. Areas of high suitability are found in the environs of Mountphilips at the western end of the UWF Grid Connection, moderate suitability and low suitability in the centre, and moderate suitability at the western end. Overall, the landscape suitability follows a consistent west to east pattern of decreasing suitability for all species, which roughly corresponds with the changes in altitude.

When considered at the level of individual bat species, the UWF Grid Connection Study Area has high suitability for common pipistrelles; moderate suitability for soprano pipistrelles, Leisler’s bat, whiskered bat and natterer’s bat, low suitability for Daubenton’s and brown long-eared bats, and negligible suitability for Nathusius’ pipistrelles and lesser horseshoe bats.

Further information on context such as known roosts identified from desktop review is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.2.1\)](#).

Survey Results

Preliminary ecological appraisals were carried out for 119 buildings within the study area, and presence / absence surveys and/or roost characterisation surveys were carried out in 2016 and 2017 for features of high or moderate roost suitability that were considered to be at risk of direct or indirect effects.

Bat roosts were identified in 14 buildings, including 8 maternity roosts, 7 non-breeding summer roosts, 4 transitional / mating roosts and 4 hibernation roosts (some buildings had more than one roost). Four buildings were considered to be of County Importance and six to be of Local Importance. These are further described per project element below.

Mature trees within 50m of the construction works area were inspected from ground level, and 26 were considered to have low suitability for bats (e.g. small crevices that could be used by individual roosting bats),

²¹ As cited in the ‘draft North Tipperary Biodiversity Plan 2007’

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while 2 were considered to have moderate suitability (e.g. multiple or larger crevices that could support multiple roosting bats). However, these numbers only refer to the potential suitability of these trees for bats, and we note that no evidence of roosting bats was observed (e.g. bat droppings) in any of these trees. All other mature trees within 50m of the construction area boundaries were inspected and evaluated as having negligible roost suitability. 17 of the low-suitability trees and none of the moderate-suitability trees were within the construction works area boundary.

A number of bridges were inspected along the route of the UWF Grid Connection and material (concrete and stone) haulage routes along local roads; bridges on national or regional roads were scoped out of the assessment, as they are maintained on a regular basis by Transport Infrastructure Ireland, and would not need to be upgraded or strengthened in order to allow the passage of construction vehicles. Within the study area 1 bridge had high suitability, 1 had moderate suitability and 5 bridges had low suitability for bat roosts. However, these numbers only refer to the potential suitability of these for bats, and we note that no evidence of roosting bats was observed in any of these bridges.

Bat activity surveys using automated detectors were carried out at twenty-seven locations (including compound locations, and additional treeline/hedgerows with high suitability for bats) within the UWF Grid Connection Study Area. . A full list of bat activity survey results is provided in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.5\)](#). Appendix 8-1 can be found in [Volume C4 EIAR Appendices](#).

Roosts

Fourteen bat roosts in total were identified, of which 12 were in dwelling houses, one was in an outbuilding/shed and one in a ruined church. None of the roosts were located within the construction area boundary. Four roosts are of County Importance, with the closest 5m from the construction works area. 6 roosts are of local importance, with the closest 5m from the construction works area. Further detail is provided below in Table 8-69.

Table 8-69: Bat Roosts Identified within UWF Grid Connection Study Area

Code	Type	Evidence of bats	Importance Evaluation	Proximity to the UWF Grid Connection
BR1	Ruined church	Maternity, mating and hibernation roost: 5-10 natterer's bats	County	20m
BR2	Dwelling house	Maternity roost: 30 - 40 common pipistrelles	Local	120m
BR3	Dwelling house	Day roost / satellite roost: 1 soprano pipistrelle	Negligible	350m
BR4	Dwelling house	Hibernation roost: >100 brown long-eared bats, 1 natterer's bat. Summer day roost: 2 brown long-eared bats, 1 natterer's bat.	County	160m
BR5	Dwelling house	Summer non-breeding roost and mating / transition roost: 3 - 4 common pipistrelles. Hibernation roost: 6 common pipistrelles, 2 brown long-eared bats	County	50m
BR6	Dwelling house	Former transitional roost: >200 pipistrelles. Access points have now been sealed.	Negligible (inactive)	140m
BR7	Dwelling house	Maternity roost: 40 - 50 common pipistrelles	Local	5m
BR8	Dwelling house	Maternity roost: 10 - 20 common pipistrelles	Local	200m
BR9	Dwelling house	Day roost / satellite roost: 1 common pipistrelle	Negligible	50m

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Code	Type	Evidence of bats	Importance Evaluation	Proximity to the UWF Grid Connection
BR10	Dwelling house	Maternity roost: 40 - 50 common pipistrelles	Local	400m
BR11	Shed	Day roost / satellite roost: 1 Myotis sp.	Negligible	430m
BR12	Dwelling house	Maternity roost: 40 - 50 common pipistrelles	Local	5m
BR13	Dwelling house	Maternity roost: 30 - 40 common pipistrelles Possible day roost / satellite roost: 1 Myotis sp.	Local	5m
BR16*	Dwelling house and farm buildings	Maternity roost: 4 - 5 natterers bats. Transitional / mating roosts: 5 - 10 natterers bats, 20 common pipistrelles, 3 brown long-eared bats. Summer non-breeding / day roost: 2 common pipistrelles, 1 Leisler's bat. Hibernation roost: natterer's bats, common pipistrelles, Leisler's bat.	County	5m

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* It should be noted that roost R16 is also within the zone of influence of the UWF Related Works and Upperchurch Windfarm, and is discussed therefore under each within the relevant sections of this report. However, it should be noted, that although the potential impacts on this roost are considered for three separate elements of the project, this does not represent three separate roosts.

Activity

Activity levels (from 27 sampling locations) were relatively high, with an average of one bat pass every two minutes throughout the survey period (a Bat Activity Index of 29.3). The most frequently-recorded species were common pipistrelles, followed by soprano pipistrelles, *Myotis* spp. Leisler's bat, Nathusius' pipistrelle and brown long-eared bat, in order of abundance. Lesser-horseshoe bats were not recorded. 5 habitat features were considered to be of County Importance as commuting routes / feeding areas and 18 to be of Local Importance.

Table 8-70: Bat Activity Sampling Results

Sampling Location	Habitat	Month	Characterisation of activity	Importance Evaluation
SD1	Mature treeline	Jun	Frequent CP, occasional SP	Local
		Sept	Frequent CP, occasional SP & MY	
SD2	Hedgerow	Aug	Frequent CP	Local
		Sept	Occasional CP	
SD3	Hedgerow	Jun	Negligible	Local
		Sept	Frequent SP, occasional CP	
SD4	Hedgerow	Jun	Frequent CP, occasional SP	Local
		Sept	Occasional CP	
SD5	Hedgerow	Jun	Occasional CP	Negligible
		Sept	Occasional CP	
SD6	Farmyard	Jun	Occasional CP	Local
		Sept	Frequent CP & SP	
SD7	Mature woodland	Aug	Frequent CP, occasional L	Local
		Sept	Frequent CP & SP, occasional MY	
SD8	Ruined church	Jun	Occasional CP & MY	Local
		Sept	Occasional CP	
SD9	Hedgerow	Jun	Negligible	Negligible

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<u>Sampling Location</u>	<u>Habitat</u>	<u>Month</u>	<u>Characterisation of activity</u>	<u>Importance Evaluation</u>
		Sept	Negligible	
SD10	Mature woodland	Aug	Frequent CP, occasional SP	Local
		Sept	Negligible	
SD11	Hedgerow	Jun	Frequent CP & SP	County
		Sept	Near-constant SP, frequent CP, occasional MY	
SD12	Hedgerow	Jun	Frequent CP & MY	County
		Sept	Frequent CP, occasional MY	
SD13	Road within conifer plantation	Jun	Near-constant CP	County
		Sept	Frequent CP, occasional SP & MY	
SD14	Road within conifer plantation	Aug	Frequent CP, occasional SP	Local
		Sept	Occasional CP	
SD15	Road within conifer plantation	Jun	Occasional CP & MY	Local
		Sept	Negligible	
SD16	Treeline	Aug	Occasional CP, SP & MY	Local
		Sept	Frequent SP, occasional CP	
SD17	Farmyard	Jun	Frequent CP	Local
		Sept	Frequent CP, occasional SP & MY	
SD18	Road within conifer plantation	Jun	Frequent CP	Local
		Sept	Frequent CP	
SD19	Hedgerow	Sept	Negligible	Negligible
		Sept	Negligible	
SD20	Roadside hedgerow	Aug	Frequent CP & MY, occasional SP	County
		Sept	Frequent CP	
SD21	Road within conifer plantation	Jun	Frequent CP, occasional L & SP	Local
		Sept	Occasional CP	
SD22	Road within conifer plantation	Aug	Occasional CP	Local
		Sept	Frequent CP & SP	
SD23	Hedgerow	Aug	Frequent CP & SP	Local
		Sept	Frequent CP, occasional SP	
SD24	Open ground	Jun	Occasional CP & L	Local
		Sept	Occasional CP	
SD25	Hedgerow	Jun	Occasional CP	Local
		Sept	Occasional CP, SP & MY	
SD26**	Farmyard	Jun	Near-constant CP	County
		Sept	Occasional CP	
SD27**	Edge of conifer plantation	Jun	Occasional CP	Negligible
		Sept	Negligible	

** It should be noted that sampling locations SD26 and SD27 are also within the zone of influence of the UWF Related Works, and are discussed in relation to same within the relevant section of this report.

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Further information on activity and roost surveys and results are included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.5\)](#). Maps showing the preliminary ecological appraisals of in respect of bats buildings, trees and bridges are provided in [Figure GC 8.8: Bats within the UWF Grid](#)

Connection Study Area. Figure GC 8.8 is part of the EIA Report for the UWF Grid Connection, and is included in **Volume F: Reference Documents** with this planning application.

8.8.2.3.2 Element 3: UWF Replacement Forestry

Not applicable – Element evaluated as excluded. See Section 8.8.2.2.1

8.8.2.3.3 Element 4: Upperchurch Windfarm

Preliminary ecological appraisals were carried out for 7 buildings within the study area, and presence / absence surveys and/or roost characterisation surveys were carried out in 2016 and 2017 for features of high or moderate roost suitability that were considered to be at risk of direct or indirect effects.

One bat roost of County Importance is located within farm buildings at Site Compound No.2, which is associated with the Upperchurch Windfarm, and therefore overlaps the construction works area directly. A further day roost/satellite roost of negligible importance is also present 15m from the construction works area within another part of the Upperchurch Windfarm.

Table 8-71: Identified Bat Roosts in the Upperchurch Windfarm study area

<u>Code</u>	<u>Type</u>	<u>Evidence of bats</u>	<u>Valuation</u>	<u>Proximity to Upperchurch Windfarm</u>
BR14	Dwelling house	Day roost / satellite roost: 1 common pipistrelle	Negligible	15m
BR16	Dwelling house and traditional farm buildings	Maternity roost: 4 - 5 natterers' bats. Transitional / mating roosts: 5 - 10 natterers bats, 20 common pipistrelles, 3 brown long-eared bats. Summer non-breeding / day roost: 2 common pipistrelles, 1 Leisler's bat. Hibernation roost: natterer's bats, common pipistrelles, Leisler's bat.	County	0m

Activity

Activity surveys for the Upperchurch Windfarm were carried out by Malachy Walsh & Partners in 2012 and 2013, and the results were presented in the wind farm EIS. Some excerpts from the bat report are provided below:

"The results of bats surveys indicate that up to seven species of bat are utilising habitats within the study area or are commuting through the site to more suitable habitat in the greater area.

Throughout the site common pipistrelles and soprano pipistrelles were recorded on the edge of woodland, along access tracks, hedgerows, treelines, over areas of scrub, semi-natural grassland and improved agricultural grassland. Common pipistrelle was the most common species recorded during surveys in 2012 and 2013."

8.8.2.3.4 Element 5: UWF Other Activities

Due to the absence of possible sources of hedgerow severance in respect of UWF Other Activities (only minimal trimming of outer branches is planned) activity surveys to inform an appraisal of likely effects were not required

Roosts: No bat roosts were present. Trees at hedgerow trimming locations as part of Haul Route Activities are not suitable for roosting bats. No trimming is required for Overhead Line Activities.

8.8.2.3.5 Other Projects or Activities

Not applicable – **No** Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.8.2.1.

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8.8.3 PROJECT DESIGN MEASURES for Bats

At the conception of the UWF Related Works, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-72 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Bats**.

Table 8-72: UWF Related Works Project Design Measures relevant to Bats

PD ID	Project Design Environmental Protection Measure (PD)
PD02	Flag-men will be used at temporary site entrances rather than creating sightlines by the removal of roadside boundaries. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the local road network in a in a safe and efficient manner.
PD37	All construction works will be carried out during daylight hours. Security lighting will be used at compounds. <u>All lighting</u> will be cowed in order to prevent light spill and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational.
PD38	Confirmatory surveys will be carried out at all trees with bat suitability that will require felling or other major modifications (e.g. removal of rotten branches). These trees will be subject to a ground-level visual inspection by the Project Ecologist (or a bat specialist acting on their behalf) prior to site clearance works in order to confirm the findings of the 2016 / 2017 surveys. (Note: 17 trees with low suitability were identified within the UWF Grid Connection construction works area boundary during 2016/2017 surveys).
PD39	Where a tree with moderate or high bat suitability is to be felled, a presence/absence bat surveys will be carried out. (Note. It is not expected that any trees with moderate or high suitability will be felled).
PD40	Felling of trees with bat roost suitability will be undertaken in the period late-August to late-October/early-November. Trees with low suitability for bats will be felled carefully and slowly in order to avoid impact-related injuries to any bats that may be roosting inside them. Sections of the tree with potential roost features for bats (e.g. crevices, damaged branches) will be cut in sections, lowered carefully to the ground and left undisturbed for 48 hours before removal.
PD41	Where the felling of trees with bat suitability is carried out, robust, weather-proof bat-boxes, for example Schwegler type 1FF and 2F models, will be placed in each of the affected sections to compensate for the loss of potential tree roosts. The number of bat boxes will match the number of trees with bat suitability to be felled.
PD42	Installation of bat crossing structures at severed hedgerows, proximate to areas of high bat activity or roost locations. And following the completion of construction works, the replanting of these severed hedgerows with semi-mature shrubs/trees (like for like) and limits on temporary lighting near hedgerows.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in **Appendices 5.3 and 5.5**, in **Volume C4: EIAR Appendices**.

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8.8.4 EVALUATION OF IMPACTS to Bats

In this Section, the likely direct and indirect effects of the UWF Related Works are identified and evaluated. Then the likely cumulative effects of the UWF Related Works together with the Other Elements of the Whole UWF Project are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Bats.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-73: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Destruction or disturbance of bat roosts in trees, (construction stage)	Mortality through roost destruction of roosts in forestry, in bridges or in hedgerows, (construction stage)
Severance of commuting routes or feeding areas, (construction stage)	Destruction/Disturbance of Bat Roosts in Buildings, (construction stage)
Disturbance or Displacement due to lighting, (construction stage)	Disturbance or Displacement of Bat Roosts due to Noise and Vibration, (construction stage)
	Inadvertent mortality through roost destruction due to hedgerow trimming activities (operational stage)
	Avoidance due to increased EMF (operational stage)
	Disturbance or Displacement due to lighting (operational stage)
	Disturbance or Displacement due to Noise and Vibration (operational stage)
	Mortality of bats due to collision or barotrauma (operational stage)
	Inadvertent mortality through roost destruction, (decommissioning stage)
	Disturbance or Displacement due to lighting, (decommissioning stage)
	Indirect Disturbance from Noise and Vibration, (decommissioning stage)

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.8.4.1 to 8.8.4.3.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, Section 8.8.4.4.

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8.8.4.1 Impact Evaluation Table: Destruction or disturbance of bat roosts in trees

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Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Tree felling, Trimming and pruning of mature trees and hedgerows

Cumulative Impact Source: Tree felling, Removal of mature trees, trimming and pruning of mature trees and hedgerows

Impact Pathway: Landcover

Impact Description: Crevices and cavities in mature trees can provide roosting opportunities for bats, with some species (e.g. Leisler’s bat) thought to favour roosting sites in trees. Recent research has demonstrated that the use of roosts in trees can be highly transitory, with frequent roost switching between nights and across the season, although some large cavities can be used as maternity or hibernation roosts for longer periods of time. Almost all records to date have been from broadleaf trees (particularly oaks), with only a very small number from specimen conifers, and none from conifer plantations²².

Any damage or disturbance to trees with crevices or cavities can have direct or indirect impacts on any bats that may be roosting within them. Felling can cause death or injury to bats, or the associated disturbance can cause them to emerge during daylight, thus exposing them to diurnal predators. Similarly, construction work within the root zone of trees can cause the death of trees, causing them to fall at a later date. The spatial extent of impacts is limited to the tree in question (including its root zone and overhanging branches).

Trimming of hedgerows and low-hanging branches of trees will be required along some roads in order to facilitate the passage of construction vehicles. Almost all of these locations are on public roads and already subject to the standard maintenance regime for public roads, and it is expected that all such hedgerows / trees would have been trimmed in the past. Therefore, there is a negligible risk that bats could roost in any of these branches, so this element of the project will not have any direct impacts on potential tree roosts. All works will occur within daylight hours as part of Project Design.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Destruction or disturbance of bat roosts in trees

Element 2: UWF Related Works

Impact Magnitude:

There are no trees with bat roosting suitability within the study area.

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- no change in baseline conditions

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

17 No. trees with bat roost suitability are located either within or partially within the UWF Grid Connection construction works area boundary. All of these trees were evaluated as having low suitability for roosting bats, i.e. small crevices that could be used on a transitory basis by individual roosting bats. No trees of moderate or

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²² Andrews H & Gardener M 2016. Bat Tree Habitat Key – Database Report 2016. AEcol, Bridgwater

high suitability were recorded within the construction works area. The trees were surveyed in either 2016 or 2017, and no evidence of roosting bats was observed, so it is considered that there is a low likelihood (e.g. <5%) that bats would be roosting within them at the time of construction. It is likely that some or all of these trees will be directly or indirectly affected during construction works, although decisions to fell these trees will be made at the construction stage. Even if the trees are not felled, it will be necessary to trim or prune some of the lower branches to facilitate access, and root disturbance could occur during excavation works. In recognition of the potential risk of impacts on any bats that may be roosting in these trees at the time of works, a series of best-practice measures have been incorporated into the design of the development, including pre-felling inspections, felling procedures, and the installation of bat boxes. This will ensure that any impacts on any bats present in the trees would be imperceptible.

There is no potential for sequential effects to bats, as the extent of any instance of roost disturbance/destruction is limited to those Bats which may be present in individual trees.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- Only 17 of the trees located within the zone of effect, and all were considered to have low suitability for roosting bats, and;
- Considering their low suitability for roosting bats, the likelihood that bats would occupy any of these trees at the time of felling is considered to be low (<5%);
- There was no evidence that bats were roosting in any of these trees during inspections in 2016 / 2017;
- Best practice measures have been incorporated into the project design, including pre-felling inspections, sensitive felling procedures, and the installation of bat boxes.

Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.8.2.2.1

Element 4: Upperchurch Windfarm

Impact Magnitude:

No potential tree roosts were identified in the EIS for the Upperchurch Windfarm and it was noted that the conifer plantations within the site offer “*very poor roosting habitat*”.

In the RFI reporting it was noted that “*large mature treelines in the greater area offer potential roosting sites for bats particularly along the roads in Shevry and Gleninchaveigh*”. However, only a small number of trees will be felled along these roads, and none were considered to have suitability for bats. Therefore, this element of the project will not have any direct impact on potential tree roosts.

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- None of the trees within the footprint of the development are suitable for roosting bats, so there will be no change to the baseline conditions

Element 5: UWF Other Activities

Impact Magnitude: There is no requirement to fell trees. Trimming of hedgerows and low-hanging branches of trees will occur as part of Haul Route Other Activities. Haul Route Activity locations are on public roads and already subject to the standard maintenance regime for public roads, and it is expected that all such hedgerows / trees would have been trimmed in the past. Therefore, there is a negligible risk that bats could roost in any of these branches. No tree or hedgerow trimming is required for Overhead Line Activities. Significant planting of new trees will occur as part of the Upperchurch Hen Harrier Scheme (totalling 2.8km).

Significance of the Impact: Neutral effect.

Rationale for Impact Evaluation:

- None of the trees within the footprint of the development are suitable for roosting bats, so there will be no change to the baseline conditions

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Bats	<ul style="list-style-type: none"> • Trimming associated with Haul Route Activity locations will not contrast with any baseline activities, and; • Tree planting in respect of the Upperchurch Hen Harrier Scheme will increase availability of trees for Bats.
	Evaluation of Cumulative Impacts – Destruction or disturbance of bat roosts in trees
Sensitive Aspect	All Elements of the Whole UWF Project
	<u>Cumulative Impact Magnitude:</u> There is no potential for the UWF Related Works to cumulatively effect bats, as Neutral effects are likely to occur to Bats as a result of the development of the UWF Related Works. At a wider population level, Neutral cumulative effects are likely as the UWF Grid Connection is the only Element which will cause effects - where instances of tree felling has the potential to affect Bat Roosts, whereas the remaining elements do not include trees suitable for roosting bats, and trimming activities on public roads as part of UWF Other Activities will have Neutral effect on bat roosts. There is no potential for cumulative sequential effects; as the extent of any instance of roost disturbance/destruction is limited to those Bats which may be present in individual trees.
	Significance of the Cumulative Impact: No Cumulative Impact
	<u>Rationale for Cumulative Impact Evaluation:</u> <ul style="list-style-type: none"> • Effects are limited to the UWF Grid Connection.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

8.8.4.2 Impact Evaluation Table: Severance of commuting routes or feeding areas

Impact Description	
Project Life Cycle Stage:	Construction stage/early operational stage
<u>Impact Source:</u> Site clearance	
<u>Cumulative Impact Source:</u> Site clearance	
<u>Impact Pathway:</u> Land cover	
<p><u>Impact Description:</u> Bats forage and commute along hedgerows, treelines and other linear habitat features. Both temporary and permanent clearance of short sections of habitats such as Hedgerows will be required to facilitate some construction works, particularly along the routes of new access roads or underground trenching locations. The removal of this habitat would not kill or injure any bats, but it may disrupt their behaviour, reducing the value of regular feeding areas and forcing bats to use alternate commuting routes. In many cases bats will be able to adapt to an altered route, as many bat species (e.g. pipistrelles) readily cross gaps of 5 - 10m. However, the disruption of key feeding areas or commuting routes may have a significant effect. For example, alteration of the key commuting routes to and from bat roosts can potentially cause bats to permanently abandon the roost.</p> <p>Bat protection measures have been incorporated into the project design in order to minimise the effects of habitat severance on bats. This includes the installation of bat crossing structures at severed hedgerows proximal to areas of high Bat activity or roost locations, the replanting of severed hedgerows with semi-mature (i.e. at least ten years growth) shrubs/trees on a like-for-like basis, and limits on lighting. This will substantially reduce the risk of impacts on bats in these areas. The bat crossings will be inspected annually during the operational stage, maintained if necessary and removed once vegetation has re-established to the level of the adjacent hedgerow/field boundary. Further to this, at each crossing location, enhancement via the planting of locally sourced native species of trees at either side of the crossing location will be undertaken. This will ensure that a like for like scenario develops where for every shrub/tree removed another is planted, ensuring no net loss of vegetation, and a rapid re-establishment to original height.</p> <p>Re-instated hedgerows will be planted with semi-mature (locally sourced, native) trees, thus reducing the time required for re-establishment to original vegetation height. Therefore, the effects of vegetation removal would only persist in the short term (approx. 1 – 7 years), and after this period, the hedgerows would return to the baseline condition. It is also noted that other elements of the project will include substantial Hedgerow planting, resulting in a net increase in the coverage of this habitat within the study area.</p>	
<u>Impact Quality:</u> Negative and Positive	
Evaluation of the Subject Development Impact–Severance of commuting routes or feeding areas	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> 10m sections of field boundary will be permanently removed at two locations along Realigned Windfarm Road RWR2. However, as these areas are un-vegetated, they are not considered to be of importance for commuting or foraging bats. 145m of linear vegetation features (primarily hedgerows) will be removed temporarily (c.1 week to 1 month) at 15 locations along works locations for the Internal Windfarm Cabling and for Haul Route Works (HW7 and HW10). Temporary bat crossing structures will be installed at severed hedgerows proximal to areas of either high Bat activity or roost locations, in order to avoid effects from the severance of these features during works. When complete, all temporarily removed hedgerows or field boundaries will be reinstated with semi-mature vegetation.</p>	
Significance of the Impact: Imperceptible	

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Bats	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Only a small extent of hedgerow will be permanently lost. • 370m of additional hedgerow planting will more than compensate for its loss; and • All temporarily-removed field boundaries will be reinstated to at least their former (or better) condition in the medium term, as outlined in Chapter 5 Description of the Development; • The severance of most commuting routes / feeding areas will be medium term in duration, reversible and offset by the planting of new hedgerows; • There will be a lag time in the re-establishment of the vegetation, but the continuity of linear features near bat roosts will be maintained using specially-designed bat crossing structures; • This will ensure that bats can continue to use these features during the re-establishment period
Sensitive Aspect	<p><u>Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project</u></p>
	<p>Element 1: UWF Grid Connection</p>
	<p><u>Impact Magnitude:</u> 5m sections of hedgerow will be permanently removed at 9 locations, all of which are evaluated as of local importance to bats. Temporary bat crossing structures will be installed at severed hedgerows proximal to areas of either high Bat activity or roost locations (refer to Figure GC 8.8: Bats within the UWF Grid Connection Study Area), in order to avoid effects from the severance of these features during works. In addition, approximately 585m of field boundary (primarily hedgerow and earthen banks) will be temporarily removed at other locations along the route of the UWF Grid Connection. Most of these locations were considered to be of relatively low importance for feeding / commuting bats due to their lack of vegetation (e.g. earth banks), small size and / or lack of continuity(). This includes permanent removal of roadside field boundary at 2 entrances (E1, E15) to facilitate lines of sight, although the roadside boundaries will be replanted with hedgerows behind the sightlines. Temporary removal of 2m to 5m wide sections of field boundary will also occur along the construction works area boundary to facilitate cable trenching works. The new gaps, which will be 5m in width in most locations, will be used for between 1 week and 6 months. When construction is complete, all temporarily removed hedgerows or field boundaries will be reinstated with semi-mature vegetation, thus reducing effects.</p>
	<p><u>Significance of the Impact:</u> Imperceptible</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Only a small extent of hedgerow will be permanently lost, and; • 700m of additional hedgerow planting will more than compensate for its loss; and • All temporarily-removed field boundaries will be reinstated to at least their former (or better) condition in the medium term, as outlined in Chapter 5 Description of the Development, and; • The severance of most commuting routes / feeding areas will be medium term in duration, reversible and offset by the planting of new hedgerows using semi-mature trees / shrubs; • There will be a lag time in the re-establishment of the vegetation, but the continuity of important bat commuting routes will be maintained using specially-designed bat crossing structures; • This will ensure that bats can continue to use these features during the re-establishment period.
Biodiversity	<p>Element 3: UWF Replacement Forestry– <i>N/A, evaluated as excluded, see Section 8.8.2.2.1</i></p>
	<p>Element 4: Upperchurch Windfarm</p>
	<p><u>Impact Magnitude:</u> Approximately 360m of good quality hedgerows will be removed as part of the construction of the Upperchurch Windfarm. There shall be a loss of potential foraging habitat within the site. However, this loss of habitat is not considered to be significant given the availability of extensive foraging habitat outside the site. In the Ecological Management Plan for the development it is noted that “approximately 360m of new hedgerow will be planted to mitigate this loss of habitat.”</p>
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<p><u>Significance of the Impact:</u> Not significant</p>	Bats
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of permanent loss is mitigated by the planting of the same extent of replacement habitat; and • Relatively little bat activity was recorded along hedgerow habitats. 	
<p>Element 5: UWF Other Activities</p>	
<p><u>Impact Magnitude:</u></p> <p>This element of the project will not involve the severance of any hedgerows or similar features. As part of Upperchurch Hen Harrier Scheme management up to 2.8km of hedgerow is to be planted, constituting a significant offset of Upperchurch Windfarm hedgerow removal in terms of the effects of severance</p>	Sensitive Aspect
<p><u>Significance of the Impact:</u> Imperceptible</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No hedgerows or other similar features will be severed, so there will be no change to the baseline conditions, • 2.8 km of new hedgerow planting will improve bat foraging habitat in the short to medium term. 	
<p>Evaluation of Cumulative Impacts – Severance of commuting routes or feeding areas</p>	
<p>All Elements of the Whole UWF Project</p>	
<p><u>Cumulative Impact Magnitude:</u></p> <p>Some short sections of hedgerow comprising 65m in total will be permanently removed for the UWF Grid Connection element of the Whole UWF Project.</p> <p>Approximately 710m of field boundary will be temporarily removed during construction for periods of up to six months. 20m of hedgerow removal will overlap (4 No.) for both the UWF Grid Connection and the UWF Related Works. Bat crossing structures will be installed at locations proximal to identified bat roosts or areas of high foraging activity, which will ensure that linear connectivity is maintained during this period. When construction is completed, all of these hedgerows will be reinstated to at least their former (or better) condition using semi-mature plants. The provision of these structures will avoid sequential effects on foraging bats in instances where hedgerow severance locations occur within the zone of effect of multiple project elements.</p> <p>In addition, several elements of the Project will involve hedgerow planting, as follows: the Upperchurch Hen Harrier Scheme will incorporate 2.8 km of new hedgerows, and additional hedgerows will be planted as part of the UWF Grid Connection (700m of new hedgerow), UWF Related Works (370m of new hedgerow) and Upperchurch Windfarm (360m as mitigation for loss of suitable hedgerows).</p>	
<p>Significance of the Cumulative Impact: Not Significant</p>	
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Only a small extent of hedgerow will be permanently lost. Additional hedgerow planting will more than mitigate for its loss; • All temporarily-removed field boundaries will be reinstated to at least their former (or better) condition in the medium term, as outlined in Chapter 5 Description of the Development; • The severance of most commuting routes / feeding areas will be short term in duration, reversible and offset by the planting of semi-mature trees and shrubs on a like-for-like basis; and • The continuity of important bat commuting routes will be maintained using specially-designed bat crossing structures; 	

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

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8.8.4.3 Impact Evaluation Table: Disturbance or Displacement due to Lighting

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Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Artificial lighting

Cumulative Impact Source: Artificial lighting

Impact Pathway: Visibility

Impact Description: Bats are nocturnal animals, and typically avoid any source of natural or artificial light. Lighting in the vicinity of bat roosts can cause roost abandonment, reduction in numbers of individuals, and reductions in juvenile growth rates. In addition, lighting near hedgerows and other semi-natural habitats can form barriers to the movement of commuting bats, and displace bats from feeding areas.

All construction work will take place during daylight hours as part of Project Design, so it will not be necessary to use artificial lighting at construction works areas. However, lighting will be required at temporary construction compounds for security reasons. A series of bat protection measures have been incorporated into the Project Design in order to minimise the effects of lighting on bats. This will include the fitting of cowls (specifications in line with Best Practice) to all lights in order to minimise light spill, and the use of motion and time sensors to minimise the amount of time the lights are operational. Lights will not be left on overnight.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Disturbance or Displacement due to Lighting

Element 2: UWF Related Works

Impact Magnitude:

No additional compounds required for the UWF Related Works. The already consented Site Compound No.1 at the Upperchurch Windfarm site will be used by construction personnel working on the UWF Related Works.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The use of cowling will prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition.
- Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

3 No. Temporary compounds will be used for up to one year, and each location will be fitted with lights. The spatial extent of any disturbance or displacement effects will be small, due to the use of cowls: it would be directed towards the key areas required for security, and may illuminate an area of 10 - 20m from the light source. Lights will not be directed towards any bat roosts or key commuting routes / feeding areas. As lighting will be fitted with motion and time sensors, all lighting will be of momentary duration, typically only for approx. one minute for each time that the sensor is triggered.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The use of cowling will prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition.

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<ul style="list-style-type: none"> Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration.
<p>Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.8.2.2.1.</p>
<p>Element 4: Upperchurch Windfarm</p>
<p><u>Impact Magnitude:</u> All lighting within compounds will be cowled towards the centre of the compound.</p>
<p><u>Significance of the Impact:</u> Imperceptible</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The use of cowling will prevent light spillage so there will be no change to their baseline condition. Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration.
<p>Element 5: UWF Other Activities</p>
<p><u>Impact Magnitude:</u> No artificial lighting is proposed for this element of the project.</p>
<p><u>Significance of the Impact:</u> Neutral impact</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> No artificial lighting will be required, so there will be no change to the baseline conditions
<p>Evaluation of Cumulative Impacts – Disturbance or Displacement due to Lighting</p>
<p>All Elements of the Whole UWF Project</p>
<p><u>Cumulative Impact Magnitude:</u> As noted above, some restrictions on lighting have been incorporated into the Project design in order to minimise the effects on bats. This will include the fitting of cowls to all lights in order to minimise light spill, and the use of motion and time sensors to minimise the amount of time the lights are operational. Lights will not be left on overnight. In addition, lighting may only be required for a maximum of one year in any location, and the spatial extent is expected to be of no more than 20m from the light source. Although there are some bat roosts and key commuting routes / feeding areas in the vicinity of the UWF Related Works, consented Upperchurch Windfarm and the UWF Grid Connection, the proposed project design measures will prevent the illumination of any such features, and will ensure that lights will only be active on a temporary basis. This will also prevent any sequential effects on roosting or foraging bats from multiple aspects of the Whole Project.</p>
<p>Significance of the Cumulative Impact: Imperceptible</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> The use of cowling will prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition. Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration

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Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

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8.8.4.4 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-74 below.

Table 8-74: Description and Rationale for Excluded Impacts to Bats

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Forestry Felling	1,2, 4, 5	Landcover	Mortality through roost destruction	In relation to 1, 2, 4: No likely effect, as homogenous conifer plantations have extremely limited potential or suitability for roosting bats. In relation to UWF Other Activities: No likely effect due to the absence of possible sources of hedgerow severance in respect of UWF Other Activities, no bat roosts were present and the trees at hedgerow trimming locations as part of Haul Route Activities are not suitable for roosting bats. No trimming is required for Overhead Line Activities.
Construction Works	1,2, 4,5	Bridge Upgrade Works	Mortality through roost destruction	No potential for effects, as no works are required to upgrade the integrity of structures along haulage routes. These bridges are already used by large vehicles on a regular basis, so the passage of construction vehicles would not represent a change from the baseline condition
Hedgerow Trimming	1,2, 4,5	Landcover	Inadvertent mortality through roost destruction	No potential for effects, as trimming involves only the removal of outer edges of branches which are unsuitable for Bats
Land use Change	1,2, 4,5	Renovation/alteration of Buildings	Destruction/Disturbance of Bat Roosts in Buildings	Neutral effect, as: an unoccupied dwelling house and associated outbuildings (Roost #16) will be used as a site office for the Upperchurch Windfarm. The use of the site office for welfare facilities will be very similar to its original use as a dwelling house. There will be no renovations of the exterior or interior of the building. No permanent or fixed lighting will be installed around the exterior of the property, and shutters or blinds will be used to prevent light spill from windows on the northern side which faces towards identified roosts. The outbuildings will not be used for storage. Given the above, there is a low probability that the change of use would have direct impacts on any bat roosts, and the magnitude and spatial extent of impacts is considered to be negligible, because: (i) there will be no destruction or disturbance of any of the bat roosts in these structures; and (ii) there will be no new artificial lighting near any roost exit / entry points; therefore, there will be Neutral effects on the bat roost. There will be no renovations or alterations of any other buildings.

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Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Noise and Vibration	1,2,4,5	Air	Disturbance or Displacement of Bat Roosts due to Noise and Vibration	Neutral Effect: Bats are not thought to be particularly sensitive to noise and / or vibration; this pathway for impacts is not discussed in any British or Irish guidelines. As there will be no construction works at night, there is no risk of noise or vibration impacts on foraging or commuting bats. Although there are some bat roosts within 10m of the Project, construction works will only be in close proximity to these roosts for no more than a half a day at any location. It is predicted that construction-related vibration will be approx. 0.5 to 1 mm/s within a zone of influence of approx. 5m. This would be barely perceptible to any human residents of properties, and therefore is also considered barely perceptible to any bats occupying a roost. Therefore, the magnitude of impacts reaching any bat roosts will be imperceptible.
Operational Stage				
Hedgerow Trimming	1,2, 4,5	Landcover	Inadvertent mortality through roost destruction	No potential for effects, as trimming of hedgerows involves only the removal of outer edges of branches which are unsuitable for Bats
EMF	1,2, 4	Air	Avoidance due to increased EMF	No likely effects, as literature supports no precedent for this as a viable impact.
Artificial Lighting	1, 4	Visibility	Disturbance or Displacement due to lighting	Neutral impact, as the only locations with operational lighting (substations, wind turbines) will incorporate bat-sensitive lighting (cowled, motion sensor and timer controlled) as part of the project design.
Noise and Vibration	1,2, 4,5	Air	Disturbance or Displacement due to noise/ vibration	Neutral impact, as there will be no significant noise or vibration during the operational phase.
Above ground structures	1,2,4	Physical contact	Mortality of bats due to collision or barotrauma	No likely effect and no potential for cumulative impacts with Upperchurch Windfarm. Upperchurch Windfarm: As per the 2014 ABP Inspectors Report no significant impact to bats is expected to occur. There would be no potential for cumulative impacts with other project elements, as follows: UWF Grid Connection: no likely impact with the Mountphilips Substation, all other parts are either underground or at ground level (i.e. new roads), UWF Related Works: no likely impact with the Telecom Relay Pole, due to the immobility of this structure.
Decommissioning Stage				
Hedgerow Trimming	1,2, 4,5	Landcover	Inadvertent mortality through roost destruction	No potential for effects as the UWF Grid Connection will not be decommissioned. In relation to the UWF Related Works or Upperchurch Windfarm trimming activities, if

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Sensitive Aspect	Bats		Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
	Artificial Lighting	1,2, 4	Air	Disturbance or Displacement due to lighting		No potential for effects, the UWF Grid Connection will not be decommissioned. In relation to the UWF Related Works or Upperchurch Windfarm, no potential for effects as there will be no requirement for lighting during decommissioning works	
	Noise and Vibration	1,2, 4	Air	Indirect Disturbance from Noise and Vibration		No potential for effects, the UWF Grid Connection will not be decommissioned. In relation to the UWF Related Works or Upperchurch Windfarm, no likely effects due to the small scale of decommissioning works or activities, with all work taking place from roads and turbine hardstands, so no potential to generate significant noise or vibration.	

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8.8.5 Mitigation Measures for Impacts to Bats

Mitigation measures were incorporated into the UWF Related Works project design including the Project Design Measures. No additional mitigation measures are required as **no significant adverse impacts** are concluded by the topic authors as likely to occur to Bats as a consequence of the UWF Related Works.

8.8.6 Evaluation of Residual Impacts to Bats

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for Bats above (Section 8.8.4) - **no significant adverse impacts**.

8.8.7 Application of Best Practice and the EMP for Bats

Best Practice Measures (BPM), although not part of the Project Design for the UWF Related Works, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Bats**, by the authors of this topic chapter, using industry best practice:

RW-BPM-13	Minimising the effects of lighting on bats
RW-BPM-14	Protection of potential tree and bridge bat roosts
RW-BPM-15	Bats – Post Construction Monitoring

These Best Practice Measures are included in full at the end of this topic chapter, and also form part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

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8.8.8 Summary of Impacts to Bats

A summary of the Impact to Bats is presented in Table 8-75.

Table 8-75: Summary of the impacts to Bats

Impact to Bats:	Destruction or disturbance of bat roosts in trees	Severance of commuting routes or feeding areas	Disturbance or Displacement due to Lighting
<i>Evaluation Impact Table</i>	<i>Section 8.8.4.1</i>	<i>Section 8.8.4.2</i>	<i>Section 8.8.4.3</i>
Project Life-Cycle Stage	Construction	Construction/early Operation	Construction
<u>UWF Related Works</u>	Neutral	Imperceptible	Imperceptible
Element 1: UWF Grid Connection	Imperceptible	Imperceptible	Imperceptible
Element 3: UWF Replacement Forestry	No Potential for Impact Evaluated as Excluded – see Section 8.8.2.2.1		
Element 4: Upperchurch Windfarm	Neutral	Not Significant	Imperceptible
Element 5: UWF Other Activities	Neutral	Imperceptible	Neutral
<u>Cumulative Impact:</u>			
All Elements of the Whole UWF Project	No Cumulative Impact	Not Significant	Imperceptible

The greyed out boxes in the summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to present the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

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8.9 Sensitive Aspect No.8: Non-Volant Mammals

This Section provides a description and evaluation of the Sensitive Aspect - Non-Volant Mammals.

8.9.1 BASELINE CHARACTERISTICS of Non-Volant Mammals

8.9.1.1 STUDY AREA for Non-Volant Mammals

The study area for Non-Volant Mammals in relation to the UWF Related Works is described in Table 8-76 and illustrated on **Figure RW 8.9: Non-Volant Mammals within the UWF Related Works Study Area** (Volume C3 EIAR Figures).

Table 8-76: UWF Related Works Study Area for Non-Volant Mammals

Study Area for Non-Volant Mammals	Justification for the Study Area Extents
Otter: Watercourse crossing locations plus 300m in either direction Badger and Other Mammals: construction works area plus 50m in all directions	Professional Judgement and as pertinent: Otters: Best Practice guidelines published by the Highways Agency (1999) Badgers: Best Practice guidelines published by the NRA (2005) Other mammal species professional judgement and as per Best Practice (CIEEM, 2016).

8.9.1.2 Baseline Context and Character of Non-Volant Mammals in the UWF Related Works Study Area

The principal habitats within the context of Non-Volant (non-flying) Mammals include open grassland, bogs, moors, heath and marsh which provides foraging habitat, and coniferous forestry, mixed woodland, hedgerows, and scrub, which provide shelter and provide locations for breeding and resting.

Survey Results

Badger: No Badger setts were recorded within the UWF Related Works study area.

Otter: No Otter evidence was recorded within the UWF Related Works study area.

Other species

Fallow Deer (found mainly in mature deciduous or mixed woodlands close to open grassland) are present throughout the receiving environment for the Whole UWF Project and are expected to occur in habitats adjacent to UWF Related Works. As Pine Marten evidence was noted from other elements of the Whole UWF Project this species is assumed to occur in suitable habitat (coniferous or mixed forestry and scrub) where it occurs. Red Fox (found in a wide range of habitats) and Irish Hare (found in bog, moor, heath and marsh in addition to mixed farmland, pastoral farmland and more marginal habitats) are present.

8.9.1.3 Importance of Non-Volant Mammals

All native mammals are protected by legislation under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000.

Otter is listed on Annex II and Annex IV of the EU Habitats Directive. This Annex II listing requires Member States to designate Special Areas of Conservation (SACs) for the protection of the species. Otter is therefore listed as a qualifying interest of the Lower River Shannon SAC and, hence, is evaluated as of International Importance.

The Eurasian Badger has been given legal protection under the Wildlife Act and is listed in Appendix III of the Bern convention as a species in need of protection. Badger is evaluated as of National Importance.

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Pine Marten is listed on Annex V of the EU Habitats Directive and is afforded legal protection under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000. Annex V species are those whose taking from the wild is restricted by European law. Pine Marten are evaluated as of County Importance.

Irish Hare is evaluated as of National Importance. Red Squirrel is evaluated as of County Importance. Fallow Deer are evaluated as of Local Importance (Higher Value). Populations present of Red Fox, Rabbit and Wood Mouse are evaluated as of Local Importance (Lower Value).

The Greater White-toothed Shrew is an Amber-listed invasive species rated as ‘medium risk’ however their impact on conservation goals remains uncertain due to lack of data (Kelly *et al.*, 2017). As an invasive species no importance evaluation is assigned to this species. As a high impact invasive species American Mink is similarly not assigned an importance evaluation.

8.9.1.4 Sensitivity of Non-Volant Mammals

All mammals are sensitive to the direct effects from disturbance/displacement from breeding and foraging ranges as a result of noise and visual intrusion. Some species show variable or flexible responses such as Otter where research from English Nature (Chanin, 2013) suggests indicate that Otters will rest under roads, in industrial buildings, close to quarries, and at other sites close to high levels of human activity. Mammals are also sensitive to habitat loss and additive mortality from inadvertent contact with operating machinery or vehicles. The National Parks & Wildlife Service’s Threat Response Plan for the Otter (NPWS, 2009²³), a review of and response to the pressures and threats to otters in Ireland, categorized three principal risks implicated in Otter declines across Europe: i) habitat destruction and degradation; ii) water pollution; and, iii) accidental death and/or persecution..

8.9.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

Available trends on general Irish mammals are limited however the most recent ‘red list’ (Marnell *et al.*, 2009) has judged most of Ireland’s terrestrial mammal species to be of ‘least concern’. Otter and Red Squirrel are considered near threatened.

Article 17 reporting suggests there appears to have been a genuine improvement in the status of Otter in Ireland with future prospects evaluated as ‘favourable’ (NPWS, 2013). The Badger population is currently stable in Ireland, estimated in Northern Ireland as 33,500 (Reid *et al.*, 2008) and in the Republic of Ireland as 84,000 (Sleeman *et al.*, 2009). The Pine Marten population is thought to be increasing, and is estimated at 3-10,000 mature individuals (O’Mahony *et al.*, 2007). Future prospects are evaluated as ‘favourable’ (NPWS, 2013).

Trends in respect of Greater White Toothed Shrew suggest the species is expanding its range by an average of 5.5 km/year (McDevitt *et al.*, 2014). American Mink distribution in Ireland is also expected to continue to increase (Roy *et al.*, 2009).

A scenario in which this proposed project does not take place would result in a continuation of current trends relating to Non-Volant Mammal species within the study area. Populations of mammals would be expected to remain as described above, i.e. favorable in the case of Otter, stable in the case of Badger etc.

8.9.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to Non-Volant Mammal species, 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.

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²³ https://www.npws.ie/sites/default/files/publications/pdf/2009_Otter_TRP.pdf

8.9.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

UWF Related Works is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Related Works is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Related Works is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.9.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Non-Volant Mammals considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at Appendices 5.3, 5.4, 5.5 and 5.6, in Volume C4 EIAR Appendices. Scoping of these Other Elements is presented in Section 8.9.2.2.1 below.

The evaluation of cumulative impacts to Non-Volant Mammals also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Non-Volant Mammals with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in Appendix 2.3: Scoping of Other Projects or Activities (Section A2.3 .1 and Section A2.3. 8).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Related Works or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to Non-Volant Mammals.

8.9.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Related Works Study Area along with the study areas for Other Elements which are described in Table 8-77.

Table 8-77: Cumulative Evaluation Study Area for Non-Volant Mammals

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Otter: Watercourse crossing locations plus 300m in either direction Badger and Other : construction works area, afforestation lands, activity locations plus 50m in all directions	Professional Judgement and as pertinent:
Element 3: UWF Replacement Forestry		Otters: Best Practice guidelines published by the Highways Agency (1999)
Element 4: Upperchurch Windfarm (UWF)		Badgers:Best Practice guidelines published by the NRA (2005)
Element 5: UWF Other Activities		Other mammal species professional judgement and as per Best Practice (CIEEM, 2016).
Other Projects or Activities:	Not Relevant – No Other Projects or Activities were scoped in for evaluation of cumulative effects	

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8.9.2.2.1 Potential for Impacts to Non-Volant Mammals

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Non-Volant Mammals. The results of this evaluation are included in Table 8-78.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on **Figure CE 8.9: Non-Volant Mammals within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-78: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	Included for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	Included for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	Included for the evaluation of cumulative effects
Element 5: UWF Other Activities	Included for the evaluation of cumulative effects

8.9.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.9.2.3.1 Element 1: UWF Grid Connection

Baseline surveys of the UWF Grid Connection recorded Badger (*Meles meles*), Otter (*Lutra lutra*), Fallow Deer (*Dama dama*), Red Fox (*Vulpes vulpes*), Irish Hare (*Lepus timidus hibernicus*), Rabbit (*Oryctolagus cuniculus*), Pine Marten (*Martes martes*), American Mink (*Neovison vison*), Squirrel (*Sciurus spp.*), Wood Mouse (*Apodemus sylvatica*) and Greater White-toothed Shrew (*Crocidura russula*) using the study area.

The most frequently identified species was Badger, with field evidence in the form of tracks or prints, latrines and snuffle holes (evidence of feeding). Deer, presumably Fallow Deer, were the next most frequently recorded, followed by Red Fox.

No protected sites in respect of mammals exist within the study area.

Survey Results

Badger

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. Badger densities are lower in upland and mountainous areas, areas of bog, and marginal pasturelands along the Atlantic fringe. Several setts will be present within a badger group’s territory but the focus of the badger group is known as the ‘main’ sett. The main sett is situated roughly central within the group territory and is usually occupied throughout the year and used as the principal breeding sett. Annex setts or outlier setts are smaller and may only be used intermittently or seasonally. An active main sett is characterised by considerable signs of activity, such as copious bedding, nearby latrine (defecation) sites, and well-used paths. Studies in several Irish counties have shown that territory size can vary from as little as 15ha to almost 300ha, with a mean of about 80ha.

In respect of the UWF Grid Connection, seven Badger setts were identified at varying distance of 28m to 290m from the construction area boundaries. Only a single (main) sett is within 50m of construction works,

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with the remainder at 60m (main), 64m (annex), 130m (annex- confirmed as active), 240m (annex), 237m (annex) and 290m (annex) as described. Setts are located in forestry (n=2), Riparian woodland (n=2), and hedgerows (n=3).

Overall, a total of 83 locations of Badger evidence in the form of tracks, prints and latrines were identified. The highest densities of recorded evidence were in closer proximity to setts and broadly correlate to within 500m. No animals were observed however this is typical in respect of a nocturnal species.

Further detail on Badger survey results, including the distribution of recorded evidence, is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.9\)](#). [Appendix 8-1](#) can be found in [Volume C4 EIAR Appendices](#).

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 may have to range more than 20km to find sufficient food. Territorial marking typically occurs by means of sprainting or anal secretions. These marks are left mostly at features such as bridge footings, boulders, grass tussocks and stream confluences. Within their territories an individual otter may utilise a number of resting sites within its territory; these can be hidden refuges above ground (couches), or under-ground chambers (holts). Holts tend to be natural crevices, associated with the roots of trees growing along river and lake banks. These natural recesses provide the otter with a holt that has multiple entrances from which the otter can escape if disturbed. Couches occur frequently in dense vegetation and may be associated with frequently used runs and slides into the water. The rearing of cubs occurs within ‘natal holts’, which are not marked by spraint. Although capable of breeding at any time of the year, a peak in breeding occurs during the summer and early autumn.

Otters that live in rivers and lakes tend to be completely nocturnal, described as being crepuscular – activity peaks at dusk and dawn. Otters are principally piscivorous (fish eating), relying predominantly on salmonids (salmon and trout), but also eel and small fish species such as stickleback. However, otters are not limited to fish and feed opportunistically on a range of prey when available: frogs are frequently eaten by otters, and the remains of invertebrates (crayfish), birds and small mammals have also been found in spraints.

There were seven records of Otter within the UWF Grid Connection study area, consisting of paths, slides, tracks and spraints. Evidence was distributed across the Reardnogy Beg River (a tributary of the Clare River, n=3), the Bilboa River (n=2), the Mulkear River (n=1) and the Munnia Stream (a tributary of the Newport River, n=1). Evidence suggestive of either Otter or Mink was recorded at one of the described locations on the Reardnogy Beg and is assumed to be Otter on a precautionary basis. No active breeding or resting sites (Holts or Couches) were identified. No animals were observed however this is typical in respect of a species where most activity takes place at night. The location of otter records within the study area are presented on [Figure GC 8.9: Non-Volant Mammals within the UWF Grid Connection Study Area](#). [Figure GC 8.9](#) is part of the EIA Report for the UWF Grid Connection, and is included in [Volume F: Reference Documents](#) with this planning application.

Further detail on Otter survey results, including all recorded evidence, is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.9\)](#).

Other species

Fallow Deer (found mainly in mature deciduous or mixed woodlands close to open grassland) are present throughout the receiving environment and evidence was recorded along the UWF Grid Connection corridor. There were four records of Pine Marten evidence noted and this species is assumed to occur in suitable

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habitat (coniferous or mixed forestry and scrub). Red Fox (found in a wide range of habitats) and Irish Hare (found in bog, moor, heath and marsh in addition to mixed farmland, pastoral farmland and more marginal habitats) are present throughout the UWF Grid Connection Study Area. Presumed evidence of Red Squirrel (mainly found in coniferous or mixed woodland) was observed at 2 no. locations along the UWF Grid Connection corridor. There was no evidence of Irish Stoat in any surveys to inform this appraisal.

The location of recorded evidence of Fallow Deer, Pine Martin, Red Squirrel, Irish Hare and Field Mouse, is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.9\)](#).

The carcass of the invasive species, Greater White-toothed Shrew (*Crocidura russula*) was recovered within the 50m study area of the UWF Grid Connection next to a Fox scat. American Mink is also present within the study area (Mink scat recorded at least 2 locations).

8.9.2.3.2 Element 3: UWF Replacement Forestry

Survey Results

Badger: No Badger setts were recorded within the UWF Replacement Forestry study area. A single print was recorded at ITM 594687 661526 within the study area, along a muddy farm track.

Otter: No Otter evidence was recorded within the UWF Replacement Forestry study area.

Other Species: Fallow Deer (found mainly in mature deciduous or mixed woodlands close to open grassland) are present throughout the receiving environment for the Whole UWF Project including UWF Replacement Forestry. Pine Marten was not recorded from the study area. Red Fox (found in a wide range of habitats) is present and was recorded within the study area. Irish Hare (found in bog, moor, heath and marsh in addition to mixed farmland, pastoral farmland and more marginal habitats) was not recorded.

8.9.2.3.3 Element 4: Upperchurch Windfarm

Survey Results

Badger: As per the 2013 RFI, within the Upperchurch Windfarm a disused single entrance sett has been described approximately 250m southwest of T7 and a single disused entrance badger sett was recorded along a field boundary 150m west of T4. Evidence of Badger foraging was recorded in prior surveys for the 2013 RFI.

Otter: As per the 2013 EIS, no Otter was recorded during surveys at the Upperchurch Windfarm site.

Other Species: Fallow Deer (found mainly in mature deciduous or mixed woodlands close to open grassland) evidence was recorded previously within the Upperchurch Windfarm (as per the 2013 RFI). There were no records of pine marten (*Martes martes*), hedgehog (*Erinaceus europaeus*) and Irish stoat (*Mustela erminea subsp. hibernica*) during surveying. The habitats within the study area offer potential habitat for the species. Irish Hare does occur and was observed during RFI studies. Red Fox and Pygmy shrew were recorded as present

8.9.2.3.4 Element 5: UWF Other Activities

Haul Route Activity Locations:

No mammal evidence was recorded. This is as expected given the locations of activities generally occur in immediate proximity to or overlap public roads.

Overhead Line Activity Locations:

Incidental records of mammal signs and individuals were made during surveys (January 2018) within the Overhead Line Activities study area, findings of note are summarised below.

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An old Otter Holt was recorded within the bank of a drainage ditch in the townland of Killonan. An otter pathway located 80 metres west of AM 3 was recorded between the Groody River and an adjoining stream, also in the townland of Killonan.

No active Badger setts were recorded within close proximity to the poles. An old badger sett was recorded within the hedgerow 180 metres north east AM 78, in the Mountphilips townland.

Additional mammals noted included Fox, Fallow Deer, and Rabbit. Mammal pathways were recorded frequently within hedgerows and through treelines. These could be used by a number of mammal species.

8.9.2.3.5 Other Projects or Activities:

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.9.2.1.

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8.9.3 PROJECT DESIGN MEASURES for Non-Volant Mammals

At the conception of the UWF Related Works, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-79 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Non-Volant Mammals**.

Table 8-79: UWF Related Works Project Design Measures relevant to Non-Volant Mammals

PD ID	Project Design Environmental Protection Measure (PD)
PD01	All construction works will be carried out during daylight hours.
PD29	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
PD30	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
PD31	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken <u>while cubs are present in the holt</u> and NPWS will be notified immediately
PD32	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
PD33	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as ‘out of bounds’. Fencing will be in accordance with Clause 303 of the NRA’s Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.
PD34	Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary of identified badger setts to determine the current status of known badger setts (i.e. active or inactive) and to determine if any new setts have been established in the intervening period following initial pre-planning surveys and the commencement of construction activity. These confirmatory badger surveys will be undertaken no more than 12 months in advance of proposed construction activities, during the period November and April when vegetation cover is reduced. NWPS will be notified immediately if the sett previously identified is confirmed as active or if a further active sett is located within 50 meters of the footprint of the development. If sett exclusion is required, this will be undertaken by an experienced ecologist under the necessary license and following best practice guidance (NRA, 2005).
PD35	No construction works will be carried within 50m of an active sett during the main breeding season (December 1 st to June 30 th).
PD36	Construction activity in the environs of a known active badger sett outside of the breeding period will follow NRA (2005) guidelines, i.e. no heavy machinery will be used within 30m of badger setts (unless carried out under license); lighter machinery (generally wheeled vehicles) will not be used within 20m

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	of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.
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Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Replacement Forestry and UWF Other Activities and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4: EIA Appendices](#).

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8.9.4 EVALUATION OF IMPACTS to Non-Volant Mammals

In this Section, the likely direct and indirect effects of the UWF Related Works are identified and evaluated. Then the likely cumulative effects of the UWF Related Works together with the Other Elements of the Whole UWF Project are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Non-Volant Mammals.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-80: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Badger: Habitat Loss (construction stage)	Otter – Loss of Habitat, (construction stage)
Badger: Disturbance/Displacement (construction stage)	Secondary Mortality of Otter, (construction stage)
Otter: Disturbance/Displacement (construction stage)	Secondary Mortality of Badger, (construction stage)
Irish Hare, Pine Marten, Red Squirrel and -Fallow Deer: Habitat Loss (construction stage)	Secondary Mortality of Pine Marten, Red Squirrel, Fallow Deer, Irish Hare, (construction stage)
Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance/Displacement (construction stage)	Introduction or spread of invasive species- White Toothed Shrew, (construction stage)
	Introduction or spread of invasive species- White Toothed Shrew, (operational stage)
	Disturbance/Displacement of General Non-Volant Mammals, (operational stage)
	Secondary Mortality of General Non-Volant Mammals, (operational stage)
	Introduction or spread of invasive species- White Toothed Shrew, (operational stage)
	Disturbance/Displacement of General Non-Volant Mammals, (operational stage)
	Secondary Mortality of General Non-Volant Mammals, (operational stage)

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The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.9.4.1 to 8.9.4.5.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.9.4.6.

8.9.4.1 Impact Evaluation Table: Badger - Habitat Loss

Impact Description	
Project Life Cycle Stage:	Construction stage
<u>Impact Source:</u> construction of new access roads and hardstanding areas	
<u>Cumulative Impact Source:</u> Excavations, construction of new access roads, compounds and hardstanding areas, afforestation	
<u>Impact Pathway:</u> Land cover	
<p><u>Impact Description:</u> Badger is evaluated as a High Sensitivity receptor. Construction works will cause a permanent loss of some suitable foraging or breeding habitat in the form of grassland, woodland and/or hedgerows under the footprint of permanent structures such as new access roads, compounds, and hardstanding areas. Habitat loss is avoided by the use of concealed geocell roadways, replanted with grass or heather, within the SPA (UWF Grid Connection). Some temporary loss will occur during construction works; and as reinstatement will occur immediately following the completion of construction works in an area – effects will be Neutral.</p> <p>Loss of suitable foraging habitat, may affect body condition, survival rate and/or breeding capacity dependant on the percentage of loss within a groups territory (>25% is considered as significant²⁴) and the availability of other food resources. Badgers will benefit positively from varying degrees of hedgerow enhancement, the creation of new hedgerows and also the management of lands as part of the Upperchurch Hen Harrier Scheme.</p> <p><u>Impact Quality:</u> Negative, Neutral</p>	
Evaluation of the Subject Development Impact – Badger: Habitat Loss	
Element 2: UWF Related Works	
<u>Impact Magnitude:</u> 0.5Ha of suitable foraging habitat as Spoil and Bare Ground, recolonising bare ground, improved agricultural grassland, wet grassland, Conifer plantation and Scrub will be permanently lost. 170m of hedgerow will also be lost, comprising primarily earthen banks.	
Significance of the Impact: Neutral effect	
<u>Rationale for Impact Evaluation:</u>	
<ul style="list-style-type: none"> • The extent of land use change, within the context (less than 1%) of an average territory size of 80Ha, and; • No active Badger setts were recorded in baseline studies of the UWF Related Works locations, and; • No contrast with baseline conditions is expected. 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<u>Impact Magnitude:</u>	
There will be a total permanent land use change within 500m of all 7 identified Badger Setts of 0.17Ha comprising Improved agricultural grassland (0.14Ha), Wet Grassland (0.01Ha), Hedgerows (.003Ha) and Treelines (.0003Ha), (based on an average 80Ha territory per sett). This represents 0.05% of available habitat (340Ha in total).	
<u>Significance of the Impact:</u> Not Significant	
<u>Rationale for Impact Evaluation:</u>	
<ul style="list-style-type: none"> • The extent of land use change, within the context (less than 1%) of an average territory size of 80Ha, and; 	

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²⁴ NRA. *Guidelines for the treatment of Badgers prior to the construction of National Road Schemes*. <http://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Badgers-prior-to-the-Construction-of-a-National-Road-Scheme.pdf>

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- No significant contrast with baseline conditions is expected, notwithstanding;
- The duration of permanent land use change, and;
- Low reversibility

Element 3: UWF Replacement Forestry

Impact Magnitude:
 4Ha of suitable foraging habitat for Badger in the form of improved agricultural grassland will undergo a permanent land use change to a mixed species, native woodland, which will comprise tall trees and understory shrubs, along with wide ride lines, and a mix of tall grasses and scrub land cover maintained during the growth stage. The existing riparian habitat will be enhanced through the planting of Hazel, alder and willow species, and protected through the placement of fencing. The area to be created represents 5% of an average territory size (80Ha).

Significance of the Impact: Slight (Positive)

Rationale for Impact Evaluation:

- No setts were identified within the study area for UWF Replacement Forestry, but prints indicating a foraging range were noted, and;
- The extent of habitat change which is;
- A positive contrast with baseline conditions;
- With permanent duration, and;
- Low reversibility.

Element 4: Upperchurch Windfarm

Impact Magnitude:
 As per the 2013 EIS: Some permanent, irreversible loss of foraging habitat within the improved agricultural grassland in the south-eastern section of the proposed site where a badger trail and droppings were observed.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- "Arising from my assessment above and based on the information available therefore I Conclude that the development will not give rise to Significant adverse effects on the environment and that ongoing impacts are limited in terms of scale and significance and can be remediated."

Element 5: UWF Other Activities

Impact Magnitude: No permanent land take of Badger foraging or breeding habitat.

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- Badgers are not likely to forage extensively or rely on roadside habitats, and;
- No permanent land use change will occur, and;
- The brief duration of any temporary effects, with;
- No significant contrast with baseline conditions expected, and;
- The reversibility of temporary habitat loss with reinstatement of roadside verges following delivery and;
- Positive effects will accrue from land management as part of the Upperchurch Hen Harrier Scheme, and;
- Overhead Line Activities will not require land take of suitable Badger habitat nor contrast with the existing environment.

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Evaluation of Cumulative Impacts – Badger: Habitat Loss	
All Elements of the Whole UWF Project	
<p><u>Cumulative Impact Magnitude:</u> Instances of foraging and or breeding habitat loss will occur across the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm; however as setts have only be identified proximal to the UWF Grid Connection study area, in combination effects are limited to this element.</p> <p>Other temporary loss will occur, and UWF Replacement Forestry will result in a permanent land cover change, to habitat also suitable for Badger resulting in a slight positive change to higher quality breeding and foraging habitat. Management activities as part of the Upperchurch Hen Harrier scheme, whilst targeted at Hen Harrier will also benefit and possibly attract Badgers to the area.</p>	
Significance of the Cumulative Impact: Not Significant	
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of total land use change within identified territories, and; • No significant contrast with baseline conditions is expected, and; • The long-term duration of permanent land use change, with; • Low reversibility, is; • Offset by management activities as described 	

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Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.9.4.2 Impact Evaluation Table: Badger - Disturbance/Displacement

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Construction Noise and Visual Intrusion

Cumulative Impact Source: Noise and Visual Intrusion

Impact Pathway: Air and visibility

Impact Description: Badgers are high sensitivity receptors. Disturbance to or Displacement of Badgers may occur where construction works are in close proximity to occupied Badger Setts. Serious disturbance may cause an avoidance response and result in the mortality of cubs, which are typically underground during the months of January through to February prior to emergence in April.

Works will be undertaken during daylight hours only as part of Project Design, which significantly reduces effects. No construction works will take place within 50m of an active badger sett in the main breeding season (December to June inclusive), as part of Project Design.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Badger: Disturbance/Displacement

Element 2: UWF Related Works

Impact Magnitude: None

Significance of the Impact: No potential for impact

Rationale for Impact Evaluation:
 • No active Badger setts were identified in baseline studies of UWF Related Works.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Of the 7 setts identified, one main sett is located 31m from the Construction area boundary. Disturbance is possible at this location, from both cable trenching and excavation, and passing traffic along a temporary access road. Remaining setts will remain undisturbed due to distance from works. Additional Badger setts present within the vicinity are outside the zone of effect for disturbance (range 130m-240m) and therefore sequential effects will not occur i.e. multiple instances of repeated disturbance on the same individuals. The magnitudes of any effects are evaluated as high.

Significance of the Impact: Moderate

Rationale for Impact Evaluation:

- The proximity of a main sett to a source of disturbance i.e. cable trenching and passing traffic, and;
- No construction works will take place within 50m of an active badger sett in the main breeding season (December to June inclusive) as part of project design.
- Duration will be short term with relevant sections likely to be completed over a period of weeks, and; Completed during daylight hours.

Element 3: UWF Replacement Forestry

Impact Magnitude: None

Significance of the Impact: No potential for impacts

<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No setts were identified within the study area, and • All planting will be done by hand, undertaken during daylight hours, and; • Of temporary duration; • No contrast to baseline conditions is expected. 	Non-Volant Mammals
<p>Element 4: Upperchurch Windfarm</p>	
<p><u>Impact Magnitude:</u> 'Some noise and anthropogenic disturbance during the construction phase of the development'.</p>	
<p><u>Significance of the Impact:</u> Not significant</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Duration temporary. • Impact from disturbance is expected to be mostly reversible post construction. • As per the UWF EIS 2013- It is probable that a negative impact to badger will not be significant. 	
<p>Element 5: UWF Other Activities</p>	
<p><u>Impact Magnitude:</u> Negligible</p>	
<p><u>Significance of the Impact:</u> Neutral effect</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No Badger setts were identified at Haul Route Activity locations or within 50m of same. • Overhead Line Activities at any one location will be brief-momentary in duration, conducted during daylight hours only, with no excavations and the use only of light vehicles. • Activities pertaining to the Upperchurch Hen Harrier Scheme management prescriptions will be similar to existing agricultural activities. 	
<p>Evaluation of Cumulative Impacts – Badger: Disturbance/Displacement</p>	
<p>All Elements of the Whole UWF Project</p>	
<p><u>Cumulative Impact Magnitude:</u> The UWF Related Works or UWF Replacement Forestry will not contribute to cumulative effects as Neutral effects are expected from both of these projects. Cumulative effects of the Other Elements of the Whole UWF Project relate to the UWF Grid Connection and the consented Upperchurch Windfarm, which are expected to have Moderate and Not Significant effects, respectively.</p>	
<p>Significance of the Cumulative Impact: Moderate</p>	
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The proximity of an active badger main sett and badger records in the study areas; • Project design measures to avoid/reduce effects on Badger, with • Duration will be short term with relevant sections likely to be completed over a period of weeks at locations in proximity to setts along the UWF Grid Connection, and; • Works completed during daylight hours only. 	

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.9.4.3 Impact Evaluation Table: Otter - Disturbance/Displacement

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Construction Noise and Visual Intrusion
Cumulative Impact Source: Noise and Visual Intrusion
Impact Pathway: Air and visibility

Impact Description: Otter are rated as a very high sensitivity receptor (based on International importance ratings) and do not tolerate disturbance at or near holts (breeding dens) that are in active use (breeding may occur at any time of the year, but most likely during the period). As no active holts were located within 150m (upstream or downstream) of works locations (i.e. watercourse crossings) then effects are reduced to disturbance/displacement of foraging or resting animals, primarily within aquatic habitats but also within adjacent riparian corridors. This could include the disturbance of animals at resting places (couches).

These effects are reduced by an adherence to completing works during daylight hours only as part of Project Design. However watercourses are present which form part of or are hydrologically connected to European Sites (cSAC's) which include Otter as a Qualifying Interest. Significant effects on Otter from displacement resulting from noise or visual intrusion may therefore affect in turn the integrity of these designated site(s).

Impact Quality: Negative

Evaluation of the Subject Development Impact – Otter: Disturbance/Displacement

Element 2: UWF Related Works

Impact Magnitude: Negligible

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- Application of project design measures for the protection of Otter,
- No active holts were identified overlapping the construction area boundaries or within 150m, and;
- Works will take place during daylight hours only, and;
- Be of brief-temporary duration.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:
 5 No. watercourse crossings have been identified as potential sources of disturbance to Otter. A number of sensitive locations, specifically where recorded Otter evidence occurs close to drilling operations at the Newport (Mulkear) (W10) and Bilboa Rivers (57), cable trenching works at W7 (the Munnia, a tributary of the Newport). In addition, trenching works within 2 existing structures, and the movement of construction traffic over these existing structures along the Reardnogy Beg (at Watercourse Crossings W43, W44) where otter evidence was identified. The magnitude of source disturbance/stimulus from drilling operations is considered the greater effect in terms of types of watercourse crossings. Although considered unlikely (due to the phased approach being undertaken as part of Project Design for Class 1 and 2 watercourses) the potential exists for sequential effects should animals be displaced and consequently encounter a second source stimulus on a Class 3 or 4 watercourse.

Significance of the Impact: Slight (residual impact – see UWF Grid Connection EIA Report)

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<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The implementation of Additional Mitigation Measure AMM-01:Disturbance to or displacement of Otter – see UWF Grid Connection EIA Report • The very high sensitivity <u>rating</u> of the species, and; • Recorded Otter evidence in close proximity to the identified crossings, notwithstanding; • Works will take place during daylight hours, and; • The brief-temporary duration of disturbance events, with • Project design measures to avoid/reduce effects also in place , however; • Effects may not be reversible. 	<p>Non-Volant Mammals</p>
<p>Element 3: UWF Replacement Forestry</p>	
<p><u>Impact Magnitude:</u> Negligible</p>	<p>Sensitive Aspect</p>
<p><u>Significance of the Impact:</u> Neutral effect</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No active holts or resting places were recorded in baseline studies, and; • All planting will be done by hand, and; • Undertaken during daylight hours, and • Of temporary duration; • No significant contrast to baseline conditions is expected. • Any effect will be reversible, given the low magnitude of source disturbance. 	
<p>Element 4: Upperchurch Windfarm</p>	
<p><u>Impact Magnitude:</u> None</p>	
<p><u>Significance of the Impact:</u> Neutral effects</p>	<p>Biodiversity</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No Otter were recorded and hence disturbance effects were not scoped in for evaluation. 	
<p>Element 5: UWF Other Activities</p>	
<p><u>Impact Magnitude:</u> Negligible</p>	
<p><u>Significance of the Impact:</u> Neutral effect</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No otter holts or resting places were recorded at Haul Route Activity locations, and; • Locations of Overhead Line Activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours; • The offsetting effects of long term management activities for the Upperchurch Hen Harrier Scheme which will promote and enhance existing Otter habitat – including the enhancement of riparian corridors. • The low reversibility of the above described management. 	<p>Topic</p>

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Evaluation of Cumulative Impacts – Otter: Disturbance/Displacement	
All Elements of the Whole UWF Project	
<p><u>Cumulative Impact Magnitude:</u> There is no likelihood of additive cumulative effects to individual Otters from both the UWF Related Works and the UWF Grid Connection due to the separation distance between the 5 No. UWF Grid Connection watercourse crossing points and the UWF Related Works crossing points.</p> <p>There is no potential for cumulative additive effects to Otters from both the UWF Related Works and the Upperchurch Windfarm due to the absence of Otter recorded at the watercourses within these sites. There is no potential for cumulative effects of the UWF Replacement Forestry with the Other Elements due to the Neutral effect of UWF Replacement Forestry.</p> <p>The in combination effect of the whole project, where considered in its entirety is in the order of Project Element 1 i.e. the Grid Connection.</p>	
Significance of the Cumulative Impact: Slight	
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Notwithstanding the separation distances between the 5 no. watercourse crossing locations along the UWF Grid Connection and the watercourse crossing locations associated with the UWF Related Works and Other Elements, and • The absence of Otter records at the UWF Related Works, UWF Replacement Forestry and UWF study areas, and • Works will take place during daylight hours, and; • Be brief-temporary in duration; • The high sensitivity of the species .and context of crossing locations as part of Project Element 1 utilizing drilling within an SAC with Otter as a Qualifying Interest, with; • Recorded evidence of Otter in close proximity, and • Potential (albeit unlikely) for sequential effects 	

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.9.4.4 Impact Evaluation Table: Irish Hare, Pine Marten, Red Squirrel and Fallow Deer - Habitat Loss

Impact Description	
Project Life Cycle Stage:	Construction stage
<u>Impact Source:</u> groundworks and vegetation clearance, and new access roads and compound areas	
<u>Cumulative Impact Source:</u> groundworks and vegetation clearance, new access roads and hardstanding areas, afforestation	
<u>Impact Pathway:</u> Land cover	
<p><u>Impact Description:</u> Populations of Pine Marten and Red Squirrel are evaluated as of County Importance. Populations of Irish Hare are evaluated as of National Importance. Populations of Fallow Deer are evaluated as of Local Importance (Higher Value).</p> <p>Construction Works will involve groundworks and vegetation clearance which will result in the temporary and/or permanent land use change of some suitable foraging or breeding habitat - deciduous and mixed forestry/woodland/Scrub in respect of Pine Marten, Red Squirrel and Fallow Deer and open fields, grassland and upland heath and bog in respect of Irish Hare. Temporary land use change will be reinstated immediately resulting in Neutral effects. Permanent effects will be avoided by the use of concealed, geocell roads within the SPA as part of Project Design, the instatement of heather (which will also provide shelter for Hare and Deer and foraging opportunities for Pine Marten) in lieu of 1Ha of clear felled forestry at Castlewaller, the creation of new hedgerows as part of the UWF Grid Connection and UWF Related Works, the management of deciduous woodland as UWF Replacement Forestry (permanent), and management activities as part of the Upperchurch Hen Harrier Scheme which will have secondary positive effects for mammals species through the provision of enhanced shelter and foraging habitat.</p> <p><u>Impact Quality:</u> Negative and positive</p>	
Evaluation of the Subject Development Impact – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Habitat Loss	
Element 2: UWF Related Works	
<u>Impact Magnitude:</u> Permanent land use change of 0.28Ha (<1%) of available suitable foraging or breeding Pine Marten, Red Squirrel and Fallow Deer habitat (48Ha).	
Permanent land use change of 0.19ha (<1%) of available suitable foraging or breeding Irish Hare habitat (123Ha).	
Significance of the Impact: Not Significant	
<u>Rationale for Impact Evaluation:</u>	
<ul style="list-style-type: none"> • The extent of permanent land use change, evaluated as Negligible (1-5%), within the context of available habitat, and; • Comprises a very slight change from baseline conditions; notwithstanding; • The long term duration, and • Low reversibility; 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<u>Impact Magnitude:</u> Permanent land use change of 2.04Ha (1%) of available suitable foraging or breeding Pine Marten, Red Squirrel and Fallow Deer habitat (184.6Ha).	

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Permanent land use change of 2.77ha (1.4%) of available suitable foraging or breeding Irish Hare habitat (198Ha).
<u>Significance of the Impact:</u> Not Significant for Pine Marten, Red Squirrel and Fallow Deer, and Slight for Irish Hare
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • The extent of permanent land use change, evaluated as low (1-5%), within the context of available habitat, and; • Comprises a minor shift from baseline conditions; notwithstanding • Reinstatement measures will provide suitable habitat; • The permanent duration , and • Low reversibility.
Element 3: UWF Replacement Forestry
<u>Impact Magnitude:</u> Construction Works will include land take of some suitable foraging habitat for Irish Hare and Fallow Deer. The loss of foraging habitat is offset by the provision of further breeding and foraging habitat through replanting of deciduous woodland.
<u>Significance of the Impact:</u> Not significant
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • The extent of land use change is primarily improved agricultural grassland, and; • A slight positive contrast with baseline conditions is expected from management, • Which is of Permanent Duration and ; • Not reversible.
Element 4: Upperchurch Windfarm
<u>Impact Magnitude:</u> <p>Pine Marten: There shall be loss of potential suitable habitat, due to the loss of conifer plantation. This negative effect is irreversible.</p> <p>Irish Hare: Some loss of habitat within the footprint of the Upperchurch Windfarm.</p> <p>Red Squirrel: Not recorded, therefore Neutral effect.</p> <p>Fallow Deer: There is a high probability (>50% likelihood) that the Construction Works will include land take of some suitable habitat for Fallow Deer. The scale of habitat loss is evaluated as negligible in the context of available habitat.</p>
<u>Significance of the Impact:</u> Not Significant
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • No Pine Marten were recorded during studies to inform the baseline EIS, and; • The scale of Pine Martin habitat loss (4.35Ha) is evaluated as negligible in the context of available forestry habitat. • Fallow Deer were recorded in low numbers (n=5) during studies to inform the EIS RFI, and; • The scale of habitat loss (4.35Ha) is evaluated as negligible in the context of available forestry habitat
Element 5: UWF Other Activities
<u>Impact Magnitude:</u> Negligible
<u>Significance of the Impact:</u> Neutral effects
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • The absence of habitat loss, and; • The brief duration of any effects, and; • No significant contrast with baseline conditions is expected, and;

- The reversibility of temporary habitat loss with reinstatement of roadside verges following delivery and;
- The offsetting effects of management activities for the Upperchurch Hen Harrier Scheme which will promote and enhance existing mammalian habitat, with;
- Neutral effects likely from Overhead Line Activities as described due to the brief duration of same, and an adherence to working during daylight hours.

Evaluation of Cumulative Impacts – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Habitat Loss

All Elements of the Whole UWF Project

Cumulative Impact Magnitude:

Instances of land use change of suitable habitat for Irish Hare, Pine Marten, Red Squirrel and Fallow Deer will occur in the context of the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm. Sequential effects may occur from multiple sources of land take occurring simultaneously at different locations. Effects will be offset by the management of lands such as UWF Replacement Forestry and the Upperchurch Hen Harrier Scheme.

Significance of the Cumulative Impact: Not Significant for Pine Marten, Red Squirrel and Fallow Deer, and **Slight** for Irish Hare

Rationale for Cumulative Impact Evaluation:

- The extent of habitat loss overall (1-5%);
- Will limit effects as animals will have ample habitat to move into in respect of any permanent land use change, even in the instance of sequential land use change, and;
- No significant contrast with baseline conditions is therefore expected, and;
- The offsetting effects of management activities for the Upperchurch Hen Harrier scheme and UWF Replacement Forestry will promote and enhance existing mammalian habitat.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.9.4.5 Impact Evaluation Table: Irish Hare, Pine Marten, Red Squirrel and Fallow Deer - Disturbance /Displacement

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Construction Noise and Visual Intrusion

Cumulative Impact Source: Noise and Visual Intrusion

Impact Pathway: Air and visibility

Impact Description: Populations of Pine Marten and Red Squirrel are evaluated as of County Importance. Populations of Irish Hare are evaluated as of National Importance. Populations of Fallow Deer are evaluated as of Local Importance (Higher Value).

Disturbance or displacement effects from visual intrusion and other anthropogenic sources may have secondary effects from stress, on breeding success, foraging capacity and in a worst-case result in effective habitat loss through displacement. Responses will vary dependant on species (some have increased sensitivity inherently or at varying times of the year such as during the reproductive cycle) and existing habituation (e.g. to farming activities). Effective habitat loss is offset by the high availability of suitable habitat for all species under consideration. An adherence to working during daylight hours only also greatly reduces the likelihood of effects, with most animals expected to undergo brief-temporary effects before returning to previously occupied habitats. The probability of disturbance from visual intrusion and anthropogenic sources is evaluated as medium (5-50% likelihood) given the distribution of fauna recorded, availability of suitable habitat and existence of source stimuli from e.g. farming activities across much of the project elements under consideration.

The potential for sequential effects through multiple sources of stimulus operating concurrently does exist with multiple work crews in operation at the same time. In this instance initially displaced animals may subsequently encounter a second stimulus, leading to additive disturbance.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance /Displacement

Element 2: UWF Related Works

Impact Magnitude:

Populations of the above species in the immediate vicinity of the work locations such as cable trenching, traffic movements, cable laying, road widening, Haul Route Works, re-alignment of wind farm roads etc. will experience a temporary source of disturbance/displacement. The spatial extent of any disturbance/displacement will be limited to the immediate vicinity of the construction area boundaries. Sequential effects may occur should animals encounter multiple sources of source stimulus. Overall populations are not expected to be affected.

Significance of the Impact: Moderate

Rationale for Impact Evaluation:

- The temporary duration of works, and;
- Works will take place during daylight hours only, and;
- The expected contrast with baseline conditions from the introduction of visual and other anthropogenic sources.
-

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Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<p><u>Impact Magnitude:</u> Populations of the above species in the immediate vicinity of the work locations such as cable trenching, traffic movements, cable laying etc. will experience a temporary source of disturbance/displacement. All are expected to return with no permanent displacement considered likely. Sequential effects may occur should animals encounter multiple sources of source stimulus. Overall populations are not expected to be affected.</p>	
<p><u>Significance of the Impact:</u> Moderate</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The temporary duration of the main stimulus associated with trenching and ducting expected to last 20-24 weeks overall, and; • Works will take place during daylight hours only, and; • The expected contrast with baseline conditions from the introduction of visual and other anthropogenic sources. 	
Element 3: UWF Replacement Forestry	
<p><u>Impact Magnitude:</u> Negligible</p>	
<p><u>Significance of the Impact:</u> Neutral effect</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • All planting will be done by hand, and; • All planting will be undertaken during daylight hours, therefore; • No significant contrast to baseline conditions is expected. 	
Element 4: Upperchurch Windfarm	
<p><u>Impact Magnitude:</u> Some noise and anthropogenic disturbance during the construction phase of the development. Duration temporary. Impact from disturbance is expected to be mostly reversible post construction.</p>	
<p><u>Significance of the Impact:</u> Not Significant</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The species of terrestrial mammal including badger within the study area are not consider likely to be impacted by Upperchurch Windfarm apart from the increase in noise and activity during construction phase which would be deemed a localized and temporary impact with species expected to return soon after construction. 	
Element 5: UWF Other Activities	
<p><u>Impact Magnitude:</u> Populations of the above species in the immediate vicinity of the activities such as Haul Route Activities (hedgerow trimming) or Overhead Line Activities will experience a temporary source of disturbance/displacement. All are expected to return with no permanent displacement considered likely. Sequential effects may occur should animals encounter multiple sources of source stimulus. Overall populations are not expected to be affected.</p>	
<p><u>Significance of the Impact:</u> Moderate</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The temporary duration of works, and; • Works will take place during daylight hours only, and; 	

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Non-Volant Mammals	<ul style="list-style-type: none"> • The expected contrast with baseline conditions from the introduction of visual and other anthropogenic sources. • The offsetting effects of management activities for the Upperchurch Hen Harrier Scheme which will promote and enhance existing mammalian habitat.
	<p>Evaluation of Cumulative Impacts – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance /Displacement</p>
Sensitive Aspect	<p>All Elements of the Whole UWF Project</p>
	<p><u>Cumulative Impact Magnitude:</u> Instances of disturbance may occur across all elements, cumulative impacts may occur where various Elements are located in close proximity to each other The scale/magnitude of any disturbance response is evaluated as medium. The spatial extent of any disturbance/displacement will be limited to the immediate vicinity of the construction area boundaries. Sequential effects are unlikely given the alternative habitat available.</p>
	<p>Significance of the Cumulative Impact: Moderate</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The temporary duration of works, and; • Works will take place during daylight hours only, and; • The expected contrast with baseline conditions from the introduction of visual and other anthropogenic sources. • The offsetting effects of management activities for the Upperchurch Hen Harrier Scheme which will promote and enhance existing mammalian habitat.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.9.4.6 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-81 below.

Table 8-81: Description and Rationale for Excluded Impacts to Non-Volant Mammals

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage / Planting Stage				
Land take	1,2,3,4,5	Land cover	Otter: Loss of habitat	Evaluated as Excluded: There will be no permanent loss of aquatic habitat (Elements 1,2,4). Any loss of riparian habitat will be negligible, resulting in no contrast to baseline conditions and Neutral effects on Otter. No loss of aquatic habitat in relation to Elements 3, 5.
Operating Machinery	1,2,3,4	Direct Contact	Otter: Secondary Mortality	Evaluated as Excluded: No holts of resting places are located within the works areas associated with Elements 1,2,3,4). Sources of mortality are therefore restricted to accidental collision with vehicles, which is avoided through works only occurring in daylight hours. Neutral effects.
Operating Machinery	1,2,4	Direct Contact	Badger: Secondary Mortality	Evaluated as Excluded: No setts are located within the construction works areas. Sources of mortality are therefore restricted to accidental collision with vehicles, with effects avoided through an adherence to only working during daylight hours. Neutral effects.
Operating Machinery	1,2,4,5	Direct Contact	Pine Marten, Red Squirrel, Fallow Deer, Irish Hare: Secondary Mortality	Evaluated as Excluded: Works will only be conducted during daylight hours. Potential Secondary mortality is limited to vehicular collision and as such effects are considered unlikely.
Delivery of Materials	1,2,3,4,5	Landscaping	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew	Evaluated as Excluded: The Irish population of this invasive species is considered as Established/ Widespread and expanding. Range estimated at 7,600km ² in 2013, with a rate of expansion of 0.5-14.1km/yr depending on landscape characteristics (McDevitt <i>et al.</i> , 2014 ²⁵). It is considered that the low number of deliveries of organic materials such as marker posts or hedging (a likely source of transportation or introduction) will have Neutral additive effects, within the context of background trends (a species already established and increasing rapidly).

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²⁵ McDevitt, A.D., Montgomery, W.I., Tosh, D.G., Lusby, J., Reid, N., White, T.A., McDevitt, C.D., O'Halloran, J., Searle, J.B. and Yearsley, J.M., (2014). Invading and expanding: range dynamics and ecological consequences of the greater white-toothed shrew (*Crocidura russula*) invasion in Ireland. PLoS One. 2014 Jun 23; 9(6):e100403. doi: 10.1371/journal.pone.0100403. eCollection 2014

Non-Volant Mammals		Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
		Operational Stage / Growth Stage				
Sensitive Aspect	Delivery of Materials	1,2,3,4,5	Landscaping	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew	Evaluated as Excluded: No significant deliveries of materials are required for any Element of the Whole UWF Project.	
	Noise and human activity	1,2,3,4,5	Air and Visibility	General Non-Volant Mammals: Disturbance/Displacement to all Non-Volant mammals	Evaluated as Excluded: Levels of operational maintenance will have Neutral disturbance effects to mammals.	
	Operating Machinery	1,2,3,4,5	Direct Contact	General Non-Volant Mammals: Secondary Mortality	Evaluated as Excluded: Frequency of vehicular usage too low for measurable effect – any effects will be Neutral.	
Decommissioning Stage						
Biodiversity	Delivery of Materials	1,2,3,4,5	Landscaping	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew	Evaluated as Excluded: In relation to Element 1, 3, no potential for effects as no decommissioning will take place. In relation to Element 2,4,5 – no significant deliveries of materials are required.	
	Noise and Human Activity	1,2,3,4,5	Air and Visibility	General Non-Volant Mammals: Disturbance/Displacement to all Non-Volant mammals	Evaluated as Excluded: In relation to Element 1, 3, no potential for effects as no decommissioning will take place. In relation to Element 2,4,5 – Daylight hours of works, habituation, and limited frequency of disturbance reduces disturbance/displacement to 'Neutral'	
	Operating Machinery	1,2,3,4,5	Direct Contact	General Non-Volant Mammals: Secondary Mortality	Evaluated as Excluded: In relation to Element 1, 3, no potential for effects as no decommissioning will take place. In relation to Element 2,4,5 – Reduced vehicular movement, limited to established roads only reduces effect to 'Neutral effect'. Mammals will have become habituated to existing roads. Frequency of growth stage vehicular usage reduces effect for Element 3 to Neutral.	
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8.9.5 Mitigation Measures for Impacts to Non-Volant Mammals

Mitigation measures were incorporated into the UWF Related Works project design including the Project Design Measures. No additional mitigation measures are required as **no significant adverse impacts** are concluded by the topic authors as likely to occur to Non-Volant Mammals as a consequence of the UWF Related Works.

8.9.6 Evaluation of Residual Impacts to Non-Volant Mammals

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impacts are the same as the Impacts set out in Impact Evaluation Table sections for Non-Volant Mammals above (Section 8.9.4) – i.e. **no significant adverse impacts**.

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8.9.7 Application of Best Practice and the EMP for Non-Volant Mammals

Best Practice Measures (BPM), although not part of the Project Design for the UWF Related Works, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Non-Volant Mammals**, by the authors of this topic chapter, using industry best practice:

RW-BPM-20	Monitoring of Identified Badger Setts
RW-BPM-21	Disturbance and/or physical injury to Other Mammals
RW-BPM-22	Management of general non-native invasive species

These Best Practice Measures are included in full at the end of this topic chapter, and also form part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

8.9.7.1 Surface Water Management Plan

Water quality and the existing drainage regime will be managed under a Surface Water Management Plan (SWMP) which will be implemented by the appointed Contractor during the construction stage of the UWF Related Works.

The Surface Water Management Plan will provide the water management framework for construction works and will ensure that work is carried out with minimal impact on the surface water environment and in accordance with the Project Design and Best Practice Measures and environmental commitments made in this EIA Report. The Surface Water Management Plan is part of the **Environmental Management Plan for UWF Related Works**, and accompanies this planning application as **Volume D**.

8.9.7.2 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan also forms part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

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8.9.8 Summary of Impacts to Non-Volant Mammals

A summary of the Impact to Non-Volant Mammals is presented in Table 8-82.

Table 8-82: Summary of the impacts to Non-Volant Mammals

Impact to Non-Volant Mammals:	Badger: Habitat Loss	Badger: Disturbance /Displacement	Otter: Disturbance /Displacement	Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Habitat Loss	Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance /Displacement
<i>Evaluation Impact Table</i>	<i>Section 8.9.4.1</i>	<i>Section 8.9.4.2</i>	<i>Section 8.9.4.3</i>	<i>Section 8.9.4.4</i>	<i>Section 8.9.4.5</i>
Project Life-Cycle Stage	Construction	Construction	Construction	Construction	Construction
UWF Related Works	Neutral	No potential for Impact	Neutral	Not Significant	Moderate
Element 1: UWF Grid Connection	Not Significant	Moderate	Slight	Ranges from Not Significant to Slight	Moderate
Element 3: UWF Replacement Forestry	Slight (positive)	No potential for Impact	Neutral	Not Significant	Neutral
Element 4: Upperchurch Windfarm	Not Significant	Not Significant	Neutral	Not Significant	Not Significant
Element 5: UWF Other Activities	Neutral	Neutral	Neutral	Neutral	Moderate
Cumulative Impact:					
All Elements of the Whole UWF Project	Not Significant	Moderate	Slight	Ranges from Not Significant to Slight	Moderate

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.10 Sensitive Aspect No.9: Amphibians & Reptiles

This Section provides a description and evaluation of the Sensitive Aspect - Amphibians & Reptiles.

8.10.1 BASELINE CHARACTERISTICS of Amphibians & Reptiles

8.10.1.1 STUDY AREA for Amphibians & Reptiles

The study area for Amphibians & Reptiles in relation to the UWF Related Works is described in Table 8-83 and illustrated on **Figure RW 8.10: Amphibians & Reptiles within the UWF Related Works Study Area** (Volume C3 EIAR Figures).

Table 8-83: UWF Related Works Study Area for Amphibians & Reptiles

Study Area for Amphibians & Reptiles	Justification for the Study Area Extents
Construction works area plus 50m in all directions	Professional Judgement and as per Best Practice (CIEEM, 2016)

8.10.1.2 Baseline Context and Character of Amphibians & Reptiles in the UWF Related Works Study Area

Suitable habitat exists within the study area for Common Frog *Rana temporaria* and Common Lizard (Viviparous Lizard).

Smooth Newt has been recorded from Co. Tipperary in suitable habitat (Meehan 2013). In general it is perceived that information gaps exist in terms of the distribution of these species in North Tipperary (Browne 2007). Extrapolated data primarily from the 2011 National Frog Survey (Reid *et al.*, 2013), used to inform Irelands Article 17 reporting to the EU does not indicate any distribution of this species within either 10km square overlapping the UWF Related Works (R95 and R96).

Common frog is one of only three amphibians found in Ireland. It is a widespread and abundant species occurring in a broad range of habitats throughout the country. Adults congregate to spawn in ponds and ditches in the spring. Eggs develop into tadpoles as water temperature rises and following metamorphosis; young froglets emerge onto land in early summer. These young animals are particularly vulnerable to predation. They spend 2-3 years on land, feeding on terrestrial invertebrates, before returning to freshwater to breed. Life expectancy of 3-4 years would be typical.

Viviparous Lizard (*Lacerta vivipera*) is likely to occur in suitable habitat as the species is found in a range of habitat such as woodland, marshes, moors, and bog.

Survey Results: No Common Frog or Smooth Newt was noted, but both species is considered as likely to occur in suitable habitat. As per the 2013 EIS, Common Frog is described from a number of locations within the overlapping Upperchurch Windfarm. Viviparous Lizard was recorded in suitable habitat (acid grassland) within the UWF Related Works study area boundary.

8.10.1.3 Importance of Amphibians & Reptiles

All amphibian and reptile species are protected under the Wildlife Act (1976, amended 2000).

The Common Frog is also listed on the Annex V of the Habitats Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC), meaning that the removal of this species from the wild is restricted by European law.

All amphibians and reptiles present are evaluated as of Local Importance (Higher Value).

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8.10.1.4 Sensitivity of Amphibians & Reptiles

Amphibians and reptiles are sensitive to direct mortality, including at the larval stage (frogs), habitat loss, habitat fragmentation and disturbance through visual intrusion, noise and vibration. Amphibian declines have also been linked to the emergence of previously unrecorded diseases.

Populations of Amphibians and Reptiles are evaluated as Low Sensitivity receptors.

8.10.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

The Common Frog was assessed as having a ‘Favourable’ conservation status within the National Frog survey of Ireland 2010/11 (Reid *et al.*, 2013). Its conservation status is classified as least concern in a European context (Kuzmin *et al.*, 2009). No estimate of population trend is available as the 2010/11 survey provided the first baseline for the country.

The Smooth Newt has a conservation status of least concern in a European context (Arntzen *et al.*, 2009). There is no population estimate available for Ireland and therefore, there is no evidence to illustrate the current population status.

There is no population estimate to-date for Viviparous Lizards in Ireland and hence, there is no evidence to illustrate the current population status. In a European context, the Viviparous Lizard has a conservation status of least concern (Agasyen *et al.*, 2010).

Given the above, a scenario in which this proposed project does not take place would result in a continuation of current trends relating to amphibians and reptiles within the study area.

8.10.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to amphibians and reptiles, as identified above, will be the receiving environment at the time of construction and on into the operational phase . Recorded species are expected to persist.

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8.10.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

UWF Related Works is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Related Works is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Related Works is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.10.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Amphibians & Reptiles considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.10.2.2.1](#) below.

The evaluation of cumulative impacts to Amphibians & Reptiles also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Amphibians & Reptiles with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Related Works or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to Amphibians & Reptiles.

8.10.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Related Works Study Area along with the study areas for Other Elements which are described in Table 8-84.

Table 8-84: Cumulative Evaluation Study Area for Amphibians & Reptiles

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	50m area around and incorporating the construction works areas, afforestation lands and activity locations	Professional Judgement and as per Best Practice (CIEEM, 2016).
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities:	Not Relevant – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects.	

Amphibians & Reptiles

8.10.2.2.1 Potential for Impacts to Amphibians & Reptiles

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Amphibians & Reptiles. The results of this evaluation are included in Table 8-85.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on [Figure CE 8.10: Amphibians & Reptiles within the Cumulative Evaluation Study Area](#) (Volume C3 EIAR Figures).

Table 8-85: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Evaluated as excluded</u> : No likely effects due to: No evidence of Amphibian or Reptile species was recorded from habitat or other surveys of the UWF Other Activities locations.

Sensitive Aspect

8.10.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.10.2.3.1 Element 1: UWF Grid Connection

Extrapolated data primarily from the 2011 National Frog Survey (Reid *et al.*, 2013), used to inform Irelands Article 17 reporting to the EU does indicate distribution of this species within at least one 10km square overlapping the UWF Grid Connection (R86).

Common frog: Adult frogs were recorded in 6 locations along the UWF Grid Connection study area. Tadpoles were recorded in 2 locations. These are illustrated on [Figure GC 8.10: Amphibians & Reptiles within the UWF Grid Connection Study Area](#). [Figure GC 8.10](#) is part of the EIA Report for the UWF Grid Connection, and is included in [Volume F: Reference Documents](#) with this planning application.

Smooth Newt: Due to their wide distribution across Ireland, there is the possibility that Smooth Newt (*Lissotriton vulgaris*) occurs within suitable habitat (typically garden ponds, natural pools, drainage ditches and quarry ponds). However, this species was not recorded during walkover surveys of the UWF Grid Connection which we note overlapped the optimum survey period for the species (late - March and early April 2016).

Viviparous Lizard (*Lacerta vivipera*) was also not recorded.

8.10.2.3.2 Element 3: UWF Replacement Forestry

Extrapolated data primarily from the 2011 National Frog Survey (Reid *et al.*, 2013), used to inform Irelands Article 17 reporting to the EU does not indicate any distribution of this species within the 10km square which overlaps the UWF Replacement Forestry (R96).

No amphibians or reptiles were recorded from site visits to the UWF Replacement Forestry lands, however as Viviparous Lizard (*Lacerta vivipera*) was recorded in suitable habitat (acid grassland) within the adjacent Upperchurch Windfarm study area, it is considered that this species is likely to occur on the UWF Replacement Forestry lands also.

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8.10.2.3.3	Element 4: Upperchurch Windfarm
<p>Upperchurch Windfarm: As per the 2013 EIS, Common Frog is described from a number of locations within the Upperchurch Windfarm. Viviparous Lizard (<i>Lacerta vivipera</i>) was also recorded in suitable habitat in acid grassland within the Upperchurch Windfarm. This species has not been previously recorded in the study area (NBDC, 2016). The location of this survey record is identified on Figure CE 8.10: Amphibians & Reptiles within the Cumulative Evaluation Study Area.</p>	
8.10.2.3.4	Element 5: UWF Other Activities
<p>Not applicable – Element evaluated as excluded. See Section 8.10.2.2.1.</p>	
8.10.2.3.5	Other Projects or Activities
<p>Not applicable – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.10.2.1.</p>	

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8.10.3 PROJECT DESIGN MEASURES for Amphibians & Reptiles

At the conception of the UWF Related Works, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-86 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Amphibians & Reptiles**.

Table 8-86: UWF Related Works Project Design Measures relevant to Amphibians & Reptiles

PD ID	Project Design Environmental Protection Measure (PD)
PD01	All construction works will be carried out during daylight hours.
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Replacement Forestry and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4 and 5.5](#), in [Volume C4: EIAR Appendices](#).

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8.10.4 EVALUATION OF IMPACTS to Amphibians & Reptiles

In this Section, the likely direct and indirect effects of the UWF Related Works are identified and evaluated. Then the likely cumulative effects of the UWF Related Works together with the Other Elements of the Whole UWF Project are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Amphibians & Reptiles.

As a result of the exercise, **no impacts were included for evaluation.**

Table 8-87: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification in Section 8.10.4.1)
No impacts included for evaluation	<i>Habitat degradation (compaction, change in drainage), (construction stage)</i>
	<i>Reduction in foraging and breeding habitat, (construction stage)</i>
	<i>Disturbance/Displacement, (construction stage)</i>
	<i>Physical injury/destruction of individual amphibians and reptiles, (construction stage)</i>

The source-pathway-receptor links and the rationale for excluded impacts are described in **Section 8.10.4.1**

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8.10.4.1 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from evaluation in Impact Evaluation Tables sections are described in Table 8-88 below.

Table 8-88: Description and Rationale for Excluded Impacts to Amphibians & Reptiles

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage / Planting Stage				
Landtake	1,2,3,4	Soils/ Surface Water	Habitat degradation (compaction, change in drainage)	Evaluated as Excluded: Construction Works associated with Element 1,2,4 may result in some secondary effects on habitat composition for Amphibians and reptiles, however the spatial extent of this will be Negligible and any habitat degradation effects to local populations are likely to be Neutral. No compaction or habitat degradation likely as a result of Element 3 or 5.
Landtake	1,2,3,4,5	Landcover	Reduction in foraging and breeding habitat	Evaluated as Excluded: In relation to Element 1,2, 4 - There is a high probability that the Construction Works will include some land use change of suitable foraging or breeding habitat. Any other habitat loss is temporary as reinstatement will occur within 2 weeks. No permanent land use change associated with Element 5. Any permanent land use change (Elements 1,2,3,4) is unlikely to be significant within the context of available habitat and low occurrence of species as described herein. The extent of land use change is evaluated as negligible in the context of available habitat. The spatial extent of any loss will be limited to works within the construction boundary comprising permanent features. Neutral effects on Amphibians or Reptiles.
Noise and human activity	1,2,4,5	Visibility	Disturbance/Displacement	Evaluated as Excluded: Construction works and activities may result in some cross-factor effects from disturbance stimuli (visual and vibration related), however the spatial extent, limited frequency, and brief duration Will be Negligible and effects to local populations are likely to be Neutral.
Operating Machinery	1,2,3,4,5	Direct Contact	Physical injury/mortality of individuals	Evaluated as Excluded: Identified locations do not overlap construction works areas or activity locations. Neutral effects.
Operational Stage / Growth Stage				
Evaluated as Excluded: Operational Stage works or activities will cause Negligible source magnitude or duration of effects, and any effects on Amphibians and Reptiles are expected to be Neutral.				
Decommissioning Stage				
Evaluated as Excluded: Populations of Amphibians and Reptiles are evaluated as Low Sensitivity receptors. Decommissioning Works may result in some cross-factor effects from disturbance stimuli (visual and vibration related), however the spatial extent, limited frequency, and brief duration will be Negligible and any disturbance or displacement effects to local populations are likely to be Neutral.				

8.10.5 Mitigation Measures for Impacts to Amphibians & Reptiles

Mitigation measures were incorporated into the UWF Related Works project design including the Project Design Measures. No additional mitigation measures are required as the topic authors conclude that **Neutral impacts** are likely to occur to Amphibians & Reptiles as a consequence of the UWF Related Works.

8.10.6 Evaluation of Residual Impacts to Amphibians & Reptiles

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in the Description and Rationale for Excluded Impacts to Amphibians & Reptiles in Section 8.10.4.1, i.e. **Neutral impact**.

8.10.7 Application of Best Practice and the EMP for Amphibians & Reptiles

Best Practice Measures (BPM), although not part of the Project Design for the UWF Related Works, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Amphibians & Reptiles**, by the authors of this topic chapter, using industry best practice:

RW-BPM-16	Monitoring of non-native invasive plant species
RW-BPM-22	Management of general non-native invasive species
RW-BPM-23	Best practice methods to ensure the protection of common frog (<i>Rana temporaria</i>) and smooth newt (<i>Triturus (Lissotriton) vulgaris</i>).
RW-BPM-24	Best practice methods to ensure the protection of Viviparous lizard (<i>Lacerta (Zootoca) vivipara</i>)

These Best Practice Measures are included in full at the end of this topic chapter, and also form part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

8.10.7.1 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan also forms part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

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8.10.8 Summary of Impacts to Amphibians & Reptiles

No impacts to Amphibians & Reptiles are concluded by the topic authors as likely to occur.

Table 8-89: Summary of the impacts to Amphibians & Reptiles

Impact to Amphibians & Reptiles	Impact
<i>Evaluation</i>	<i>Section 8.10.4.1</i>
Project Life-Cycle Stage	All
<u>UWF Related Works</u>	Neutral Impacts / No Likely Impacts
Element 1: UWF Grid Connection	Neutral impacts / No likely impacts
Element 3: UWF Replacement Forestry	Neutral impacts /No likely impacts
Element 4: Upperchurch Windfarm	Neutral impacts / No likely impacts
Element 5: UWF Other Activities	No Likely Impacts - Evaluated as excluded, See Section 8.10.2.2.1
<u>Cumulative Impact:</u>	
All Elements of the Whole UWF Project	No Potential for Cumulative Impacts (as Neutral impacts from any individual Element)

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Amphibians & Reptiles with either the UWF Related Works or the Other Elements of the Whole UWF Project (see Section 8.10.2.1).

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Topic

8.11 Sensitive Aspect No.10: Marsh Fritillary

This Section provides a description and evaluation of the Sensitive Aspect - Marsh Fritillary.

8.11.1 BASELINE CHARACTERISTICS of Marsh Fritillary

8.11.1.1 STUDY AREA for Marsh Fritillary

The study area for Marsh Fritillary in relation to the UWF Related Works is described in Table 8-90 and illustrated on [Figure RW 8.11: Marsh Fritillary within the UWF Related Works Study Area](#) (Volume C3 EIAR Figures).

Table 8-90: UWF Related Works Study Area for Marsh Fritillary

Study Area for Marsh Fritillary	Justification for the Study Area Extents
50m area around and incorporating the construction works areas	Professional Judgement and as per Best Practice (CIEEM, 2016).

8.11.1.2 Baseline Context and Character of Marsh Fritillary in the UWF Related Works Study Area

Marsh Fritillary (*Euphudras aurinia*) has a wide distribution across Ireland, but the distribution is patchy and it is still considered overlooked in some parts of its range. Colonies can be found in a variety of habitats including calcareous grassland, degraded bogs, wet heath, transition mires and fens up to 300m (Reagan *et al.*, 2010). It is the only protected butterfly species in Ireland. The population often fluctuates within its range dependant on weather, food supply and interaction with parasites. Larvae overwinter in a small web close to the ground and emerge in early spring. At a local level, populations can fluctuate highly and are subject to extremely low levels or periodic extinctions. The identification and protection of breeding sites is listed as a regional issue of concern in the Tipperary County Development Plan with inadvertent loss of previously unknown colonies an identified threat. Previous records exist from 2 locations proximal to the Whole UWF Project, Cumber Bog near Kilcommon (<2km) and Dromsallagh, near Cappawhite (~10km). The evidence all indicates that the Marsh Fritillary is relatively sedentary, rarely dispersing beyond 750m, although colonisation may rarely take place over longer distances of 5–20 km (Warren 1994). The distance of 2km has been previously considered as a standardised ‘functional landscape’ i.e. the area within which most dispersal, new colonisation and regular exchange of genetic material will occur (Fowles & Smith 2006).

Suitable habitat for Marsh Fritillary overlaps UWF Related Works construction works areas at Shevry, where cabling as part of UWF Related Works are to be placed under roads consented as part of the Upperchurch Windfarm.

Habitat for Marsh Fritillary to the extent of 0.54Ha is present at Shevry, of which 0.062Ha (11.5%) overlaps the construction works area. Evidence of breeding in the form of larval webbing was recorded at 4 locations within this habitat in September 2017 - all outside the works area boundary. A parasitic Braconid wasp of the genus *Cotesia* was also recorded. This species can be an influencing factor in local level population fluctuations and may be a limiting factor in records of the species from this location. This colony size is classified as (Small i.e. the predicted peak population is <100 adults) and is located 10.7km east of Baurnadomeeny and 12.1km east of Bealaclave.

Further detail on survey results are presented in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.11\)](#). The location and extent of Marsh Fritillary habitat and species is illustrated on [Figure RW 8.11: Marsh Fritillary within the UWF Related Works Study Area](#).

Marsh Fritillary

Sensitive Aspect

8.11.1.3 Importance of Marsh Fritillary

Marsh Fritillary is the only butterfly species resident in Ireland that is listed in Annex II of the EU Habitats Directive 92/43/EEC. The population/habitat extent recorded from the current study is evaluated as of County Importance.

8.11.1.4 Sensitivity of Marsh Fritillary

Marsh Fritillary is sensitive to habitat loss, directly through land take or indirectly through compaction from vehicular movement. Individuals are considered as sensitive to vibrations on a precautionary basis. At the webbing stage larvae are sensitive to habitat disturbance and direct mortality from contact with machinery. Marsh fritillary habitat is sensitive to land use change from drainage regime modification, the application of nutrients, higher intensities of grazing, the introduction of invasive species and alteration of physical structure. At a landscape level habitat fragmentation may affect population function at a larger scale (Asher *et al.*, 2001).

8.11.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

The species was assessed as having an ‘Inadequate’ conservation status with an overall declining conservation trend in the most recent Article 17 report (NPWS, 2013) as required under the EU Habitats Directive 92/43/EEC. Within the Article 17 report, the range was assessed as ‘favourable’, the population was assessed as ‘inadequate’ with a qualifier of declining, habitat was assessed as ‘favourable’ and future prospects as ‘inadequate’ with a qualifier of declining. The species is classified as vulnerable due to a population decline of ≥ 30 percent (A2c) in the Irish Red List for Butterflies (Reagan *et al.*, 2010). Its conservation status is classified as least concern in a European context (Van Swaay *et al.*, 2010).

Given the trends presented above, a scenario in which this project does not take place would result in a continuation of current trends relating to Marsh Fritillary, within the study area, in line with the decline cited above in respect of future prospects.

8.11.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to invertebrates, particularly Marsh Fritillary, as identified above, will be the receiving environment at the time of construction given the short time period likely to elapse in the interim. With respect to the operational phase, the above described decline is likely to be observed over the lifetime of the UWF Related Works.

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Topic

8.11.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

UWF Related Works is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Related Works is Element 2. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Related Works is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.11.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Marsh Fritillary considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.11.2.2.1](#) below.

The evaluation of cumulative impacts to Marsh Fritillary also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Marsh Fritillary with either the UWF Related Works or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: Forestry, Agriculture and Turf-Cutting activities have been scoped in for evaluation of cumulative effects to Marsh Fritillary.

8.11.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Related Works Study Area along with the study areas for Other Elements and Other Projects or Activities which are described in Table 8-91.

Table 8-91: Cumulative Evaluation Study Area for Marsh Fritillary

<u>Cumulative Project</u>	<u>Cumulative Study Area Boundary</u>	<u>Justification for Study Area Extent</u>
Element 1: UWF Grid Connection	50m area around and incorporating the construction works areas, afforestation lands, activity locations	Professional Judgement and as per Best Practice (CIEEM, 2016).
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities: Forestry Agriculture Turf-Cutting	2km from Element construction works areas/afforestation lands/activity locations	The distance of 2km has been previously considered as a standardised 'functional landscape' i.e. the area within which most dispersal, new colonisation and regular exchange of genetic material will occur (Fowles & Smith 2006).

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8.11.2.2.1 Potential for Impacts to Marsh Fritillary

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect Marsh Fritillary. The results of this evaluation are included in Table 8-92.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on **Figure CE 8.11: Marsh Fritillary within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-92: Results of the Evaluation of the Other Elements and Other Projects or Activities

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded:</u> No potential for effects due to: No suitable habitat for Marsh Fritillary was recorded on or adjacent (50m) to the UWF Replacement Forestry lands.</p> <ul style="list-style-type: none"> • No potential for habitat loss or habitat degradation effects as there is no suitable habitat for Marsh Fritillary in or adjacent (50m) to the afforestation lands, • No potential for mortality of in-flight adults or in-situ larvae, as no suitable habitat or Marsh Fritillary populations were recorded within or adjacent (50m) to the afforestation lands, • No potential for disturbance or displacement effects during planting or management activities, as no suitable habitat or Marsh Fritillary populations were recorded within or adjacent (50m) to the afforestation lands and no heavy machinery is required.
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<p><u>Evaluated as excluded:</u> No potential for effects due to: No suitable habitat for Marsh Fritillary overlaps Haul Route Activity locations or the Upperchurch Hen Harrier Scheme. Marsh Fritillary was recorded proximal to Overhead Line Activities on Shower Bog in 2001. The exact location is unknown however no suitable habitat exists at structure locations in close proximity along the overhead line route.</p>
Other Projects or Activities	
Forestry/Agriculture/Turf-Cutting	<p><u>Yes, included</u> for the evaluation of cumulative effects <i>(Forestry is included as afforestation is a source of habitat loss).</i></p>

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8.11.2.3 Cumulative Information: Baseline Characteristics – Context & Character

The total area of suitable habitat identified from all 3 colonies within the UWF Related Works/Upperchurch Windfarm and UWF Grid Connection study areas comprises 1.2Ha in total with colonies being dispersed at intervals of 10.7km and 12km respectively.

8.11.2.3.1 Element 1: UWF Grid Connection

Survey Results

Suitable Marsh Fritillary habitat patches were identified at two locations, Baurnadomeeny and Beaclave, along the UWF Grid Connection. Subsequent visits were undertaken during optimal periods (September 2016, April 2017 and September 2017) to map the scale of these habitat patches and measure/confirm occupancy through the recording in situ larval webbing or emerged Larvae as applicable to the survey period.

The total area of suitable habitat at Baurnadomeeny comprises 0.57Ha of which 0.003ha (0.52 %) overlaps or is within the construction area boundaries. The available habitat is spread over a number of scattered pockets as is typical of the species. In September 2016, larval webs were located 42.5 and 65.8 m south of the construction works area boundary whilst single larvae were located 169.8 m north and 60.4 m south of the works area. In April 2017 a total of 583 no. larvae and 1 no. web were confirmed during walked transects through all suitable habitat at this location. Three clusters of larvae (31, 16 and 2 individuals) were located within suitable habitat overlapping the works area. In September 2017, 16 larval webs were recorded within habitats present at this location. This colony size is classified as (Medium i.e. the predicted peak population is 100-1000 adults).

The total area of suitable habitat at Beaclave comprises 0.1Ha of which 0.00005ha (0.05%) overlaps or is within the construction area boundaries. Two larval webs were recorded on 22nd September 2016, 34.6 m and 36.5 m south of the works area. In April 2017, 69 larvae were counted during the walked transects at this location. The majority were grouped (12, 40 and 11) together, close to the location of a larval web recorded in September 2016. The remaining larvae were scattered in small numbers across the larger area of suitable habitat. The nearest larva was recorded 21.7 m south of the construction works area boundary. The main cluster of larvae was 32.1 m south of the construction works area. No larvae were located within suitable habitat overlapping the works area boundary. In September 2017 a single web was recorded. This colony size is classified as Small (i.e. the predicted peak population is <100 adults).

Further detail on survey results are presented in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.11\)](#). The location and extent of Marsh Fritillary habitat and species is illustrated on [Figure GC 8.11: Marsh Fritillary within the UWF Grid Connection Study Area](#). [Figure GC 8.11](#) is part of the EIA Report for the UWF Grid Connection, and is included in [Volume F: Reference Documents](#) with this planning application.

8.11.2.3.2 Element 3: UWF Replacement Forestry

Not applicable –evaluated as excluded. See Section 8.11.2.2.1.

8.11.2.3.3 Element 4: Upperchurch Windfarm

Habitat for Marsh Fritillary at Upperchurch is the same habitat identified in relation to the UWF Related Works above within the UWF Related Works Study Area – i.e. 0.54Ha is present at Shevry, of which 0.062Ha (11.5%) overlaps the construction works area for both the Upperchurch Windfarm and the UWF Related Works (the Internal Windfarm Cabling will be constructed within the new windfarm road at this location).

8.11.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded – see Section 8.11.2.2.1.

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8.11.2.3.5 Other Projects or Activities

Turf-Cutting: Only one Marsh Fritillary colony is known within the geographical study area for Cumulative effects (2km); this is located at Cummer Bog. Cummer bog is subject to peat extraction (turf cutting).

Agriculture and Forestry: Colonies may occur in wet grassland (agriculture) but are unlikely to be present in Forestry.

8.11.2.4 Cumulative Information Baseline Characteristics - Importance of Marsh Fritillary

Marsh Fritillary is the only butterfly species resident in Ireland that is listed in Annex II of the EU Habitats Directive 92/43/EEC. The population/habitat extent recorded from the current study is evaluated as of County Importance.

8.11.2.5 Cumulative Information Baseline Characteristics - Sensitivity of Marsh Fritillary

Marsh Fritillary is sensitive to habitat loss, directly through land take or indirectly through compaction from vehicular movement. Individuals are considered as sensitive to vibrations on a precautionary basis. At the webbing stage larvae are sensitive to habitat disturbance and direct mortality from contact with machinery. Marsh fritillary habitat is sensitive to land use change from drainage regime modification, the application of nutrients, higher intensities of grazing, the introduction of invasive species and alteration of physical structure. At a landscape level habitat fragmentation may affect population function at a larger scale (Asher *et al.*, 2001).

8.11.2.6 Cumulative Information Baseline Characteristics - Trends in the Baseline Environment (the 'Do-Nothing' scenario)

The species was assessed as having an 'Inadequate' conservation status with an overall declining conservation trend in the most recent Article 17 report (NPWS, 2013) as required under the EU Habitats Directive 92/43/EEC. Within the Article 17 report, the range was assessed as 'favourable', the population was assessed as 'inadequate' with a qualifier of declining, habitat was assessed as 'favourable' and future prospects as 'inadequate' with a qualifier of declining. The species is classified as vulnerable due to a population decline of ≥ 30 percent (A2c) in the Irish Red List for Butterflies (Reagan *et al.*, 2010). Its conservation status is classified as least concern in a European context (Van Swaay *et al.*, 2010).

Given the trends presented above, a scenario in which this project does not take place would result in a continuation of current trends relating to Marsh Fritillary, within the study area, in line with the decline cited above in respect of future prospects.

8.11.2.7 Cumulative Information Baseline Characteristics - Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to invertebrates, particularly Marsh Fritillary, as identified above, will be the receiving environment at the time of construction given the short time period likely to elapse in the interim. With respect to the operational phase, the above described decline is likely to be observed over the lifetime of the Whole UWF Project.

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8.11.3 PROJECT DESIGN MEASURES for Marsh Fritillary

At the conception of the UWF Related Works, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-93 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Marsh Fritillary**.

Table 8-93: UWF Related Works Project Design Measures relevant to Marsh Fritillary

PD ID	Project Design Environmental Protection Measure (PD)
PD06	If any compaction has occurred along the construction works area, these areas will be ploughed with a sub-soiler to loosen the subsoil layer
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted
PD09	New permanent access roads will have a permanent surface water drainage network in place which will include check dams. These check dams will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD43	Pre-construction survey of the distribution of Devil’s-bit Scabious (larval food plant of Marsh Fritillary) during the last available April prior to the commencement of construction works. This requires that any areas of Devil’s-bit Scabious that are located within the construction works area boundary, will be strimmed/cut to ground level in the last available late April / early May period prior to the commencement of construction.

Additionally, **Chapter 5: Description of the Development (UWF Related Works)**, describes drainage systems which will be installed and reinstatement that will be carried out on site:

Section 5.2.3.5.6 - An integrated drainage system will be installed along new permanent roads and will maintain the existing drainage regime through the regular piping and release of clean water from the upslope side the works area to the downslope side.

Section 5.2.3.5.11 - Following the completion of construction works in an area, with the exception of new permanent infrastructure such as New Permanent Access Roads or permanently felled forestry areas, the lands under the construction works areas will be reinstated to their former condition and returned to the landowner for use as before.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection. These Project Design Measures are included in the description of UWF Grid Connection, which can be found in this EIA Report in **Appendices 5.3 in Volume C4: EIAR Appendices**.

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8.11.4 EVALUATION OF IMPACTS to Marsh Fritillary

In this Section, the likely direct and indirect effects of the UWF Related Works are identified and evaluated. Then the likely cumulative effects of the UWF Related Works together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Marsh Fritillary.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-94: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Habitat Loss (construction stage)	<i>Habitat Degradation (Introduction of invasive alien species which may out-compete food plants such as DBS), (construction stage)</i>
	<i>Habitat degradation (drainage alteration) - Marsh Fritillary, (construction stage)</i>
	<i>Habitat degradation (Compaction) - Marsh Fritillary, (construction stage)</i>
	<i>Mortality to in-flight MF Adults through contact with machinery, (construction stage)</i>
	<i>Potential disturbance/displacement from Vibration, (construction stage)</i>
	<i>Mortality of in situ Larvae, (construction stage)</i>
	<i>Potential disturbance/displacement of Marsh Fritillary individuals breeding in suitable habitat proximal to the Whole UWF Project during maintenance, (construction stage)</i>

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Table in the next section – **Section 8.11.4.1.**

The source-pathway-receptor links and the rationale for impacts excluded are described in **Section 8.11.4.2,** directly after the Impact Evaluation Table section.

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8.11.4.1 Impact Evaluation Table: Habitat Loss

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> Excavation Works <u>Cumulative Impact Source:</u> Excavation Works <u>Impact Pathway:</u> Land Cover</p> <p><u>Impact Description:</u> Marsh Fritillary is a medium sensitivity receptor of County Importance.</p> <p>Permanent land use change or Habitat loss of Marsh Fritillary habitat such as Devils-Bit scabious rich swards may result in loss of habitat ‘patches’ , a size reduction in individual colonies or reduce meta-population connectivity, and cause secondary, population level declines. Temporary land use change will not result in long term effects as all lands will be reinstated immediately.</p> <p>Effects have been reduced by the selective placement of e.g. temporary roads within the construction works areas to avoid DBS rich swards or locations where larvae were recorded. Management prescriptions to be implemented as part of the Upperchurch Hen Harrier scheme, such as a limitation on the excavation of drains, will allow improved grassland to revert back to wet grassland/semi-natural grassland habitats and possibly further Marsh Fritillary habitat, meta-population interconnectivity.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation of the Subject Development Impact – Habitat Loss	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Permanent land use change of 0.062Ha or 11.5% of suitable habitat present will occur during the construction stage.</p>	
Significance of the Impact: Slight	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The magnitude of the habitat loss: evaluated as medium (5-20% of habitat present), and; • The absence of webs within the habitats to be removed and low overall number present, and; • The contrast to the baseline environment represents a partial change to baseline attributes, and; • The long-term nature of the loss, and; • The low reversibility of the identified effect 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<p><u>Impact Magnitude:</u> Temporary landtake of suitable habitat comprising 0.00299 Ha (29.9m²) or 0.56% of total suitable habitat present will occur during the construction stage.</p>	
<u>Significance of the Impact:</u> Not Significant	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No permanent loss of suitable habitat will occur, and; • Habitat extent to be temporarily lost represents a negligible amount (<0.6%) of total suitable habitat present, • No webs or larvae were recorded from the habitats under consideration, and; 	

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- The temporary to short-term duration (up to 1 year), and;
- The reversibility of the impact with the restoration of lands.

Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.11.2.2.1.

Element 4: Upperchurch Windfarm

Impact Magnitude:
Permanent land use change of 0.062Ha (620m²) or 11.5% of suitable habitat present at the location will occur during the construction stage.

Significance of the Impact: Slight

- Rationale for Impact Evaluation:
- The magnitude of the habitat loss: evaluated as medium (5-20% of habitat present), and;
 - The absence of webs within the habitats to be removed and low overall number present, and;
 - The contrast to the baseline environment represents a partial change to baseline attributes, and;
 - The long-term nature of the loss, and;
 - The low reversibility of the identified effect

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.11.2.2.1.

Cumulative Information: Individual Evaluations of Other Projects or Activities

Other Project: Forestry /Agriculture/Turf-cutting

Impact Magnitude:
Afforestation can result in direct habitat loss for Marsh Fritillary of suitable habitat. Agricultural activities such as reclamation (land use change) can also effect habitat loss whilst turf-cutting can directly remove suitable habitat. A corollary of this is that suitable habitat for Marsh Fritillary often exists on the margins of cutover bog due to the grassland structure brought about from peat extraction. Only one colony is known within the geographical study area for Cumulative effects (2km); this is located at Cumber Bog. Cumber bog is subject to peat extraction and therefore Marsh Fritillary habitat loss is considered. The probability of Habitat Loss is evaluated as High on a precautionary basis. In the absence of predictive estimates on extraction the magnitude of habitat loss is evaluated as High (20-80% pf population or habitat change). Afforestation within the geographical study zone is considered unlikely to result in significant habitat loss; as much of the suitable habitat is within the Slieve Felim to Silvermines SPA and afforestation will be limited. Agricultural activities are considered unlikely to result in any contrast to baseline activities.

Significance of the Impact: Moderate

- Rationale for Impact Evaluation:
- The likely continuance of Peat Extraction in Cumber Bog

Evaluation of Cumulative Impacts – Habitat Loss

All Elements of the Whole UWF Project

Cumulative Impact Magnitude:
In total 1.2Ha of suitable habitat for this sensitive receptor of County Importance is present within the Cumulative Evaluation Study Area. 0.00299ha of this will be temporarily lost prior to re-instatement within the UWF Grid Connection element whilst 0.062ha will be lost within the UWF Related Works and Upperchurch Windfarm elements. As the works areas overlap at this location, there is no potential for cumulative effects between the UWF Related Works and the Upperchurch Windfarm (the effect will only occur once). Furthermore there is no potential for likely cumulative effects to Marsh Fritillary between the UWF Grid Connection and the UWF Related Works/Upperchurch Windfarm colonies due to the separation distance between the colonies.

Cumulative effects to the wider county population level may occur due to impacts to individual local populations.

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<p>Significance of the Cumulative Impact: Slight</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The overall extent and degree of Habitat loss (5.1% of available habitat) in respect of a County Important receptor, and; • The long-term nature of the loss, which is offset by; • The absence of webs in the habitats to be lost.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p><u>Cumulative Impact Magnitude:</u></p> <p>In total 1.2Ha of suitable habitat for this sensitive receptor of County Importance is present within the Whole UWF Project Study Area. 0.25% of this will be temporarily lost prior to re-instatement within the UWF Grid Connection whilst 5.1% will be lost within the UWF Related Works/Upperchurch Windfarm. Habitat loss from peat extraction within the geographical study zone is evaluated as high on a precautionary basis and may impact at least one colony <i>potentially</i> connected to those identified within the Windfarm Study areas; notwithstanding that the distance from the Cummer Bog colony is greater than 5km to either the UWF Grid Connection or the UWF Related Work/Upperchurch Windfarm colonies.</p>
<p>Significance of the Cumulative Impact: Moderate</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The overall extent and degree of Habitat loss from the Whole UWF Project and; • The long-term nature of the loss, and; • The likely continuance of peat extraction at the nearest known colony within the study zone.

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8.11.4.2 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-95 below.

Table 8-95: Description and Rationale for Excluded Impacts to Marsh Fritillary

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Movement of soils and machinery	1,4	Soils	Habitat Degradation (Introduction of invasive alien species which may out-compete food plants such as DBS.)	Evaluated as Excluded: Marsh Fritillary is a medium sensitivity receptor of County Importance. In total across the 5 elements no invasive species of Flora are present within construction works areas that overlap Marsh Fritillary habitat. There is extremely low probability of invasive flora being transferred to habitat patches present. Effects are unlikely.
Landuse Change	1,2,4	Surface Water	Habitat degradation (drainage alteration)	In respect of the UWF Grid Connection habitat patches/colonies implemented surface water management will maintain surface water flows to down-gradient areas of habitat, and; <ul style="list-style-type: none"> •Access roads at Baurnadomeeny (S66) are temporary, with no permanent effects expected, whilst; •Effects will not be significant at Bealaclave (S55) with flows expected to be maintained; In respect of UWF Related Works/Upperchurch Windfarm habitat patches/colony: <ul style="list-style-type: none"> •Implemented surface water management at Shevry will maintain surface water flows to down-gradient areas of habitat. Neutral effects are considered likely.
Movement of Soils and Machinery	1,2,4	Soils	Habitat degradation (Compaction)	Evaluated as Excluded; In relation to Elements 1,2,4 - Vehicular movement will be limited to temporary and permanent roads within the construction area boundaries, the effect of which is appraised under Habitat Loss.
Operating Machinery	1,2,4	Direct Contact	Mortality to in-flight MF Adults through contact with machinery	Evaluated as Excluded; It is considered as extremely unlikely that the short duration of the works period at any Marsh Fritillary colony will result in this secondary effect. No contrast to baseline conditions (e.g. the presence of operating farm machinery) is expected. Neutral effects are considered likely.
Excavation Works	1,2,4	Ground and Air Vibrations	Potential disturbance/displacement from Vibration	Low levels of ground and air vibrations are expected to be detectable within the immediate vicinity (1-5m) of tracking machines. A maximum estimate is (0.5 to 1mm/s). There is a low probability of this affecting in situ Marsh Fritillary. In respect of the UWF Grid Connection habitat patches/colonies:

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Source(s) Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				<ul style="list-style-type: none"> •Only a single web is located within the 5m buffer zone of vehicular usage (at Baurnadomeeny, with zero at Bealaclave) •The dampening of vibrations from soft ground reduces effects, and; •The brief to temporary duration (less than 1 day to up to 1 year) of the construction period reduces effects. <p>In respect of UWF Related Works/Upperchurch Windfarm habitat patch/colony: Zero webs were located within the 5m buffer zone of vehicular usage (at Shevry). Neutral effects are considered likely.</p>
Excavation Works	1,2,4	Excavations	Mortality of In-Situ larvae	Project Design Measures will avoid mortality of in-situ larvae.
Operational Stage				
Machinery Movement	1,2,4	Ground and Air Vibrations	Potential disturbance/displacement of Marsh Fritillary individuals breeding in suitable habitat proximal to the Whole UWF Project during maintenance	Evaluated as Excluded: Annual maintenance, comprising 1-2 people, travelling in light vehicles along new/existing road to Joint Bay locations, or walking over lands between Joint Bays will have Neutral effect.
Decommissioning Stage				
Evaluated as Excluded: Neutral effects on General Invertebrates are considered likely due to the scale of works required.				

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8.11.5 Mitigation Measures for Impacts to Marsh Fritillary

Mitigation measures were incorporated into the UWF Related Works project design including the Project Design Measures. No additional mitigation measures are required as **no significant adverse impacts** are concluded by the topic authors as likely to occur to Marsh Fritillary as a consequence of the UWF Related Works.

8.11.6 Evaluation of Residual Impacts to Marsh Fritillary

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table for Marsh Fritillary above (Section 8.11.4.1) – i.e. **no significant adverse impact**.

8.11.7 Application of Best Practice and the EMP for Marsh Fritillary

Best Practice Measures (BPM), although not part of the Project Design for the UWF Related Works, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Marsh Fritillary**, by the authors of this topic chapter, using industry best practice:

RW-BPM-25	Measures to ensure the protection of Marsh Fritillary (<i>Euphydryas aurinia</i>)
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These Best Practice Measures are included in full at the end of this topic chapter, and also form part of the **Environmental Management Plan for UWF Related Works**, which is included as **Volume D** with the planning application.

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8.11.8 Summary of Impacts to Marsh Fritillary

A summary of the Impact to Marsh Fritillary is presented in Table 8-96.

Table 8-96: Summary of the impacts to Marsh Fritillary

Impact to Marsh Fritillary:	Habitat Loss
<i>Evaluation Impact Table</i>	<i>Section 8.11.4.1</i>
Project Life-Cycle Stage	Construction
<u>UWF Related Works</u>	Slight
Element 1: UWF Grid Connection	Not Significant
Element 3: UWF Replacement Forestry	No Potential for Impacts - Evaluated as Excluded, see Section 8.11.2.2.1
Element 4: Upperchurch Windfarm	Slight
Element 5: UWF Other Activities	No Potential for Impacts - Evaluated as Excluded, see Section 8.11.2.2.1
<u>Cumulative Impact:</u>	
All Elements of the Whole UWF Project	Slight
All Elements of the Whole UWF Project <i>cumulatively with</i> Other Projects or Activities Forestry, Agriculture, Turf- Cutting	Moderate

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The greyed out boxes in

the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

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8.12 Policy Context

8.12.1 National Policy - National Biodiversity Action Plan

National Biodiversity Action Plan, for the period 2017-2021:

The Plan sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity', and follows on from the work of the first and second National Biodiversity Action Plans. The Plan has been developed in line with the EU and International Biodiversity strategies and policies.

119 targeted actions are contained in the Plan, underpinned by seven strategic objectives. The objectives lay out a clear framework for Ireland's national approach to biodiversity, ensuring that efforts and achievements of the past are built upon, while looking ahead to what can be achieved over the next five years and beyond. They include:

- mainstreaming biodiversity across the decision making process in the State;
- strengthening the knowledge base underpinning work on biodiversity issues;
- increasing public awareness and participation;
- ensuring conservation of biodiversity in the wider countryside;
- ensuring conservation of biodiversity in the marine environment;
- expanding and improving on the management of protected areas and protected species;
- enhancing the contribution to international biodiversity issues

8.12.2 Regional Policy - Mid-West Regional Planning Guidelines 2010-2022

The administrative area of North Tipperary fell under the Mid-West Regional Authority until it was incorporated into the new Southern Regional Assembly in 2014. The Southern Regional Assembly is currently preparing a new Spatial Economic and Planning Strategy for the Region. The Mid-West Regional Planning Guidelines 2010-2022 still apply until this new strategy is published.

The principal issues regarding the conserving and enhancing of environmental qualities from a regional perspective include;

- The development of well-based collaborative processes or managing natural resources that cross county and regional boundaries;
- Developing common approaches to managing key environmental assets including groundwater, surface water, Natura 2000 sites and other habitats as well as air quality while acknowledging the primary role of individual Local Authorities in this work;
- The protection and enhancement of water quality in line with the Water Framework Directive and River Basin Management Plans;
- Improvement of the quality of drinking water at certain locations;
- Maintenance of the quality of drinking water where it is satisfactory at present;
- Managing flood risk is also a key planning and development challenge, particularly as there is a multiplicity of agencies managing the Shannon River System;

Maintaining the architectural heritage and improving the design quality of new developments

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8.12.3 North Tipperary County Development Plan 2010 (as varied):

North and South Tipperary County Councils were amalgamated into Tipperary County Council in June 2014.

The relevant County Development Plan for the formally North Tipperary local authority area is now North Tipperary County Development Plan 2010-2016 (as varied), adopted in December 2015. This plan is the current policy documents for the location of all the Project Elements at present.

Relevant provisions include,

- HERT 29 is to maintain the quality and conservation values of European Sites and other sites.

HERT 29a is to restrict any development which would be harmful to or result in significant deterioration of habitats or species in European Sites and other sites.

8.12.4 Felling and Reforestation Policy

Forest Service Policy²⁶ in respect of supporting renewable energy and energy security is herein referred. We note the following as cited in respect of ‘Overriding environmental considerations’:

“As set out in Section 3.4.2, certain natural habitat and species of Community interests are protected under the Habitats and Birds Directives. In certain situations, trees and forests may be incompatible with the conservation of protected Annex habitats and species at a site and / or national level, and deforestation may be considered. For example, the continuation (via reforestation) of forest cover on a particular site within an SAC may be deemed incompatible with the maintenance and restoration of a particular habitat for which that SAC was designated. Similar situations may also exist under the Water Framework Directive, where provisions under the Reforestation Objectives CCF and BIO may not suffice. In such situations, permanent forest removal may be considered by the Forest Service, on application. This approach was applied within the context of EU LIFE Projects focused on bog restoration – see Case Study 1. Deforestation will be viewed as an option for such sites where the conversion of the site to an ‘open habitat’ is key to benefiting the habitat or species in question. For other habitats and species, deforestation may not be strictly required. An alternative may be to use low density native woodland planting to create an open mosaic of woodland and open habitats. Each application will be assessed by the Forest Service on a case-by-case basis.”

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²⁶ Department of Agriculture, Food and the Marine (2017). Felling and Reforestation Policy.

8.13 Best Practice Measures

RW-BPM-01	Measures for Protection of Surface Water Quality during Watercourse Crossing Open Trench Works where the Dam and Over Pump Method is used.	
Environmental Commitment		
<ul style="list-style-type: none"> • Prevention of significant surface water quality impacts at watercourse crossings due to in-stream works. • Prevention of significant morphological impacts at watercourse crossings due to open trench works. 		
Relevant Watercourse Crossing Points		
<p>The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.</p> <p><u>Relevant Watercourse Crossing Points:</u> WW1, WW2, WW4, WW12, WW13, WW14, WW21, WW22, WW24, WW25 AND WW31.</p> <p>The damming and over-pumping method will also be used at cable-only crossings where flows are very low at the time of the proposed crossing works.</p> <p><u>Relevant Watercourse Crossing Points:</u> WW3, WW9, WW10, WW17, WW18, WW19, WW20, WW26 and WW28.</p>		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> • Monitor weather conditions. • Supervise excavation works and drainage works as required. 	
Surface Water Quality Protection Measures		
<ul style="list-style-type: none"> • In-stream works at Class 1 and Class 2 watercourses will only be done over a dry period during the months of July, August and September, as required by IFI for in-stream works, (Project Design Measure); • Firstly, the crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance of vegetation; • A minimum 10 meter vegetative buffer zone will be maintained (if present) between disturbed areas and the watercourse bank. There will be no storage of material / equipment, excavated material (see below) or overnight parking of machinery inside the 10m buffer zone; • Double silt fencing will be placed upslope of the buffer zone on each side of the watercourse. The silt fencing will have removable "gates" as required to allow access of excavator while maintaining ease of replacement for overnight or during periods of heavy rainfall. The silt fencing will be extended at least 10m upstream and downstream of the crossing location works; • Bog mats will be used underneath the excavator, inside the 10 meter vegetative buffer zone, to prevent soil erosion/rutting and potential surface water quality impacts from localized surface water runoff; • A temporary sump will be constructed in the watercourse bed upstream of the proposed dam location if a natural pool does not already exist. The sump will be lined with clean rockfill to prevent scouring and erosion during pumping at the intake; • An energy dissipater (such as clean rock fill or splash plates) will be placed on the watercourse bed downstream of the dam at the pump outfall. This will prevent scouring and erosion of the watercourse bed at the outfall during pumping; • Dams are to be made of sand (clean) bags, cobbles or clean well-graded coarse gravel fill. Poorly sorted material will not be used as it would be a potential source of fine sediment; 		

Best Practice Measures

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- Watercourse bed excavation works will only commence once the stream flow is isolated from the proposed trench excavation area;
- Temporary storage of excavated material will be undertaken outside of the 10m buffer on flat ground or within a local hollow area. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the watercourse;
- Any pumped water from trench dewatering will be discharged onto a well vegetated, flat, dry area at least 50m from a watercourse via a straw bale dewatering structure or geotextile filter bag (i.e. silt bag) (Project Design Measure). Silt fencing will also be placed downslope of the outfall;
- If there is no suitable area for discharge onto ground, temporary settlement ponds will be used where necessary and will be put in place prior to commencement of preparation works;
- Sediment laden water from trench dewatering will not be discharged directly to a watercourse (Project Design Measure);
- Clay bunds will be placed within the trench backfill on either side of the watercourse to prevent the trench acting as a drain towards the watercourse, thus preventing potential water quality impacts;
- If concrete is in place in the trench, a layer of fine sand (5 – 10cm) will be over the cement prior to backfilling. This will prevent release of cement into the watercourse when flow is restored;
- Upon completion of the in-stream work, the watercourse crossing will be restored to its original configuration and stabilized to prevent bank erosion by means of timber stakes, timber planks and geotextiles as required (Project Design Measure);
- Operation of machinery and use of equipment within the 10m buffer will be kept to a minimum to avoid any unnecessary disturbance;
- Disturbance of bankside soils and watercourse sediments will be kept to the minimum required for the cable laying process to avoid any unnecessary impact on the watercourse morphology;
- There will be no batching or storage of cement allowed at the watercourse crossing;
- There will be no refueling allowed within 100m of the watercourse crossing (Project Design Measure);
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing; and,
- Works will not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted.

References

- IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.

RW-BPM-02	Measures for Protection of Surface Water Quality during Watercourse Crossing Open Trench Works where dam and Pipe/ Flume method is used.	
Environmental Commitment		
<ul style="list-style-type: none"> • Prevention of significant surface water quality impacts during watercourse crossing works in-stream works. • Prevention of significant morphological impacts at watercourse crossings due to in-stream works. 		
Relevant Watercourse Crossing Points		
<p>The flume/pipe watercourse crossing method will typically be used where a temporary watercourse crossing structure is proposed.</p> <p><u>Relevant Watercourse Crossing Points: WW5, WW7, WW8, WW16 and WW27</u></p> <p>The flume/pipe watercourse crossing method will also be used at cable-only crossings where flows are too large to be managed by the dam and over pump method at the time of the proposed crossing works.</p> <p><u>Relevant Watercourse Crossing Points: WW3, WW9, WW10, WW17, WW18, WW19, WW20, WW26 and WW28.</u></p>		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> • Monitor weather conditions. • Supervise excavation works and drainage works. 	
Surface Water Quality Protection Measures		
<ul style="list-style-type: none"> • In-stream works at Class 1 and Class 2 watercourses will only be done over a dry period during the months of July, August and September, as required by IFI for in-stream works, (Project Design Measure); • Firstly, the crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance of vegetation; • A minimum 10 metre vegetative buffer zone will be maintained between disturbed areas and the watercourse. There will be no storage of material / equipment, excavated material (see below) or overnight parking of machinery inside the 10m buffer zone; • Double silt fencing will be placed upslope of the buffer zone on each side of the watercourse. The silt fencing will have removable "gates" as required to allow access of excavator while maintaining ease of replacement for overnight or during periods of heavy rainfall. The silt fencing will be extended at least 10m upstream and downstream of the crossing location works; • Bog mats will be used underneath the excavator inside the 10 metre vegetative buffer zone to prevent soil erosion/rutting and potential water quality impacts from localised surface water runoff; • A pipe/flume with sufficient capacity/size to accommodate flow in the stream will then be placed in the watercourse without disturbance of the watercourse bed; • The pipe within the watercourse will have impervious dams placed on both the upstream and downstream ends to prevent flow within the channel along the proposed trench location (the upstream dam will be placed first); • An energy dissipater (such as clean rock fill or splash plates) will be placed on the watercourse bed downstream of the pipe/flume outfall. This will prevent scouring and erosion of the watercourse bed at the outfall; • Dams are to be made of sand (clean) bags, cobbles or clean well-graded coarse gravel fill. Poorly sorted material will not be used as it would be a potential source of fine sediment; • Only once the watercourse flow is isolated from the excavation area, will the watercourse bed excavation works be allowed to commence (Project Design Measure); 		

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- Temporary storage of excavated material will be undertaken outside of the 10m buffer on flat ground or within a local hollow. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the watercourse;
- Sediment laden water from trench dewatering will be discharged onto a well vegetated, flat, dry area at least 50m from a watercourse via a straw bale dewatering structure or geotextile filter bag. Silt fencing will be placed downslope of the outfall;
- If there is no suitable area for discharge onto ground, temporary settlement ponds will be used where necessary and will be put in place prior to commencement of preparation works;
- Sediment laden water from trench dewatering will not be discharged directly to a watercourse (Project Design Measure);
- Clay bunds will be placed within the trench backfill on either side of the watercourse to prevent the trench acting as a drain towards the stream, thus preventing potential water quality impacts;
- Once the lean mix concrete is in place in the trench, a layer of fine sand (5 – 10cm) will be over the cement prior to backfilling. This will prevent release of cement into the watercourse when flow is restored;
- Upon completion of the in-stream work, the stream crossing will be restored to its original configuration and stabilised to prevent bank erosion by means of timber stakes, timber planks and geotextiles as required;
- If the watercourse crossing is to be used as a temporary crossing for construction machinery, double silt fencing and berms will be placed at the crossing to prevent sediment/runoff from the access road surface entering the watercourse;
- Operation of machinery and use of equipment within the 10m buffer will be kept to a minimum to avoid any unnecessary disturbance;
- Disturbance of bankside soils and watercourse sediments will be kept to the minimum required for the cable laying process to avoid unnecessary impact on the watercourse morphology;
- There will be no batching or storage of cement allowed at the watercourse crossing;
- There will be no refuelling allowed within 100m of the watercourse crossing;
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing; and,
- Works will not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted.

References

- IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.

RW-BPM-03	Measures for Protection of Surface Water Quality during Stream Crossing Open Trench Works where the Channel Diversion Method is Used.	
Environmental Commitment		
Prevention of significant surface water quality impacts at stream crossings due to in-stream works.		
Work Sections/Locations		
No planned location, BPM included on a precautionary basis		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> • Monitor weather conditions. • Supervise excavation works and drainage works. 	
Surface Water Quality Protection Measures		
<ul style="list-style-type: none"> • As the watercourse is Class 1, the in-stream works will only be done over a dry period in the months of July, August or September, as required by IFI for in-stream works (Project Design Measure); • Firstly, the works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance of vegetation; • A minimum 10 meter vegetative buffer zone will be maintained between disturbed areas and the watercourse. There will be no storage of material / equipment, excavated material (see below) or overnight parking of machinery inside the 10m buffer zone; • Double silt fencing will be placed upslope of the buffer zone on each side of the watercourse. The silt fencing will have removable "gates" as required to allow access of excavator while maintaining ease of replacement for overnight or during periods of heavy rainfall. The silt fencing will be extended at least 10m upstream and downstream of the crossing location; • Bog mats will be used underneath the excavator inside the 10 meter vegetative buffer zone to prevent soil erosion and potential water quality impacts from localised surface water runoff; • Temporary storage of excavated overburden from the diversion channel will be undertaken outside of the 10m buffer on flat ground or within a local hollow. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the watercourse; • The watercourse dam (in the stream to be diverted) will be made of sand (clean) bags, cobbles or clean well-graded coarse gravel fill. Poorly sorted material will not be used as it would be a potential source of fine sediment (the dam will be installed once the diversion channel is in place); • The banks and bottom of the diversion channel will be lined with impermeable geotextile to prevent erosion and surface water quality impacts. A layer of clean course gravel will be placed over the geotextile on the bed of the channel to keep it in place; • An energy dissipater (such as clean rock fill or splash plates) will be placed on the watercourse bed and opposing bank of the receiving watercourse downstream of the diversion channel. This will prevent scouring and erosion of the watercourse bed and bank at the outfall during diversion; • Watercourse bed trench excavation works will commence once stream flow is fully diverted from the crossing excavation area; • Temporary storage of excavated material from the crossing trench will be undertaken separately to the material from the diversion channel. All storage areas will be outside the 10m buffer zone. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the watercourse; 		

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- Sediment laden water from trench dewatering will be discharged onto a well vegetated, dry, flat area at least 50m from a watercourse via a straw bale dewatering structure or geotextile filter bag. The outfall will also be surrounded by silt fencing;
- If there is no suitable area for discharge onto ground, settlement ponds will be used where necessary and will be put in place prior to commencement of preparation works;
- Any water from trench dewatering will not be discharged directly to a watercourse (Project Design Measure);
- Clay bunds will be placed within the trench backfill on either side of the watercourse to prevent the trench acting as a drain towards the stream, thus preventing potential water quality impacts;
- Once the lean mix concrete is in place in the trench, a layer of fine sand (5 – 10cm) will be over the cement prior to backfilling. This will prevent release of cement into the watercourse when flow is restored;
- Upon completion of the in-stream works, the stream crossing will be restored to its original configuration and stabilised to prevent bank erosion by means of timber stakes, timber planks and geotextiles as required (Project Design Measure);
- The diversion channel will be backfilled and reinstated to its original level and rock armour will be placed at the stream banks where the inflow and outflow of the diversion channel previously existed;
- The ground surface along the reinstated diversion channel will be re-seeded at the soonest opportunity to prevent soil erosion;
- The silt fencing on either side of the stream buffer will be left in place and maintained until the disturbed ground has re-vegetated;
- Operation of machinery and use of equipment within the 10m buffer will be kept to a minimum to avoid any unnecessary disturbance;
- Disturbance of bankside soils and stream sediments will be restricted to the minimum required for the cable laying process to avoid unnecessary impact on the stream morphology;
- There will be no batching or storage of cement allowed at the stream crossing;
- There will be no refuelling allowed within 100m of the stream crossing;
- All plant will be checked for purpose of use prior to mobilisation at the stream crossing; and,
- Works will not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted.

References

- IFI (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- NRA (2008) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.

RW-BPM-04	Measures for Protection of Surface Water Quality during Widening or Replacing an Existing Culvert.	
Environmental Commitment		
Prevention of significant surface water quality impacts from sediment input during widening or replacing an existing culvert crossing. Typically this work will be undertaken where there is a requirement to widen an existing road at a watercourse crossing or where the existing culvert is inadequate for crossing with construction traffic.		
Work Sections/Locations		
Existing culverts will be replaced at the following locations: <u>Relevant Watercourse Crossing Points: WW12, WW21 and WW31</u>		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Monitor weather conditions. Supervise excavation works and drainage works. 	
Surface Water Quality Protection Measures		
<ul style="list-style-type: none"> Replacing / extending of culverts in watercourses of ecological importance (Class 1 and Class 2 type watercourses) will only be done over a dry period between July and September (as required by IFI); When the watercourse is Class 1 or Class 2, and there is a requirement to disturb either the bed or bank, the watercourse will be dammed upstream and pumped prior to work commencing (refer to RW-BPM-01); Where culverts in drains (Class 4) or low ecological importance (Class 3) are being replaced, temporary check dams / silt fencing arrangements will be placed within the drain downstream of the crossing location. No damming or over pumping will be necessary unless flows are significant; If a cable is being placed beneath the culvert and dewatering of the excavation is required, please refer to RW-BPM-01 or RW-BPM-02 for water management / water quality protection measures; Where culvert widening has been completed, only clean, well-sorted fill or hardcore will be used to widen the road at the crossing location. Poorly sorted material will not be used as it would be a potential source of fine sediment; Before the road surface layer is put in place, a layer of geotextile will be placed over the fill to prevent wash down of fines into the fill and potentially into the watercourse; A temporary berm (i.e. sandbags and/or rectangular straw bales) will placed along the edge of the access road to prevent loose material being dislodged or washed into the watercourse; Use of weather forecasts will be made, and works will be planned when a dry spell of weather is forecasted; If high levels of silt or other contamination is noted in any local watercourse, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied; Work will not be undertaken during periods of high rainfall. This will minimise the risk of entrainment of suspended sediment in surface water runoff and transport via this pathway to surface watercourses; All disturbed ground will be re-seeded at the soonest opportunity to prevent erosion; There will be no batching or storage of cement allowed at the watercourse crossing; 		

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- There will be no refuelling allowed within 100m of the watercourse crossing; and,
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing.

References

- IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.

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RW-BPM-05	Surface Water Quality Protection Measures During Excavation Works Within 50m of a Watercourse.	
Environmental Commitment		
Prevention of significant surface water quality impacts from sediment input when excavation works (cable trenching, temporary, permanent access construction, haul route works etc.) are being carried out within 50m of a Class 1 (EPA blueline mapped watercourse) or Class 2 (EPA blueline equivalent).		
Work Sections/Locations		
<ul style="list-style-type: none"> Trench excavations and access road construction (temporary or permanent) will be required within 50m of a watercourse at all Class 1 and Class 2 watercourse crossing locations along the 110kV UGC; Trench excavations and access road construction will run over / adjacent / parallel to Class 1 or Class 2 watercourses at UWF Related Works sections SW12, SW24, SW25, SW26, SW27, SW28, SW52, RW3, SW53, SW54, SW55, SW67, SW68 and HW11; 		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Monitor weather conditions. Supervise excavation works and drainage works. 	
Surface Water Quality Protection Measures		
<ul style="list-style-type: none"> Where works are proposed within the 50m watercourse buffer zone, additional mitigation will be employed to ensure the watercourse is protected; Weather forecasting resources will be used, and works will be planned when a dry spell of weather is forecasted; Where the cable trench / access road / works area is running adjacent and parallel to a watercourse (all watercourse types, Class 1 to Class 4), a minimum 5m buffer will be maintained between the works area and the watercourse edge; Silt fencing will be placed down-gradient of the works during construction at all locations within the 50m watercourse buffer; Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered; In a case where only a 5 - 10m buffer is being maintained, double silt fencing will be put in place on the downslope side; Additional silt fencing or temporary straw bales (rectangular bales, pinned down firmly with stakes) will be placed across any natural surface depressions / channels that slope towards a local watercourse; Where the cable trench / access road route slopes down perpendicular towards a watercourse (<i>i.e.</i> base of stream valley), regularly spaced, temporary bunds or shallow swales will also be put in place perpendicular across the works corridor to dissipate surface water runoff from the works area and onto adjacent vegetated ground. Additional silt fencing will be put at the outfall location of the bunds / swales; Temporary check dams / silt fencing arrangements will be placed in any local artificial watercourses/drains (Class 4 and Class 5 watercourses) within 30m of the works corridor (this will also include existing road drains along the haul route works); The check dams / silt fencing arrangements will be placed every 10m; Bog mats will be used in wet / boggy areas zone to prevent ground rutting and soil erosion which could lead to potential water quality impacts. All ground rutted by vehicles / machinery will be levelled or backfilled to prevent their progression as preferential pathways for surface water runoff; 		

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- If high levels of silt or other contaminants are noted in any local watercourse, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- Excavation work will not be undertaken during periods of high rainfall. This will minimise the risk of entrainment of suspended sediment in surface water runoff and transport via this pathway to surface watercourses;
- All disturbed ground will be re-seeded at the soonest, practicable opportunity to prevent erosion;
- All temporary surface water control / protection measures such as silt fencing and check dams will be kept in place until disturbed ground has vegetated and stabilised. Regular daily checks will be undertaken;
- Where the cable trench route runs downslope for long distances (>50m) towards a watercourse, regular spaced impermeable bunds will be placed within the trench backfill to prevent the trench acting as a drain towards the stream thus preventing potential water quality impacts from surface water drainage within the trench;
- There will be no refuelling allowed within 100m of a watercourse; and,
- All plant will be checked for purpose of use prior to mobilisation.

References

- IFI (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- NRA (2008) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.

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RW-BPM-06	Surface Water Quality Protection Measures During Tree Felling Works.	
Environmental Commitment		
Prevention of significant surface water quality impacts from sediment/nutrient input during coniferous tree felling.		
Work Sections/Locations		
<ul style="list-style-type: none"> Coniferous tree block felling will be required at the following locations: RWR1/SW16 and SW24 		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Monitor weather conditions. Supervise tree felling works and drainage works. 	
Pre-felling surveys		
<ul style="list-style-type: none"> Inspection of main drainage ditches and outfalls will be completed during wet periods, and well in advance of the proposed felling works; Another full inspection of the proposed felling area will be completed by the Construction Manager one day in advance of the proposed felling works; Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines; Inspection of all areas reported as having unusual ground conditions; and, Pre-felling surface water sampling will be undertaken at the main watercourse downstream of the works area (sampling will be completed during a wet period). 		
Protection of watercourses during felling works		
<ul style="list-style-type: none"> Machine combinations will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance; Checking and maintenance of roads and culverts will be undertaken by the Construction Manager throughout the felling operation; No tracking of vehicles through watercourses will occur, as vehicles will use road infrastructure and watercourse crossing points; Drains which flow from the areas to be felled will have temporary silt traps installed; Where felling is to be completed inside the 10 – 25m aquatic buffer zone along a watercourse, double silt fencing will be arranged downslope of the proposed works area; Brush mats or bog mats will be used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding will occur; Timber will be stacked in dry areas away from surface water buffer zones. Temporary rectangular straw bales to be emplaced on the down-gradient side of timber processing areas; Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water runoff; Following tree felling all drains will be inspected to ensure that they are functioning and silt traps will remain in place until all disturbed ground has stabilised; Extraction tracks near drains will be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining vegetated ground. Silt fencing will be installed downslope of any diversion channels where ground has been broken or disturbed; 		

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- All accumulated silt will be removed from existing drains, culverts and silt traps. This removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.

Post-felling surveys

- Post-felling surface water sampling will be undertaken at the main watercourse downstream of the works area (sampling will be completed during a wet period).

References

- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): Forest Operations & Water Protection Guidelines;
- Forest Services (Draft) Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures; and,
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.

RW-BPM-07	Protection of Surface Water and Groundwater Quality during use of Cement Based Compounds.	
Environmental Commitment		
Prevention of significant surface water and groundwater quality impacts during use of Cement Based Compounds.		
Work Sections/Locations		
<ul style="list-style-type: none"> • Internal Windfarm Cabling – public road crossing locations and • Telecom Relay Pole - foundations 		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> • Monitor weather conditions. • Ensure best practice e storage and use of Cement Based Compounds. 	
Measures along the 110kV UGC		
<ul style="list-style-type: none"> • No wet-cement products will be used along the grid connection route (Project Design Measure); • A semi-dry granular cement mix will be used in the cable trench, and, pre-cast structures / pipes will be used for new temporary or permanent crossings; • No washing out of any plant or equipment used in concrete transport or concreting operations will be allowed along the route; • Any spills no matter how small or material or overburden contaminated with cement mix will be moved off-site for disposal at a licensed premises; • Outfalls or natural pathways (<i>i.e.</i> preferential flow paths) from the trench towards any local drain or watercourse will be prevented. Outfalls or natural pathways will be temporarily blocked using sand bags and geotextile until the cement mix has set; and, • At watercourse crossing locations, a layer of fine sand (5 – 10cm) will be placed over the cement mix within the trench prior to backfilling. This will prevent release of cement into the watercourse when flow is restored. 		
Measures at Mountphilips Substation and End Masts		
<ul style="list-style-type: none"> • No batching of wet-cement products will occur on site (Project Design Measure). • Ready-mixed supply of wet concrete products and pre-cast products will be used for watercrossing structures; • No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; • Where concrete will be delivered on site, only the chute will need to be cleaned, using the smallest volume of water practicable. Cement wash water will be collected in a sealed, temporary lagoon which will be placed at least 50m from a watercourse; • No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be tanked and removed from the site to a suitable, non-polluting, discharge location; • Weather forecasting will be used to plan dry days for pouring concrete; • The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event. 		

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Monitoring Measure

- Regular pH monitoring of the construction drainage water will be completed. When there is an increase of pH above the natural baseline in the local stream, pH adjustment will be undertaken prior to the release of the surface water drainage.

References

- IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.
- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on ‘Control of Water Pollution from Linear Construction Projects’ (CIRIA Report No. C648, 2006)
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors.

RW-BPM-08	Protection of Surface Water and Groundwater Quality During Storage and Handling of Fuels, Oils and Chemicals.	
Environmental Commitment		
Prevention of significant water quality impacts during storage and handling of fuels, oils and chemicals.		
Work Sections/Locations		
<ul style="list-style-type: none"> Construction works area boundary 		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Monitor weather conditions. Ensure best practice use and storage of fuels, oils and chemicals on-site. 	
Manage of on-site refueling		
<ul style="list-style-type: none"> On site re-fuelling of immobile machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site, and will be towed around the site by a 4x4 jeep to where machinery is located; The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages; The fuel bowser will be parked on a level area in the construction compound when not in use and only designated, trained and competent operatives will be authorised to refuel plant on site; Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; All generators and suction pumps used at watercourse crossing locations will have a double skinned fuel tank or be placed on a drip tray; and, There will be no storage of fuel or refuelling or mobile plant permitted within 100m of a watercourse. 		
Storing fuel properly		
<ul style="list-style-type: none"> Fuels stored on site will be minimised. Storage areas, which will be located at the temporary compounds, will be bunded appropriately for the fuel storage volume for the time period of the construction (Project Design Measure). 		
Monitoring Measure		
<ul style="list-style-type: none"> Regular pH monitoring of the construction drainage water will be completed. When there is an increase of pH above the natural baseline in the local stream, pH adjustment will be undertaken prior to the release of the surface water drainage. 		
Avoid leakage from plant and tools		
<ul style="list-style-type: none"> The plant, machinery and tools used during construction will be regularly inspected for leaks and fitness for purpose. 		
Contingency for spillages		
<ul style="list-style-type: none"> An emergency plan for the construction phase to deal with accidental spillages is contained within Environmental Management Plan (Section 6). Spill kits will be available to deal with any accidental spillage in and outside the refuelling area; and, Any spills no matter how small or material or overburden contaminated with fuel/oil will be moved off-site for disposal at a licensed premise. 		

Best Practice Measures

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References

- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006).
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.
- EMP for UWF Related Works, Section 6: Environmental Emergency Procedure for Oil/Fuel Spillage

RW-BPM-09	Design of New Permanent Watercourse Crossing Structures to Prevent Flood Risk	
Environmental Commitment		
Prevention of flooding at watercourse crossings due to undersized culverts / bridges.		
Work Sections/Locations		
Relevant Watercourse Crossing Points: WW1, WW12, WW13, WW15, WW21, WW24, WW25 and WW31 (Class 4 water crossings), also WW14 (Class 3 water crossings), also WW2, WW4 and WW22 (Class 2 water crossings).		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> • Ensure appropriate culvert/bridge design. • Supervise the construction works. 	
Surface Water Quality Protection Measures		
<ul style="list-style-type: none"> • All permanent culverts/bridges will be sized to cope with a minimum 100-year flood event (Project Design Measure); • A freeboard of 300mm, or as required by OPW, will be kept below the crossing structure during a 100-year flood event; • At a minimum, all new pipe culverts will be 900mm in diameter regardless of the anticipated flood flow (Project Design Measure) (<i>i.e.</i> minimum 900mm culvert will be used in Class 3/Class 4 watercourses regardless of flows); • New and replaced permanent crossing structures will be construction in accordance with the Office of Public Works (OPW) guidelines Construction, Replacement or Alteration of Bridges and Culverts (2013), • As agreed with OPW (telephone consultation, February 2018) will be subject to a Section 50 application to OPW following the grant of planning permission. 		
References		
<ul style="list-style-type: none"> • The Planning System and Flood Risk Management Guidelines (DoEHLG, 2009). • OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts. • NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. 		

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RW-BPM-10	Surface Water Quality Protection Measures During Temporary Storage of Overburden	
Environmental Commitment		
Prevention of significant surface water quality impacts during Temporary Storage of Overburden.		
Work Sections/Locations		
Temporary overburden storage will be located at the following locations: <u>Internal Windfarm Cabling</u> , construction works area boundary <u>Haul Route Works locations</u>		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> • Monitor weather conditions. • Supervise excavation works and drainage works 	
Surface Water Quality Protection Measures		
<ul style="list-style-type: none"> • No temporary overburden storage areas will be permitted within 50m of a Class 1 (EPA blueline mapped watercourse) or Class 2 (EPA unmapped blueline equivalent) watercourse (Project Design Measure); • Sloping ground and areas with wet ground conditions / ponding will be avoided; • Where possible, the temporary overburden storage area will be located on vegetated ground as the existing vegetation will act as an effective buffer against any sediment in runoff from the storage area; • The overburden mound will not be compacted, nor will the surface of the mound be smoothed or battered back as rough surfaces on overburden mounds increase infiltration and reduce surface water runoff and erosion; • A perimeter of double silt fencing will be placed around the temporary storage area. Silt fencing will be checked on a daily basis and replaced when necessary; • Temporary check dams and silt fencing arrangements will be placed in local Class 4 watercourses (Drains) and Class 3 watercourses (Marginal Watercourses) if they exist within 20m of the storage area; • Where the temporary overburden storage areas are located in forestry, temporary blocking of mound drains/rills will be undertaken downslope of the storage area. All existing roadside drains will have temporary check dams installed; • During periods of heavy rainfall a sheet of polyethene or a geotextile will be used to cover the overburden to prevent erosion; and, • All temporary overburden storage areas will be checked / monitored on a daily basis until stabilised to ensure no drainage issues of surface water quality impacts are occurring. 		
References		
<ul style="list-style-type: none"> • IFI (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters; • NRA (2008) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes; and, • CIRIA C648 (2006) Control of Water Pollution from Linear Construction Sites. 		

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RW-BPM-11	Surface Water Quality Protection Measures during Permanent Storage of Overburden	
Environmental Commitment		
Prevention of significant surface water quality impacts during Permanent Storage of Overburden.		
Work Sections/Locations		
Permanent overburden storage will be located at the following locations: - <u>Telecom Relay Pole</u> - Realigned Windfarm Roads		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> • Monitor weather conditions. • Supervise excavation works and drainage works. 	
Surface Water Quality Protection Measures		
<ul style="list-style-type: none"> • No permanent overburden storage areas will be permitted within 50m of a Class 1 (EPA blueline mapped watercourse) or Class 2 (EPA unmapped blueline equivalent) watercourse (Project Design Measure); • Sloping ground and areas with wet ground conditions will be avoided; • If possible, within grassland, the permanent overburden storage area will be located on vegetated ground as the existing vegetation will act as an effective buffer against any sediment in runoff from the storage area until it has stabilised by vegetation; • Within grassland, a perimeter of double silt fencing or a sand bag/geotextile berm will be placed around the permanent storage area until the mound has stabilised by vegetation; • Where the permanent overburden storages areas are located in forestry, temporary blocking of mound drains/rills will be undertaken downslope of the storage area until the mound has stabilised by vegetation; • At permanent storage areas along proposed permanent access roads or existing roads (<i>i.e.</i> forestry tracks and farm tracks) silt trap / silt fence arrangements will be placed within the proposed / existing road drainage and left in place until the mound has stabilised by vegetation; • The overburden mound will be seeded at the soonest opportunity to prevent erosion; and, • All permanent overburden storages areas will be checked / monitored on a weekly basis until stabilised to ensure no drainage issues of surface water quality impacts are occurring. 		
References		
<ul style="list-style-type: none"> • IFI (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters; • NRA (2008) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes; and, • CIRIA C648 (2006) Control of Water Pollution from Linear Construction Sites. 		

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RW-BPM-12	Monitoring of nesting and roosting Hen Harrier (<i>Circus cyaneus</i>)	
Environmental Commitment		
To identify and monitor breeding Hen Harrier		
Work Sections/Locations		
2km buffer of UWF Grid Connection construction works areas, UWF Related Works/UWF Replacement Forestry/Consented Upperchurch Windfarm/ Windfarm and UWF Other Activity Locations located within or adjacent to suitable Hen Harrier habitat- including the UHHS.		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Scheduling of construction activities 	
Project Ecologist	<ul style="list-style-type: none"> Carrying out of surveys to Best Practice guidance for nesting Hen Harrier. Must be aware of the best practice guidance listed in References below. 	
Surveying of nesting and roosting Hen Harrier		
<ul style="list-style-type: none"> Monthly surveys following (SNH) guidance will be undertaken by a suitably qualified Ornithologist Confirmatory hen harrier breeding surveys will be completed, before construction works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the construction works area boundary (Project Design Measure). Breeding Surveys will take place monthly between February and August of the construction year and will be targeted at confirming breeding attempts and/or nest locations within the 2km buffer area utilized to establish baseline conditions. Confirmatory hen harrier roosting surveys will be completed, within 1000m of the construction works boundary. Roosting surveys will take place monthly between October and February of the construction year and will be targeted at confirming roosting locations within the 1km buffer area utilized to establish baseline conditions. These surveys (both breeding and roosting) will be completed prior to the start-up of all construction activities, until construction is complete and for 4 years thereafter (Years 1-3 and Year 5) (Project Design Measure). Surveys will also be undertaken in years coinciding with any National Surveys of Hen Harrier to fully inform future trends in respect of the Slievefelim to Silvermines Mountains SPA. A report including nesting activity, levels of usage and any disturbance events, will be provided to the Competent Authority and NPWS following the completion of each survey season. The Project Ecologist will keep NPWS informed of the real-time status of nesting Hen Harrier as a result of the monitoring associated with this project. 		
Construction Works Restrictions		
<ul style="list-style-type: none"> A temporal construction exclusion zone of 500m will be established around any active hen harrier breeding attempt or active nesting location. The temporal exclusion zone will be established by a suitably qualified Ornithologist and will be strictly adhered to by all personnel involved in the construction works. No construction works will take place within the temporal exclusion zone during the breeding season March to August (Project Design Measure). A temporal construction exclusion zone of 1000m will be established around identified Hen Harrier roost locations during the winter roosting season (October to February inclusive). The temporal exclusion 		

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<p>zone will be established by a suitably qualified Ornithologist and will be strictly adhered to by all personnel involved in the construction works. Construction works within 1000m of a roost will be limited to the period between one hour after sunrise to one hour before sunset (Project Design Measure).</p>
<p>Compliance Monitoring</p>
<ul style="list-style-type: none"> • The temporal exclusion zone will be monitored by a suitably qualified Ornithologist. • The Ornithologist will have ‘stop works’ authority. • Any non-compliance will be recorded in a register and included in a report to be provided to the competent authority following the completion of the construction stage.
<p>Operational Works Measures</p>
<ul style="list-style-type: none"> • During the Operational Phase a suitably qualified Ornithologist will be present during any required maintenance works along the 110kV UGC within the SPA to ensure no breeding Hen Harrier are disturbed.
<p>Construction Stage Dust Effects</p>
<ul style="list-style-type: none"> • If dust issues start to occur proximal to sensitive nest locations, the Project Ecologist/Ornithologist will report the issue to the Environmental Clerk of Works, who will require the Construction Contractor to minimize dust emissions, as per Best Practice Measure RW-BPM-29.
<p>References</p>
<ul style="list-style-type: none"> • Scottish National Heritage (2014) Survey Methods for Use in Assessing the Impacts of Onshore Wind-farms on Bird Communities http://www.snh.gov.uk/docs/C278917.pdf • Ruddock and Whitfield (2007) A Review of Disturbance Distances in Selected Bird Species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage. http://www.snh.org.uk/pdfs/strategy/renewables/BIRDSD.pdf

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RW-BPM-13	Minimising the effects of lighting on bats	
Environmental Commitment		
To avoid displacement or disturbance of bats arising from the use of artificial lighting.		
Work Sections/Locations		
150m around all UWF Related Works construction works areas		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Scheduling of works 	
Project Ecologist	<ul style="list-style-type: none"> The Project Ecologist will liaise with NPWS throughout the construction stage and early operational stage. Monitor the construction activities to ensure that mitigation measures are strictly adhered to at all times. Must be aware of the best practice guidance listed in References below. 	
Design principles for lighting		
<ul style="list-style-type: none"> All known bat roosts within 150m of the construction works areas will be subject to confirmatory survey prior to the onset of construction works in order to identify any changes in the interim period since baseline establishment. Surveys will be carried out at a time of year that is appropriate to the type of roost e.g. June to August for maternity roosts, or November to February for hibernation roosts. This will ensure that the Project Ecologist has accurate information regarding the location and status of roosts, and that the lighting proposals can be adapted accordingly, if required. The Project Ecologist will communicate all bat survey results and information to the Project Team. This information will also be issued to the Local Authority and relevant statutory consultees, as agreed at the consenting stage. In general, the use of lighting will be avoided throughout the scheme, as most of the surrounding landscape is of at least local importance for bats. All construction works will be carried out during daylight hours (Project Design Measure). Security lighting will be used at compounds. All lighting will be cowed in order to prevent light spill and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational (Project Design Measure). Lights would be operational for 30 seconds and would then switch off automatically. Additionally, lights will be directed only onto the required area, in conjunction with the ECoW, the Contractor will choose lighting in accordance with Guidance Notes for the Reduction of Obtrusive Light GN01-2011 when deciding on lighting; Low UV-lighting bulbs, such as low-UV LEDs or low / high pressure sodium lamps will be used. Mercury or metal halide bulbs will not be used. 		
References		
<ul style="list-style-type: none"> Stone, E.L. (2013) Bats and lighting: Overview of current evidence and mitigation guidance. University of Bristol Bat Conservation Trust (2008). Bats and the Built Environment Series: Bats and Lighting in the UK Bat Conservation Ireland (2010). Bats & Lighting: Guidance Notes for Planners, engineers, architects and developers 		

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RW-BPM-14	Protection of potential tree and bridge bat roosts	
Environmental Commitment		
Best Practice measures in respect of direct disturbance or destruction of potential tree and bridge roosts throughout the pre-construction, during construction and operational phases of the development.		
Work Sections/Locations		
Tree felling locations, bridges along haul routes and works areas		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Scheduling of construction activities 	
Project Ecologist	<ul style="list-style-type: none"> Pre-construction confirmatory surveys will be carried out by the Project Ecologist (under license) on all bat roosts identified within the zone of effect of works boundary. The Project Ecologist will liaise with NPWS throughout. Monitoring felling and pruning works on trees with bat suitability. Must be aware of the best practice guidance listed in References below. 	
Survey Measures for Potential Tree Roosts		
<ul style="list-style-type: none"> All trees that require felling or other modifications (e.g. branch removal, trimming) will be subject to a confirmatory ground-level visual inspection by the Project Ecologist prior to the onset of works. All trees with moderate or high suitability for bats will have a presence / absence bat detector survey during the season of peak activity (usually May to September, inclusive). Trees of negligible or low suitability generally do not require a presence / absence bat detector survey, but this will be reviewed by the Project Ecologist. The Project Ecologist will communicate all bat survey results and information to the Project Team. This information will also be issued to the Local Authority and relevant statutory consultees, as agreed at the consenting stage. 		
Tree Felling measures		
<ul style="list-style-type: none"> Trees with low suitability for bats will be cut in sections by a suitably qualified tree surgeon, and all sections with crevices or cavities will be lowered carefully to the ground and left undisturbed for 48 hours before removal. Any trees of moderate or high suitability will have a presence / absence bat detector survey prior to felling. If roosting bats are present, the consultant will develop a case-specific mitigation strategy (e.g. seasonal restrictions on felling works, fitting of exclusion tubes at roost entrances), and apply to the NPWS for a derogation licence. Any bats will be permanently excluded from the tree before felling, and replacement roosting opportunities (i.e. bat boxes) will be provided. If a tree of moderate or high suitability is surveyed and no bats are recorded, then it will be felled immediately. It will be cut in sections by a tree surgeon, and all sections with crevices or cavities will be lowered carefully to the ground and left undisturbed for 48 hours before removal. 		

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<p>Derogation Licenses</p> <ul style="list-style-type: none"> Any requirement for derogation from the European Communities (Birds and Natural Habitats) Regulations 2011 will be reviewed by the Project Ecologist following consultation with local representatives of the National Parks and Wildlife Service.
<p>Avoid effects on bats through disturbance or destruction of potential bridge roosts.</p> <ul style="list-style-type: none"> Structures which were previously identified as having <u>no potential for bats</u> (no suitable crevices) (Grade 0; Billington and Norman, 1997) will require a visual inspection to confirm that the previous assessment remains valid and no suitable crevices have formed in the intervening period. If the structure remains unsuitable for bats, no additional surveys are required. All bridges which were previously identified as <u>having evidence of bats or suitable crevices for bats</u> (Grade 1 to 3; Billington and Norman, 1997) will have a visual inspection (using lights, fiberscope, etc.) and bat detector surveys (to be undertaken throughout the duration of the night and include dusk emergence and dawn swarming periods) will be undertaken prior to the commencement of bridge maintenance/upgrade works to determine if bats are using the structure at the time of any works. If <u>no bats are found</u> to be present during the surveys but suitable crevices are present, these will be temporarily blocked in advance of works to ensure bats do not occupy the structure in the intervening period. If <u>bats are found</u> in any bridges, the Project Ecologist will develop a case-specific mitigation strategy (e.g. seasonal restrictions on works, fitting of exclusion valves at roost entrances, blocking of unoccupied crevices) and apply to the NPWS for a derogation license for the proposed works. If undertaken, any maintenance/upgrade works will include the conservation of a number of the most suitable crevices in the bridge structure as part of the works programme. If the complete loss of all suitable crevices is unavoidable, mitigation measures in the form of bat boxes and/or bat tubes will be erected on the bridge to provide alternative roosting opportunities. The number and placement of the bat boxes and/or tubes will be determined by a bat specialist.
<p>References</p> <ul style="list-style-type: none"> National Roads Authority (2005). Guidelines for the Treatment of Bats during the Construction of National Road Schemes. National Roads Authority, Dublin. Billington, G.E. and Norman, G.M. (1997). A Report on the Survey and Conservation of Bat Roosts in Bridges in Cumbria. Kendal, English Nature Kelleher, C. and Marnell, F. (2006). <i>Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25.</i> National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

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RW-BPM-15	Bats – Post Construction Monitoring	
Environmental Commitment		
Operational monitoring of bat roosts and sensitive severed hedgerow locations post construction to monitor effects (if any) from the construction of the UWF Related Works		
Work Sections/Locations		
Bat roost identified during baseline evaluations, Bat Crossing locations in field boundaries along the works area		
Responsibility of	Role/Duty	
Project Ecologist	<ul style="list-style-type: none"> • Post-construction activity surveys. • Liaising with NPWS. • Must be aware of the best practice guidance listed in References below. 	
Operational Surveys		
<ul style="list-style-type: none"> • Post-construction activity surveys will be carried out annually by the Project Ecologist • Roost surveys on roosts identified as part of baseline evaluation will be carried out under Licence within the suitable survey season as per Best Practice, • All hedgerow locations subject to Bat Crossing Structures and reinstatement measures will also be surveyed by a suitably qualified Bat expert within the suitable survey season as per Best Practice. • Surveys will be carried out annually during the early operational years and will continue until all revegetation has reached maturity and bat habitat severance effects are closed out. i.e. 6 years • At the end of this period, if necessary, recommendations will be made on further survey requirements following consultation with NPWS. • Results will be made available to the Local Authority and relevant statutory consultees in the form of an annual report. 		
References		
<ul style="list-style-type: none"> • National Roads Authority (2005). Guidelines for the Treatment of Bats during the Construction of National Road Schemes. National Roads Authority, Dublin. • Billington, G.E. and Norman, G.M. (1997). A Report on the Survey and Conservation of Bat Roosts in Bridges in Cumbria. Kendal, English Nature • Kelleher, C. and Marnell, F. (2006). <i>Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25.</i> National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. 		

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RW-BPM-16	Monitoring of non-native invasive plant species.	
Environmental Commitment		
Monitoring of non-native invasive plant species.		
Work Sections/Locations		
All construction works sections and operational stage wayleave areas		
Responsibility of	Role/Duty	
Project Ecologist	<ul style="list-style-type: none"> • Implementation of surveying • Must be aware of the best practice guidance listed in References below. 	
Avoid adverse effects of the introduction and spread of non-native invasive species		
<ul style="list-style-type: none"> • Monitoring in the form of confirmatory surveys will be carried out by the Project Ecologist to accurately determine the current status of invasive species locations identified during baseline studies. • Surveying will be carried out each year of operation and this survey information will be used to inform any operational stage maintenance activities. Surveys will focus always on the works area plus 7m. Surveying of municipal areas – i.e. public road haulage routes, will not be included in surveys. • The results of this will be made available to Project Team, and any bodies as agreed at the consenting stage. • The measures included in the Invasive Species Management Plan will be implemented. 		
References		
<ul style="list-style-type: none"> • National Roads Authority (2010). Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority, Dublin. • EMP for UWF Related Works - Invasive Species Management Plan. 		

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RW-BPM-17	Best practice measures for the removal of vegetation during construction.	
Environmental Commitment		
To ensure the protection of species using hedgerow and scrub habitat during the construction phase.		
Work Sections/Locations		
All sections		
Responsibility of	Role/Duty	
Project Manager	<ul style="list-style-type: none"> Inform Project Ecologist of any requirement to clear scrub or remove hedgerows during the nesting and breeding season (1st March to 31st August inclusive). 	
Construction Manager	<ul style="list-style-type: none"> Scheduling of construction activities 	
Project Ecologist	<ul style="list-style-type: none"> The Project Ecologist will be aware of all areas of hedgerow and scrub habitat which require removal during the construction phase, giving particular regard to the statutory restrictions on vegetation clearance, (the relevant statutory provisions are listed in References) 	
Measures to ensure protection of species using hedgerow and scrub habitat		
<p>Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting, and breeding season for birds and wildlife, from 1st March to 31st August, inclusive.</p> <p>Please note that all removed hedgerows or parts thereof, will be replaced to ensure that linear habitats remain unaffected in the long term.</p> <p>The following approach will be taken in order to comply with the Wildlife Acts:</p> <ul style="list-style-type: none"> Where practical, vegetation clearance will be carried out outside of the restricted period (1st March to 31st August). Where clearance is required within the closed season, a survey will be carried out by the Project Ecologist for the presence of active birds' nests (i.e. nests with eggs or young birds). If such are found, where feasible the area will be avoided until the nesting attempt is complete. If avoidance is not feasible, such as where all works along one section of the route need to be completed to avoid incursions into the area at a later stage, the Project Ecologist will seek a derogation license from the NPWS. Such works cannot take place until this derogation license is received. Construction works practices will incorporate fire prevention measures at all works areas 		
References		
<ul style="list-style-type: none"> Statutory provisions in relation to breeding birds, namely Section 46(a) of the Wildlife (Amendment) Act 2000; Statutory provisions in relation to bats and bat roosts, namely, Wildlife Acts, 1976 and 2000, and the EU Habitats Directive (Under S.I. 94 of 1997). 		

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RW-BPM-18	Best practice for the protection and preservation of tree roots during the construction phase	
Environmental Commitment		
To ensure the protection and preservation of tree roots during the pre-construction and during construction phase.		
Work Sections/Locations		
All sections		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Scheduling of construction activities 	
Project Ecologist	<ul style="list-style-type: none"> The Project Ecologist will be aware of all trees which are to be retained and preserved during the construction and/or decommissioning phase, giving particular regard to the statutory restrictions on vegetation clearance. The relevant Statutory provisions are listed in References below. Must be aware of the best practice guidance listed in References below. 	
To ensure the protection and preservation of tree roots during the pre-construction and during construction phase		
<ul style="list-style-type: none"> All works within a Root Protection Area (RPA) (see NRA guidance (2006) for calculation of the RPA) will be supervised by the Project Ecologist. An important point to remember, prior to the design and installation of protective barriers, are that roots are often asymmetric so an arbitrarily chosen circular protection zone can often prove to be inadequate. Asymmetry of roots can be suspected if the ground is sloping to one side or if there are other variables restricting root development. The instalment of protective measures and the undertaking of all remedial works will be carried out prior to commencement of any construction activity at the RPA. Any remedial works required to trees identified for retention will be carried out prior to construction by qualified tree surgeons in accordance with BS 3998 (1989) Recommendations for tree work. Vertical barriers and/or ground protection will protect all trees that are being retained on site. These provisions will be put in place prior to any development work or soil excavations are carried out within the RPA. The purpose of protective barriers is to exclude any harmful construction activity that may damage the RPA. They also help protect the main stem of the tree. Tree protection barriers will be fit for the purposes of excluding construction activities and be durable to withstand an impact. The barrier will consist of a vertical and horizontal frame and will be at least 2.3m in height. Clear concise signage will be affixed to the barrier in an unrestricted easily viewed location. The signage must specify that no construction activity is to take place within the RPA. This will remain the place until completion of all works unless certain works are deemed acceptable following consultation with an arborist. The signage must also state that no materials of any description are to be stored or the “spilling out” of materials will not occur within the RPA. 		

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- Consultations with a qualified arborist will be undertaken if required during the development, if certain construction activities within the RPA are unavoidable, e.g. excavation works.
- Any excavation works carried out within the RPA will be undertaken with extreme care and will be carried out with due diligence, avoiding damage to the protective bark covering larger roots. This may involve excavation by mini-digger and/or hand as deemed appropriate.
- Exposed roots will be wrapped in hessian sacking to avoid desiccation and roots less than 2.5cm in diameter can be pruned back to a side root.
- The advice of a qualified arborist will be sought if larger roots that influence anchorage of the tree need to be severed.
- Toolbox talks with site personnel will include the relevant best practice measures above and all site personnel will be made aware of the importance of the protective barrier.
- In general, a ground alteration in excess of 75mm will be avoided.
- Changes in ground levels in the vicinity of a tree may alter the existing soil hydrology and may necessitate the incorporation of adequate drainage around the tree.
-

References

- Section 46(a) of the Wildlife (Amendment) Act 2000
- Tree Preservation Orders (TPO), which are made under Section 205 of the Planning and Development Act, 2000
- Statutory provisions in relation to bats and bat roosts, namely, Wildlife Acts, 1976 and 2000, and the EU Habitats Directive (Under S.I. 94 of 1997).
- BS 3998 (1989) Recommendations for tree work
- NRA (2006). Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes. National Roads Authority, Dublin.

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RW-BPM-19	Disturbance to and/or displacement of nesting Common Kingfisher (<i>Alcedo atthis</i>).	
Environmental Commitment		
To avoid disturbance/displacement of nesting Kingfisher throughout the construction phase of the development.		
Work Sections/Locations		
All watercourse crossing locations		
Responsibility of	Role/Duty	
Project Manager	<ul style="list-style-type: none"> Scheduling of construction activities 	
Project Ecologist	<ul style="list-style-type: none"> Carrying out surveying to Best Practice guidance. Must be aware of the best practice guidance listed in References below. 	
Avoid disturbance and/or displacement of nesting Kingfisher during pre-construction and during construction phase of the development.		
<ul style="list-style-type: none"> Confirmatory surveys will be carried out by a suitably qualified Ornithologist and will follow standard methodology (Cummins <i>et al</i>, 2010), Surveys will be undertaken between March and April (early visit) and again between May and June (late visit) of the construction year and will be targeted at confirming breeding attempts and/or nest locations along rivers within 300m of works area boundary (No nests were located within 300m during baseline surveys). All crossing locations will be also be surveyed to confirm Kingfisher suitability both in terms of nest banks and suitable bankside vegetation at the time of construction. No construction activities will be permitted within the temporal construction exclusion zone (500m) around identified nest locations during the bird breeding season (March – August inclusive or until nesting is confirmed as complete following supervision by a suitably qualified Ornithologist). Channel and bankside vegetation (trees, scrub etc.) where confirmed as suitable for Kingfisher, will be left untouched where possible to retain branches for foraging Kingfishers and to minimize disturbance to nesting birds. At least some marginal vegetation will be retained on suitable Kingfisher nesting banks - if present. These are mostly vertical banks over one meter in height, composed of soft material into which they can dig their burrows. 		
Other Riparian Bird Species		
<ul style="list-style-type: none"> During Kingfisher surveys, all crossing locations will also be surveyed to confirm the presence or absence of other aquatic/riparian species such as Dipper, Grey Wagtail. If present at watercourse crossing locations, Statutory provisions in relation to breeding birds, namely Section 46(a) of the Wildlife (Amendment) Act 2000 will be fully adhered with 		
References		
<ul style="list-style-type: none"> Cummins, S., Fisher, J., McKeever, R.G., McNaghten, L., and Crowe, O. (2010) Assessment of the distribution and abundance of Kingfisher (<i>Alcedo atthis</i>) and other riparian birds on six SAC river systems in Ireland. National Parks and Wildlife Service and BirdWatch Ireland. 		

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- https://www.npws.ie/sites/default/files/publications/pdf/Cummins_et_al_2010_Kingfisher_survey.pdf
- Crowe, O. (2010) Ecological Impact Assessment (EclA) of the Effects of Statutory Arterial Drainage Maintenance Activities on Kingfisher (Alcedo atthis) and other riparian birds II. Office of Public Works and BirdWatch Ireland. <http://www.opw.ie/en/media/Issue%20No.%2012%20%20EclA%20Kingfisher%20Alcedo%20atthis%20and%20other%20Riparian%20Birds%20II.pdf>

Best Practice Measures

RW-BPM-20	Monitoring of Identified Badger Setts	
Environmental Commitment		
Monitoring of identified Badger setts during the operational phase of the development.		
Work Sections/Locations		
All setts identified in baseline surveys		
Responsibility of	Role/Duty	
Project Ecologist	<ul style="list-style-type: none"> Must be aware of the best practice guidance listed in References below. 	
Monitoring of identified Badger setts during the operational phase of the development.		
<ul style="list-style-type: none"> Survey of identified badger setts within 50 m of either side of the construction works area boundary to determine the current status of known badger setts (i.e. active or inactive) and to determine if any new setts have been established in the period following the completion of construction. Surveys will be undertaken annually in Operational Years 1, 2, 3, 4 and 5. These surveys can be undertaken at any time of the year, but are most effective between November and April when vegetation cover is reduced. However, until mid-January, badgers are less active during colder weather and setts can appear less well-used (NRA, 2008). Results will be made available to the Local Authority and relevant statutory consultees in the form of an annual report. 		
References		
<ul style="list-style-type: none"> National Roads Authority (2005). Guidelines for the Treatment of Badgers prior to the Construction 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. National Roads Authority, Dublin. 		

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RW-BPM-21	Disturbance and/or physical injury to Other Mammals	
Environmental Commitment		
To avoid disturbance and/or physical injury to other mammals throughout the pre-construction, during construction and operational phases of the development.		
Work Sections/Locations		
All sections		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Scheduling of construction activities. 	
Project Ecologist	<ul style="list-style-type: none"> Monitor the construction activities to ensure that mitigation measures are strictly adhered to at all times. Must be aware of the best practice guidance listed in References below. 	
Construction Stage Surveying		
<ul style="list-style-type: none"> Confirmatory surveys (of suitable habitat) for the presence/absence of these protected species or their breeding/resting places within 50m of the construction works area will be undertaken prior to the commencement of vegetation and/or hedgerow clearance and excavations. Confirmatory surveys to check for any new dens/dreys that may have arisen between the time of the original survey and start of works will be carried out by the Project Ecologist; The Project Ecologist will communicate all confirmatory survey results and information to the Project Team. This information will also be issued to the Local Authority and relevant statutory consultees, as agreed at the consenting stage. 		
Measures to avoid/minimise disturbance effects to pine martin		
<p>In the event of the confirmation of pine martin breeding/resting places specific measures will include:</p> <ul style="list-style-type: none"> Marking exclusion zones around any confirmed pine marten dens; The boundary of the exclusion zone will be a minimum of 30m from a non-breeding den and at least 100m from dens which are known or suspected of being used for breeding, No construction works will be carried out within the exclusion zones in the breeding season (March-June inclusive); If construction works during the breeding season cannot be avoided, the den will be destroyed. The destruction of a den will require an NPWS Licence. 		
Measures to avoid/minimise disturbance effects to pine martin and red squirrel		
<p>In the event of the confirmation of red squirrel breeding/resting places specific measures will include:</p> <ul style="list-style-type: none"> Marking 50m exclusion zones around any confirmed breeding red squirrel dreys; If monitoring confirms the drey is not used for breeding, smaller protection zones will be required (5m or to the nearest neighbouring tree); On-going survey of any dreys within 50m of works areas to monitor the breeding status of the drey, (red squirrels can move dreys during the breeding season, so a non-breeding drey could change status); 		

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- Avoiding felling any trees containing red squirrel dreys, if unavoidable, the destruction of a red squirrel drey will require an NPWS licence.
- Where construction works will take place within 50m of a breeding drey, the works will be scheduled, if feasible, to take place between October–January inclusive (which is outside the breeding season), If this is unfeasible the potential for disturbance will be evaluated by the Project Ecologist and works will be monitored;
- Construction machinery will not exceed 20km/hour on access roads to ensure the protection of other non-volant mammals including but not limited to Irish hare, pine marten, hedgehog, red squirrel and Irish stoat.

Measures to avoid/minimise disturbance effects to Irish hare, hedgehog, Irish stoat, pine martin, red squirrel

- Construction machinery will not exceed 20km/hour on site access roads.

References

- Scottish Natural Heritage (2012). Protected Species Advice for Developers – Pine Marten. <http://www.snh.gov.uk/docs/A1959323.pdf>.
- Scottish Natural Heritage (2012). Protected Species Advice for Developers – Red Squirrel. <http://www.snh.gov.uk/docs/A1959329.pdf>.

RW-BPM-22 Management of general non-native invasive species.	
Environmental Commitment	
To avoid the introduction, establishment and spread of non-native species to the proposed development site during the pre-construction, during construction and operational phase.	
Work Sections/Locations	
All sections	
Responsibility of	Role/Duty
Construction Manager	<ul style="list-style-type: none"> Requiring supply companies to clean delivery vehicles before entering the site to gain access to works area Obtaining and keeping a record of delivery companies cleaning of vehicles Training flagmen in the appropriate method of vehicle cleaning
Flagmen	<ul style="list-style-type: none"> Cleaning of delivery vehicles exiting the site with suitable disinfectant Maintaining a record of all vehicles cleaned and equipment, disinfectant used.
Project Ecologist	<ul style="list-style-type: none"> Carrying out spot checks on flagmen during cleaning of delivery vehicles. Must be aware of the best practice guidance listed in References below.
Inspection and Cleaning of Delivery Vehicles	
<ul style="list-style-type: none"> Prior to arrival on site, the contractor’s vehicles and equipment will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water > 65 degrees C, in addition to the removal of all vegetative material. Items difficult to soak/spray will be wiped down with a suitable disinfectant (e.g. Virkon Aquatic). Evidence that all machinery has been cleaned will be required to be on file for review by the statutory authorities. Given that Crayfish Plague has affected rivers in the area recently (2017) the level of evidence required of the Contractor will be actual registration plates of vehicles onsite and a register of when, how and where each of these were cleaned before they arrived on site. The flagmen which will be present at each active site access points will be responsible for inspecting and cleaning delivery vehicles both entering and exiting the site, and will receive training in the correct techniques. Each flagman will be equipped with a ‘disinfection box’. This will contain Virkon Aquatic or another proprietary disinfectant, a spraying mechanism, cloths or sponges, a scrubbing brush and protective gloves. Protective gloves will be worn when using any disinfectant solution. Visual inspections will be carried out on all machinery and equipment (particularly for machinery and equipment exiting the site and which has come into contact with water or soils) for evidence of attached plant or animal material, or adherent mud or debris. Any attached or adherent material will be removed before entering or leaving the site of operation, securely stored away from traffic for removal to the waste storage area in the Temporary Compound at the end of the work day. No removed material or run-off will be allowed to enter a water body of any sort. Following cleaning, all equipment and vehicles will be visually inspected to ensure that all adherent material and debris has been removed manually. Records of supplies and cleaning of delivery vehicles will be kept by the flagmen, and will be regularly inspected by the Environmental Clerk of Works. 	

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<ul style="list-style-type: none"> Spot checks on the adequacy of cleaning will be carried out by the Project Ecologist.
<p>Measures at or in watercourses</p>
<ul style="list-style-type: none"> Residual water in any containers/vessels used in works near watercourses will be flushed with disinfectant (Virkon Aquatic) onto grass. A drying period of at least 24 hours will be adhered to. All footwear used, or to be used, in streams or rivers will be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkon Aquatic or another proprietary disinfection product) and thoroughly dried afterwards. This does not apply to footwear use in wetlands or peatland areas. Any observations of mass mortality of Crayfish will be reported to the relevant authorities within 1 hour of evidence being found.
<p>Measures for white toothed shrew</p>
<ul style="list-style-type: none"> Consignments of organic materials, such as hedging material, will be inspected for presence of Greater White-toothed Shrew.
<p>References</p>
<ul style="list-style-type: none"> http://www.fisheriesireland.ie/Research/invasive-species.html http://www.nonnativespecies.org/checkcleandry/

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RW-BPM-23	Best practice methods to ensure the protection of common frog (<i>Rana temporaria</i>) and smooth newt (<i>Triturus (Lissotriton) vulgaris</i>).	
Environmental Commitment		
To avoid effects on the breeding habitat of common frog (<i>Rana temporaria</i>) and smooth newt (<i>Triturus (Lissotriton) vulgaris</i>) if present along the UWF Related Works during the pre-construction and construction phase.		
Work Sections/Locations		
All construction works areas		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> • Scheduling of construction activities 	
Project Ecologist	<ul style="list-style-type: none"> • Must be aware of the locations of all previously identified habitats suitable for breeding amphibian along the works area. • Monitor the construction activities when working adjacent to amphibian breeding habitat to ensure that mitigation measures are strictly adhered to at all times. • Must be aware of the best practice guidance listed in References below. 	
To avoid effects on the breeding habitat of common frog and smooth newt		
<ul style="list-style-type: none"> • Should construction activities be scheduled for areas proximal to previously identified habitat suitable for breeding common frog or smooth newt during the species' respective breeding seasons (frogs: January-March and newts: March-May), confirmatory surveys following standardised methodologies will be carried out at those locations to confirm the presence/absence of breeding adults and/or spawn. • If evidence of breeding frog or newts is confirmed proximal to the work locations, the areas will be fenced off with appropriate signage in order to protect these species during construction activities; • Protecting the hydrological regime of the habitat is particularly important. Thus, it is particularly important that the Project Ecologist is suitably qualified so as to have a clear understanding of the drainage characteristics of wet areas such as ponds, pools and drains which have the potential to support breeding amphibians along the route to ensure that these areas are maintained into the future; • Note: The proposed development is beyond the geographical range of the Natterjack toad (<i>Bufo (Epidalea) calamita</i>), thus this species does not require mitigation within this Project. 		
References		
<ul style="list-style-type: none"> • National Roads Authority (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority, Dublin. 		

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RW-BPM-24	Best practice methods to ensure the protection of Viviparous lizard (<i>Lacerta (Zootoca) vivipara</i>)	
Environmental Commitment		
To avoid effects on Viviparous lizard (<i>Lacerta (Zootoca) vivipara</i>) during the pre-construction and construction phase.		
Work Sections/Locations		
All sections		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Scheduling of construction activities 	
Project Ecologist	<ul style="list-style-type: none"> Monitor the construction activities to ensure that mitigation measures are strictly adhered to at all times. Must be aware of the best practice guidance listed in References below. 	
To avoid effects on Viviparous lizard.		
<ul style="list-style-type: none"> As Viviparous lizards are widespread in Ireland and can be found in a range of habitat types such as in bog, heath, the margins of coniferous woodlands, in addition to being common in a range of grassland habitats, particularly those not subject to heavy grazing pressure, a spot-check confirmatory survey by the Project Ecologist will be required within these habitats prior to the commencement of the construction stage to confirm the presence/absence of individuals. Capture and relocation operations for this species can be extremely labour-intensive and in most cases the most efficient approach is to cut down and rake-off vegetation during warm weather, with the intention of displacing the resident lizards prior to earthworks or other activities that could result in their incidental mortality (NRA, 2009). Whether or not reptile-proof fencing is then required to exclude the animals will need to be reviewed on a location-specific basis by the Project Ecologist. Note: The proposed development is beyond the geographical range of the non-native Slow-worm (<i>Anguis fragilis</i>), thus this species does not require mitigation within this Project. 		
References		
<ul style="list-style-type: none"> NRA (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority, Dublin. 		

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RW-BPM-25	Measures to ensure the protection of Marsh Fritillary (<i>Euphydryas aurinia</i>)	
Environmental Commitment		
To avoid effects on Marsh Fritillary / Marsh Fritillary habitat during the pre-construction and construction phase.		
Work Sections/Locations		
UWF Related Works: SW13 and other suitable habitat within 50m of construction works areas.		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Scheduling of construction activities 	
Project Ecologist	<ul style="list-style-type: none"> Carrying out of Confirmatory Survey of suitable habitat Monitor the construction works when working adjacent to Marsh Fritillary habitat to ensure that mitigation measures are strictly adhered to at all times. Must be aware of the best practice guidance listed in References below. 	
Pre-Construction Surveying measures for Marsh Fritillary		
<ul style="list-style-type: none"> Confirmatory survey of the distribution of Devil's-bit Scabious (larval food plant of Marsh Fritillary) (project design measure) The survey will be carried out during the last available April prior to the commencement of construction in suitable habitat within 50m of the construction works area Surveys will be completed within 12 months prior to the commencement of the construction stage, within the correct seasonal period as per Best Practice. 		
Measures for the protection of Marsh Fritillary at different times of their life-cycle		
<ul style="list-style-type: none"> Any areas of Devil's-bit Scabious that are located within the construction works area boundary, will be strimmed/cut to ground level in the last available late April / early May period prior to the commencement of construction (project design measure). 		
Post-Construction Surveying measures for Marsh Fritillary		
<ul style="list-style-type: none"> Survey all areas with identified Marsh Fritillary colonies within the correct seasonal period annually, in years 1, 2, 3 of operation as per Best Practice, Surveying will monitor the status of Marsh Fritillary colonies and record any change to baseline trends as a result of the development of the UWF Related Works. Results will be made available to the Local Authority and relevant statutory consultees, in the form of an annual report. 		
References		
<ul style="list-style-type: none"> National Roads Authority (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority, Dublin. 		

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8.14 Summary of the Biodiversity Chapter

UWF Related Works is mainly located on agricultural lands in the eastern hills of the Slievefelim to Silvermine Mountain uplands area, with some works also in roadside verges and boundaries in the vicinity of Upperchurch Windfarm. The majority of the footprint of the UWF Related Works is located within the catchment area of the River Suir with the remainder located in the catchment area of the River Shannon. The UWF Related Works are not located within either the Lower River Suir SAC or the Lower River Shannon SAC. The Slievefelim to Silvermines SPA for hen harrier is located to the west and southwest of the UWF Related Works, and with the exception of a small area (no works required at this location) adjacent to an existing hardcore forestry yard, UWF Related Works is not located within the SPA. There are no NHAs or pNHAs in close proximity to the UWF Related Works.

Surveys of the site recorded typical upland habitats and bird species, while low numbers of non-volant mammals, amphibians and reptiles were recorded. A small population of Marsh Fritillary butterfly was recorded in Shevry.

The Sensitive Aspects of Biodiversity which were evaluated in this topic chapter are: European Sites; Aquatic Habitats & Species, Terrestrial Habitats, Hen Harrier, General Bird Species, Bats, Non-Volant Mammals, Amphibians & Reptiles and the Marsh Fritillary butterfly. Although UWF Related Works will not effects National Sites, this Sensitive Aspect was also included in the evaluation in order to show the totality of the project by presenting the effects of the Other Elements of the Whole UWF Project (limited to UWF Grid Connection).

A suite of environmental protection measures (40 no.) has been integrated into the project design to ensure that significant effects to the Biodiversity environment are avoided.

In addition to the Project Design Measures, Best Practice Measures (25 no.) will be implemented during the construction and early operational stage of the UWF Related Works, these measures will provide further protection to receiving waters.

An Environmental Management Plan has been developed for the UWF Related Works to implement the environmental commitments during the construction and early operational stage. The Environmental Management Plan includes a Surface Water Management Plan and an Invasive Species Management Plan which will provide the framework for water quality, habitats and species protection at the UWF Related Works site. The UWF Related Works Environmental Management Plan is included as Volume D.

8.14.1 Summary of Effects on European Sites

In relation to European Sites, it was concluded in the NIS (See Volume E), that in light of the conservation objectives and rationale for designation of the European Sites under consideration (Slievefelim to Silvermines SPA, Lower River Shannon SAC and Lower River Suir SAC); the potential for significant effects exists as a result of a single project element of the Whole UWF Project, namely the UWF Grid Connection. However, with the implementation of the Project Design Measures and the Additional Mitigation Measure AMM-01 in respect of Otter, it is concluded that neither the UWF Grid Connection, nor any Other Element of the Whole UWF Project, alone or in combination with each other or with Other Projects or Activities, will result in any effects that will adversely affect the integrity of the European Sites.

This NIS is included in Volume E: Appropriate Assessment Reporting.

8.14.2 Summary of UWF Related Works Impacts to the other Sensitive Aspects

The likely impacts to the individual Sensitive Aspects as a result of UWF Related Works are outlined below:

- Impacts to Aquatic Habitats & Species will range from Imperceptible to Slight-Moderate,
- Impacts to Terrestrial Habitats will be Not Significant in relation to reduction of habitats, hedgerow severance or loss of high nature value trees, as a consequence of the development of UWF Related Works.
- Adverse impacts to the Hen Harrier will be Slight as a consequence of UWF Related Works.
- Adverse impacts to the General Bird Species will be Not Significant in relation to displacement/disturbance effects and habitat loss effects. Imperceptible positive habitat enhancement effects will occur due to the planting of 370m of new hedgerow along Realigned Windfarm Road RWR2.
- Adverse impacts to Bats will be no greater than Imperceptible.
- Impacts to Non-Volant Mammals will be Neutral in relation to Badger and Otter, and are expected to be Not Significant in relation to habitat loss effects to Other Mammals (Irish Hare, Pine Marten, Red Squirrel and Fallow Deer), disturbance/displacement effects to these Other Mammals is expected to be Neutral.
- Neutral effects to Amphibians & Reptiles are expected as a consequence of the development of UWF Related Works.
- Adverse impacts to Marsh Fritillary is expected to be of Slight significance as a consequence of the development of UWF Related Works.
- There is no potential for UWF Related Works to cause effects to National Sites, due to separation distances.

8.14.3 Summary of Cumulative Impacts with Other Elements of the Whole UWF Project

As UWF Related Works is one element of the larger Whole Upperchurch Windfarm Project (Whole UWF Project), the potential for cumulative effects was examined with these Other Elements.

- In-combination impacts to Aquatic Habitats & Species will range from Slight to Moderate.
- In-combination adverse impacts to Terrestrial Habitats will not be of a greater significance than for the UWF Related Works on it owns, - i.e. cumulatively Not Significant in relation to habitat reduction or hedgerow severance. However, due to the planting of trees associated with the Upperchurch Hen Harrier Scheme (UWF Other Activities) cumulative effects of all Elements of the Whole UWF Project will change from Not Significant adverse to Moderate and positive in relation to habitat enhancement effects to Terrestrial Habitats.
- In-combination impacts to Hen Harrier will change from Slight adverse for UWF Related Works on its own to **significant and positive for the in-combination effect of all Elements of the Whole UWF Project** - this is mainly due to the Very Significant positive effects of both UWF Replacement Forestry and the UWF Other Activities (Upperchurch Hen Harrier Scheme).
- In-combination adverse impacts to General Bird Species will cumulatively Slight in relation to habitat loss effects to Golden Plover and Meadow Pipit, and Not Significant in relation to displacement/disturbance effects to Golden Plover. The cumulative positive effects to General Bird Species as a result of habitat enhancement effects will increase to Slight positive, when all Elements are taken into consideration.
- Cumulative effects to Bats of the UWF Related Works in-combination with the Other Elements will be Imperceptible or not Significant.

- Adverse cumulative effects to Non-Volant Mammals will range from Not Significant to Moderate in relation to Badger and other mammals (Irish Hare, Pine Marten, Red Squirrel and Fallow Deer), and Slight adverse in relation to Otter.
- Cumulative impacts to Marsh Fritillary of the UWF Related Works in-combination with the Other Elements (in particular the consented Upperchurch Windfarm) will remain at Slight adverse significance.
- There is no potential for in-combination impacts to National Sites or Amphibians & Reptiles.

8.14.4 Summary of Cumulative Impacts with Other Projects or Activities

The cumulative impact with Other Projects or Activities relates to the in-combination effect of all Elements of the Whole UWF Project (in particular UWF Grid Connection, and to a lesser extent UWF Related Works, Upperchurch Windfarm, UWF Replacement Forestry and UWF Other Activities) with the consented projects - Bunkimalta Windfarm, Castlewaller Windfarm, Newport Distributor Road, and the activities- Forestry, Agriculture and Turf-Cutting.

- Cumulative impacts of the Other Elements of the Whole UWF Project to Aquatic Habitats & Species only relates to UWF Grid Connection, which together with Bunkimalta Windfarm and Newport Distributor Road could cause cumulative reductions in aquatic habitat quality and are evaluated as cumulatively Slight for the Clare River catchment and cumulatively Slight to Moderate for the Newport (Mulkear) River catchment. No other cumulative impacts with other projects are expected.
- Cumulative impacts to Hen Harrier will be Neutral, when the consented Bunkimalta Windfarm and Castlewaller Windfarm and forestry activities are considered in-combination with the Whole UWF Project.
- Cumulative impacts to General Bird Species is limited to cumulative habitat loss effects to Meadow Pipit and cumulative habitat enhancement effects to general birds, as a result of the cumulative effects of Bunkimalta Windfarm. Cumulative effects will not be greater than for the cumulative Whole UWF Project – i.e. Slight adverse and Slight positive cumulative effects.
- Cumulative impacts to Marsh Fritillary with Other Projects or Activities have potential to be Moderate adverse at a wider county-level population scale when Turf-Cutting activities in Cummer Bog were taken into account.
- No cumulative impacts of any Element of the Whole UWF Project with Other Projects or Activities are expected to National Sites, Terrestrial Habitats, Bats, Non-Volant Mammals or Amphibians & Reptiles.

The authors conclude that **no significant adverse effects to Biodiversity are likely to occur** as a result of the development of the UWF Related Works, either alone or in combination with Other Elements of the Whole UWF Project or Other Projects or Activities.

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8.15 Reference List

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Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

May 2018

UWF Related Works

Chapter 8 Biodiversity Figures



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Client: Ecopower Developments Ltd.

Project: Whole Windfarm Project

Title:
Figure RW 8.1:
UWF Related Works Location Map

Legend:
UWF Related Works Construction
Works Area

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Disclaimer: Although presented in mapping, please note that the construction works boundary for the Consented Windfarm is included for illustrative purposes only as it is already subject to planning consent. For study area boundaries please see Figure 8.1, and the accompanying ERK Biodiversity Appendix.

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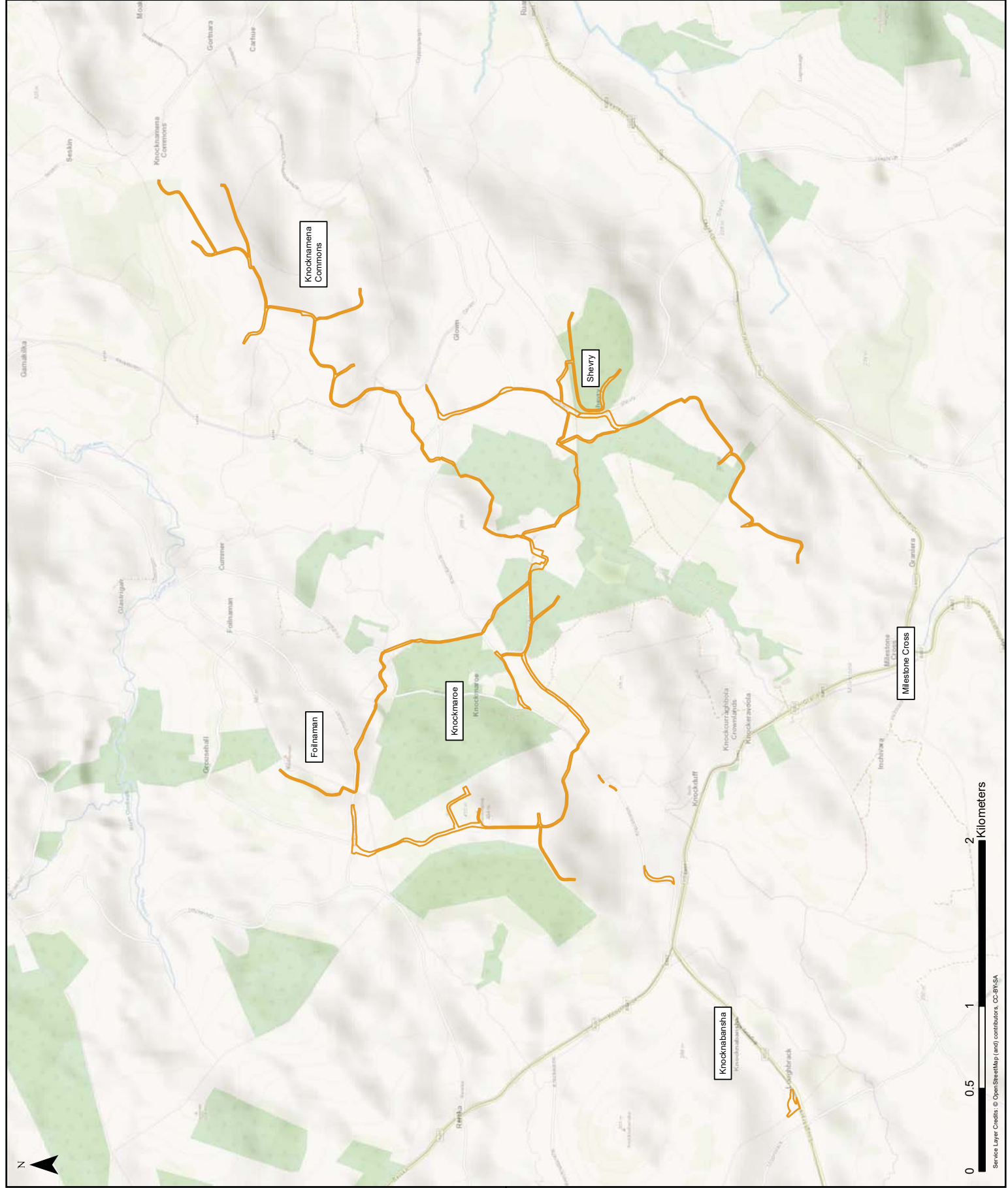
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Title:
Figure RW 8.2:
European Sites within the
UWF Related Works Study Area

- Legend:
-  UWF Related Works Construction Works Area
 -  Special Areas of Conservation within 15km
 -  Special Protection Areas within 15km
 -  Related Works 5km, 10km, 15km Buffer

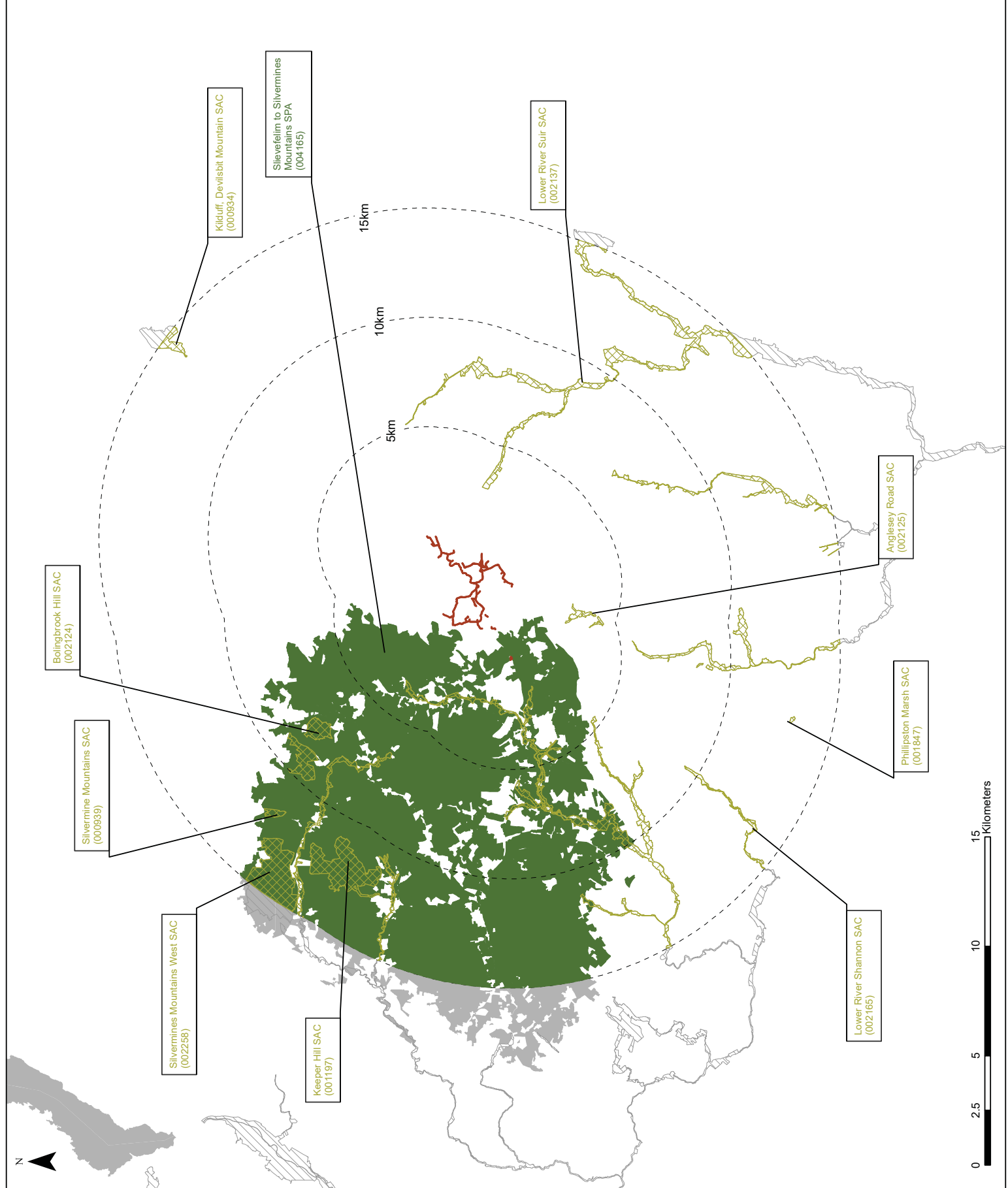
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Title:
 Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area

Legend:

- Projects/Activities
- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Construction Works Area
- UWF Other Activities Construction Works Boundary
- Special Areas of Conservation within 15km
- Special Protection Areas within 15km Buffer (Designated European Sites)

* Forestry & Agriculture: Please see those map book figures which illustrate terrestrial habitats on aerial photography, for reference purposes with respect to the extent of Forestry and Agricultural lands.

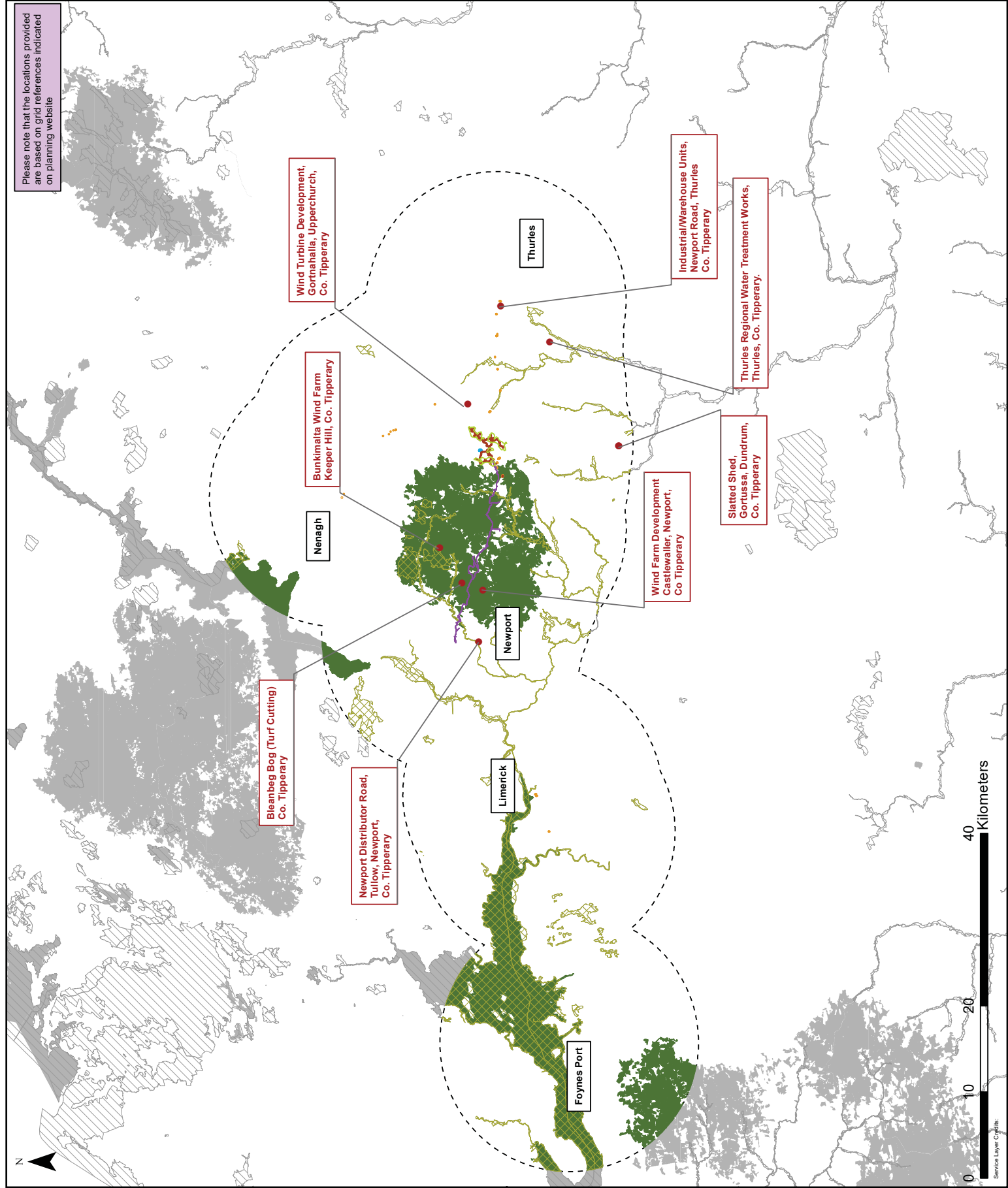
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Title:
Figure RW 8.3:
National Sites within the UWF
Related Works Study Area

- Legend:
- UWF Related Works Construction Works Area
 - National Heritage Areas within 15km
 - Proposed Natural Heritage Areas within 15km
 - Related Works 5km, 10km, 15km Buffer

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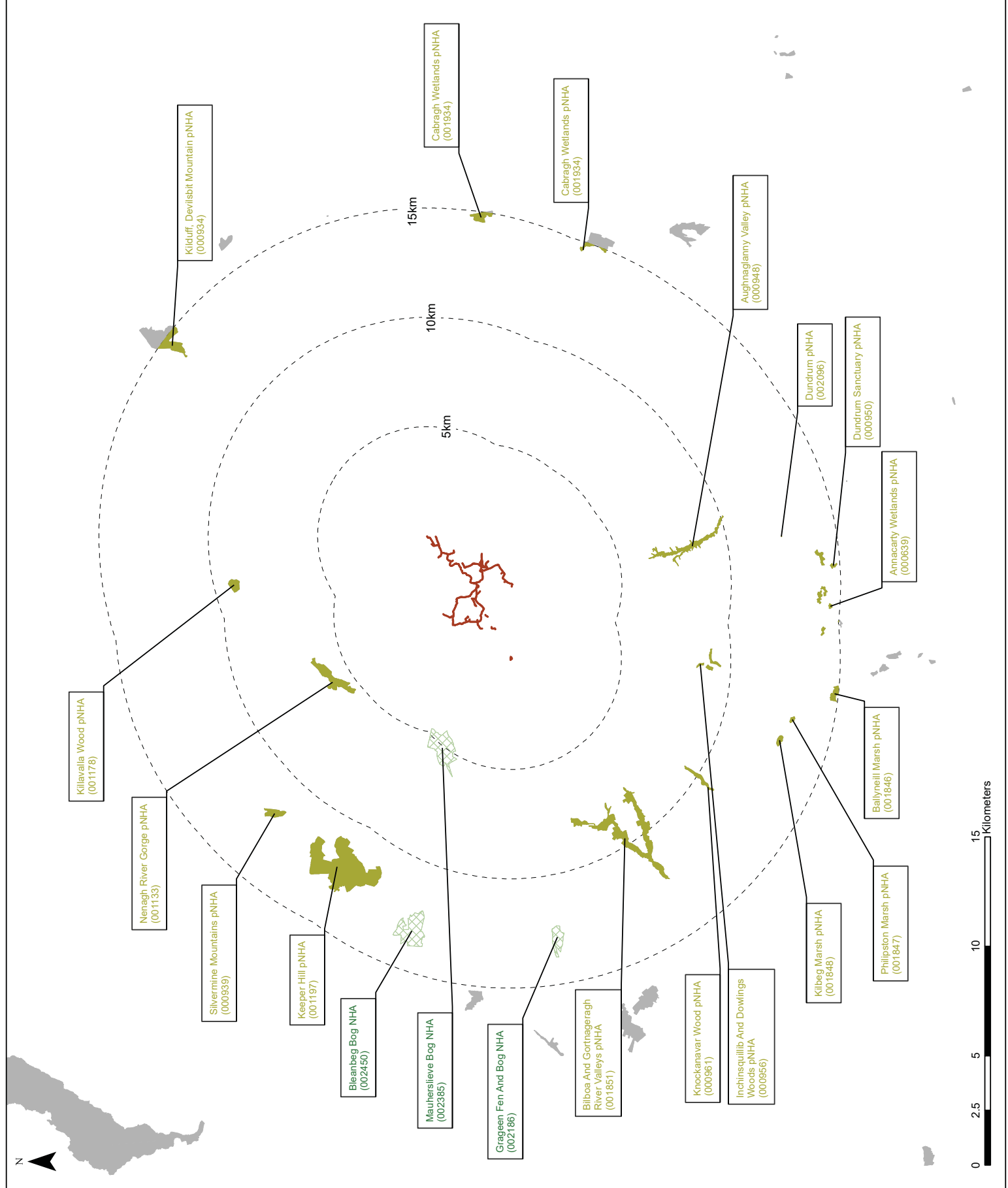
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Client: Ecopower Developments Ltd.

Project: Whole Windfarm Project

Title:
Figure CE 8.3: National Sites
within the Cumulative Evaluation
Area

- Legend:
- Upperchurch Windfarm 2013 Study Area
 - UWf Related Works Construction Works Area
 - UWf Grid Connection Construction Works Area
 - UWf Replacement Forestry Construction Works Area
 - UWf Other Activities Construction Works Boundary
 - Proposed Natural Heritage Areas within 15km
 - Natural Heritage Areas within 15km
 - 15km Buffer (NHA and pNHA sites)

No Other Projects or Activities scoped in for evaluation

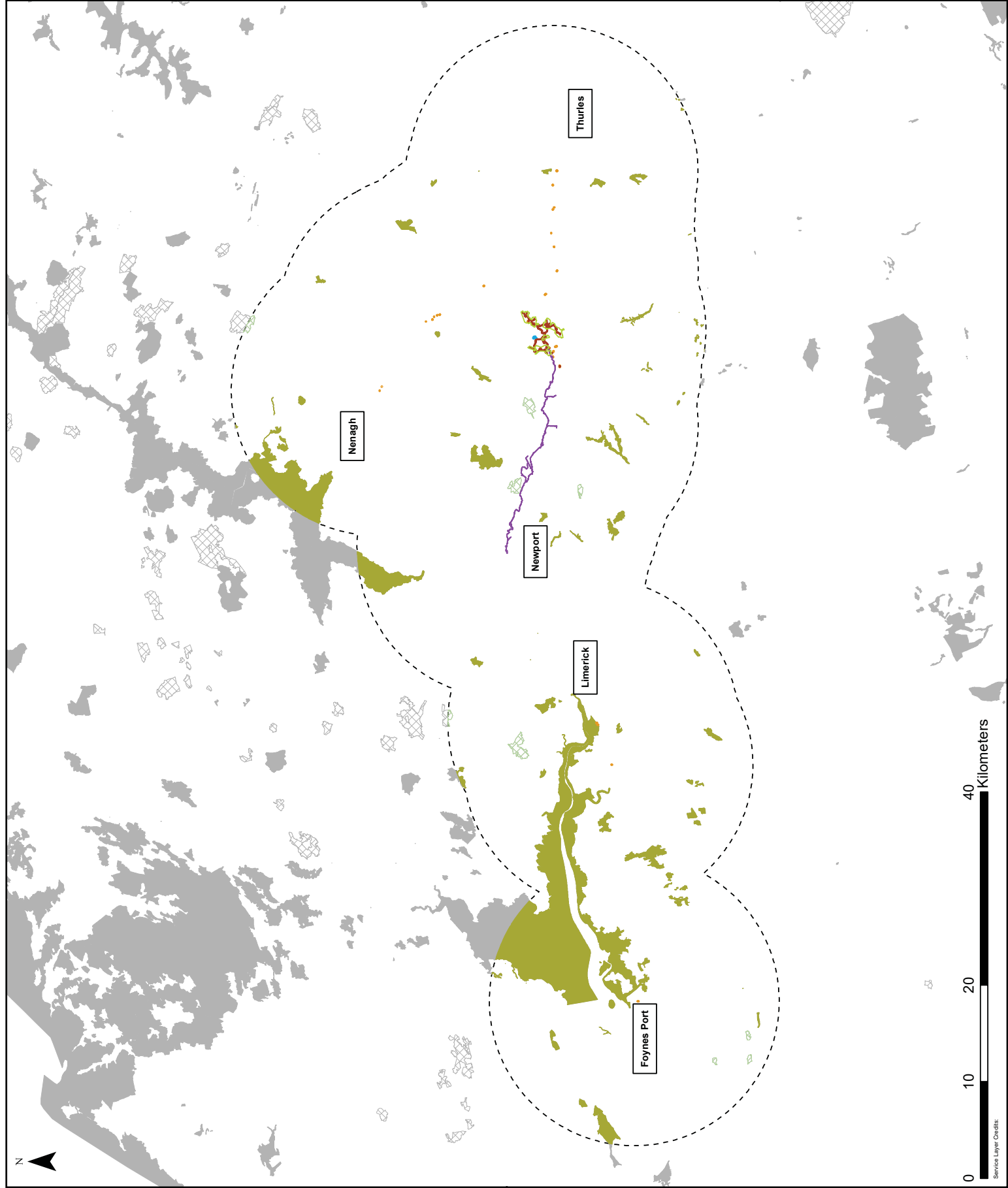
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


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
Project: Whole Windfarm Project

Title:
Figure RW 8.4: Aquatic Habitats & Species within the UWF Related Works Study Area

Legend:

-  Windfarm Water Crossing
-  UWF Related Works Construction Works Area
-  Watercourses

Watercourse Classification:

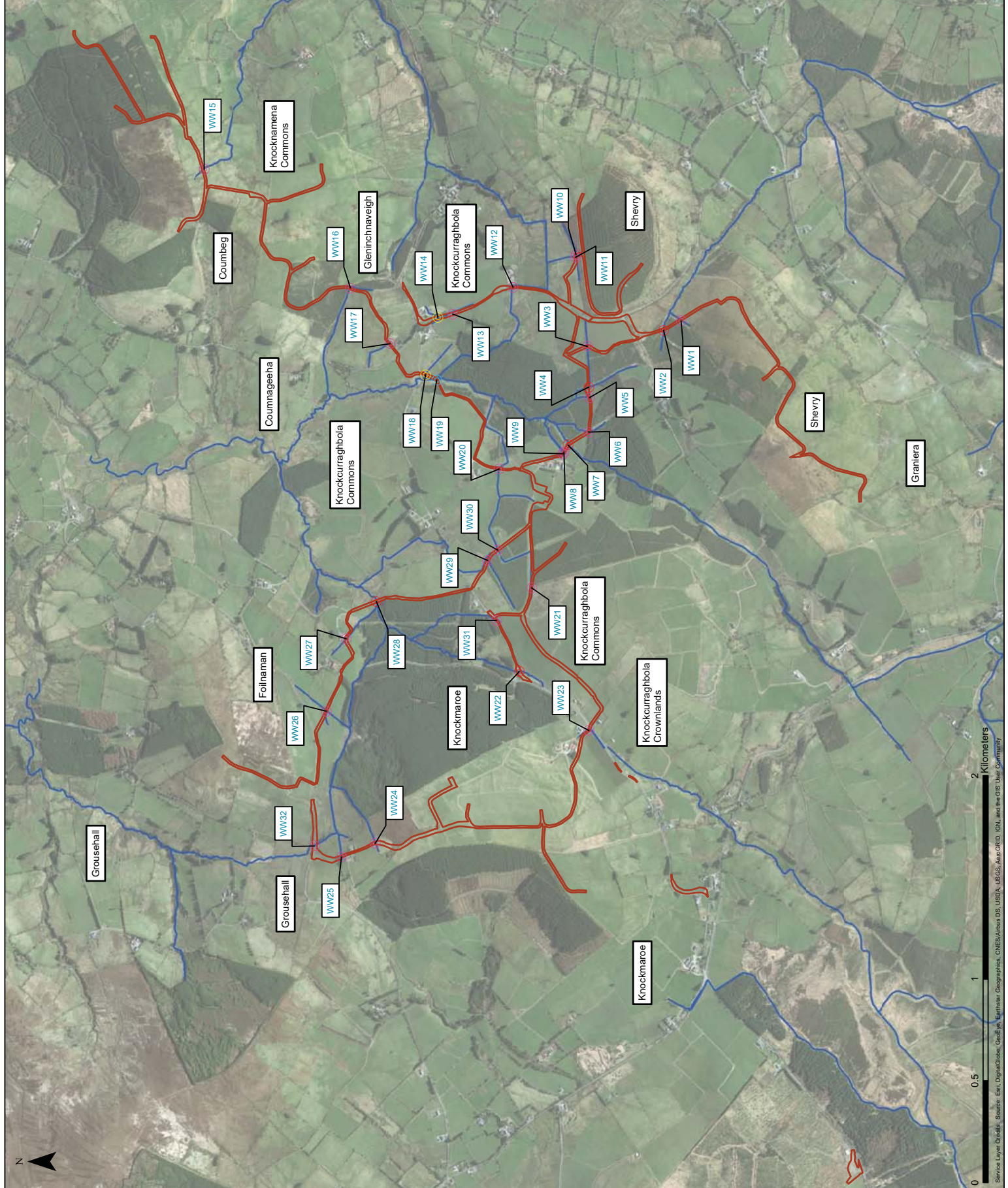
-  Class 1
-  Class 2
-  Class 3
-  Class 4

See Chapter 8, Section 8.2.6.4: Tables 8.2.3, 8.2.4, and 8.2.5 for crossing locations fisheries evaluation

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Title:
Figure CE 8.4: Aquatic Habitats & Species within the Cumulative Evaluation Study Area

- Legend:**
- Project/Activities
 - Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Construction Works Area
 - UWF Other Activities Construction Works Boundary
 - Watercourses
 - Clodiagh River Catchment
 - Mulkear River Catchment

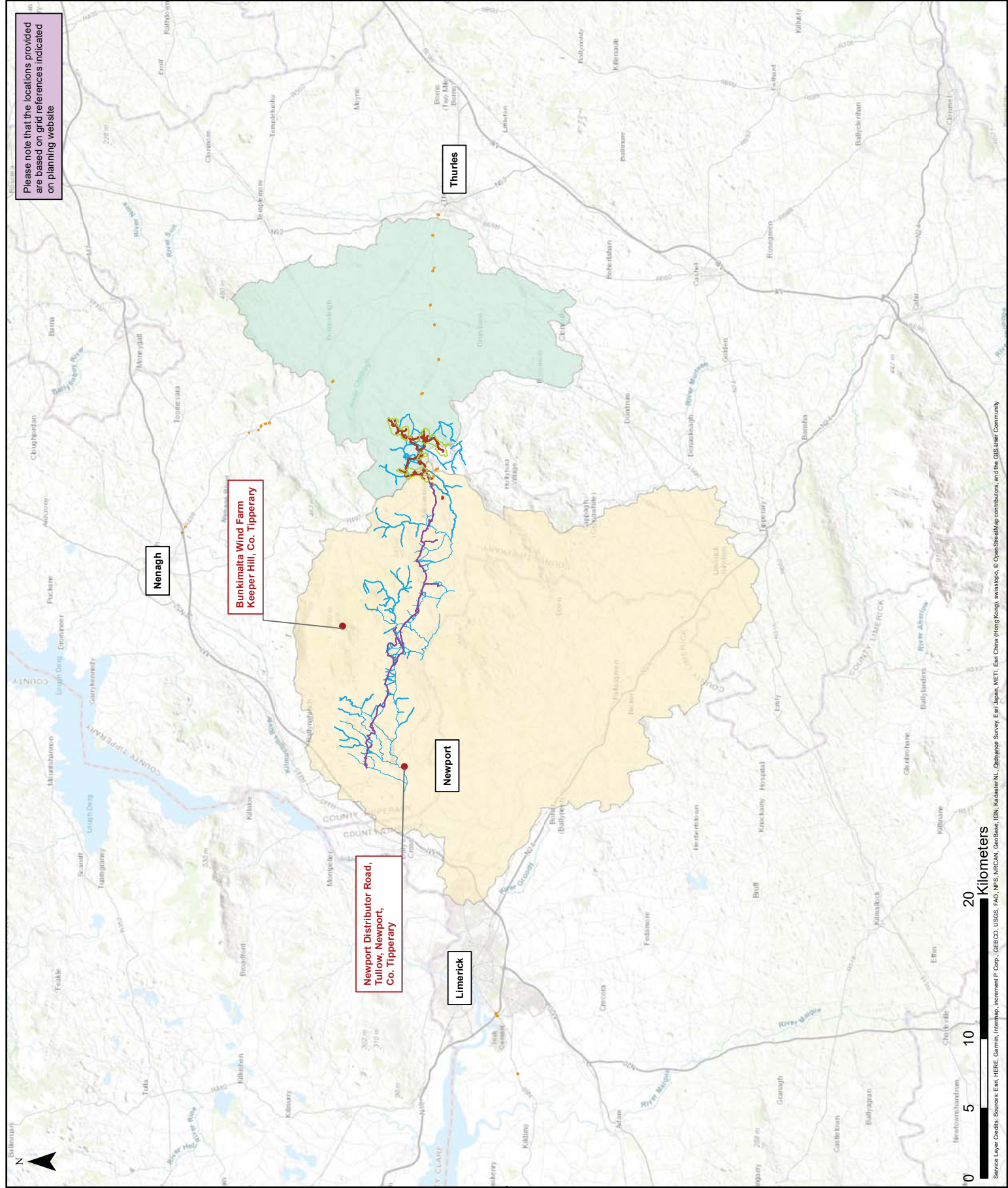
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Please note that the locations provided are based on grid references indicated on planning website



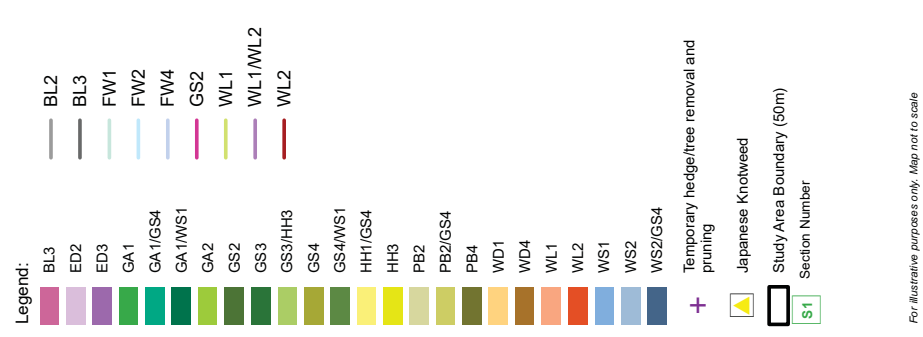
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Project: Whole Windfarm Project

Title: Figure RW 8.5: Terrestrial Habitats within the UWF Related Works Study Area.



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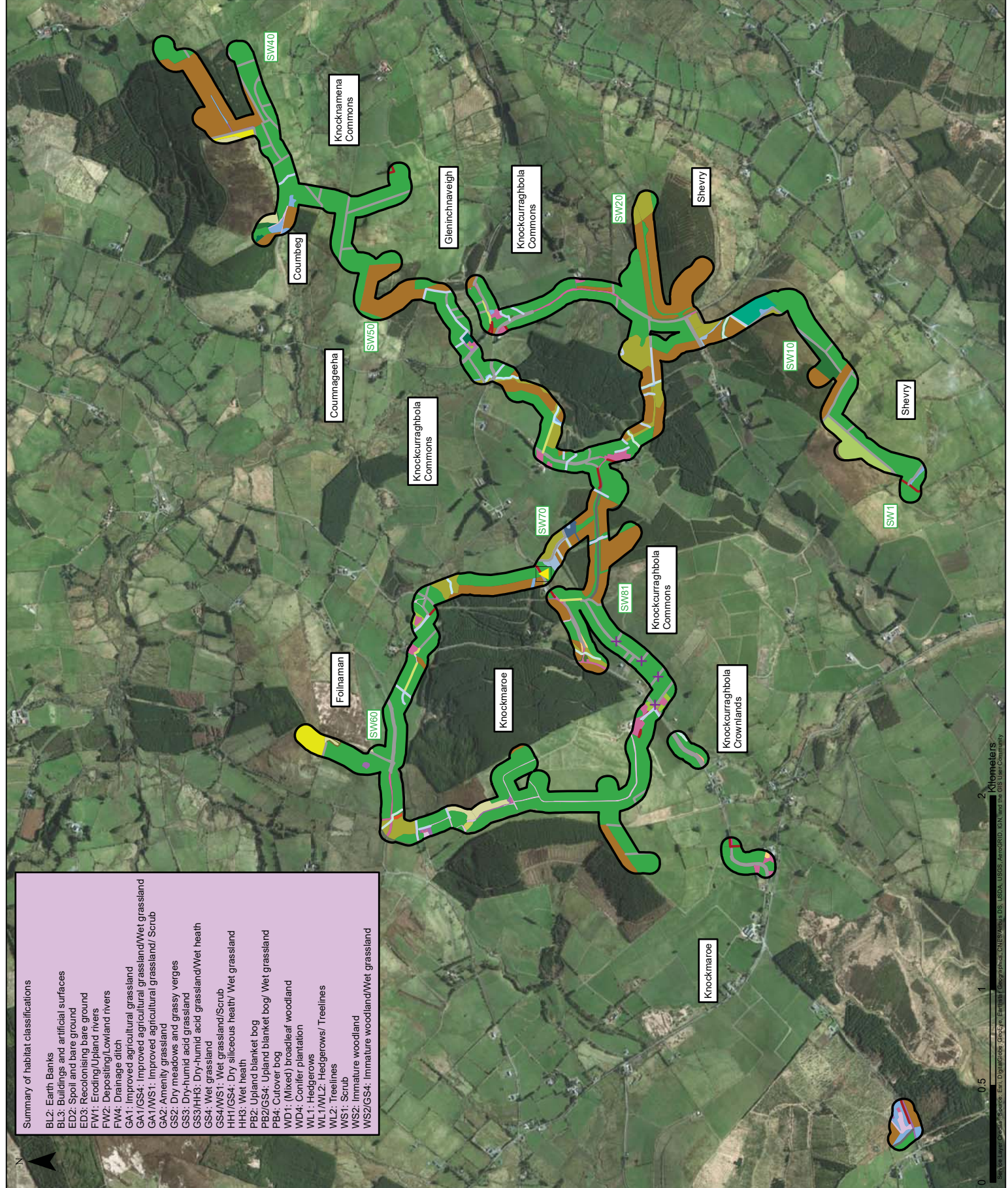
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Summary of habitat classifications

- BL2: Earth Banks
- BL3: Buildings and artificial surfaces
- ED2: Spoil and bare ground
- ED3: Recolonising bare ground
- FW1: Eroding/Upland rivers
- FW2: Depositing/Lowland rivers
- FW4: Drainage ditch
- GA1: Improved agricultural grassland
- GA1/GS4: Improved agricultural grassland/Wet grassland
- GA2: Amentily grassland
- GS2: Dry meadows and grassy verges
- GS3: Dry-humid acid grassland
- GS3/HH3: Dry-humid acid grassland/Wet heath
- GS4: Wet grassland
- GS4/WS1: Wet grassland/Scrub
- HH1/GS4: Dry siliceous heath/ Wet grassland
- HH3: Wet heath
- PB2: Upland blanket bog
- PB2/GS4: Upland blanket bog/ Wet grassland
- PB4: Curover bog
- WD1: (Mixed) broadleaf woodland
- WD4: Conifer plantation
- WL1: Hedgerows
- WL1/WL2: Hedgerows/ Treelines
- WL2: Treelines
- WS1: Scrub
- WS2: Immature woodland
- WS2/GS4: Immature woodland/Wet grassland

Client: Ecopower Developments Ltd.

Project: Whole Windfarm Project

Title:
Figure CE 8.5: Terrestrial Habitats within the Cumulative Evaluation Study Area

Legend:
Upperchurch Windfarm 2013 Study Area
Habitats 100m Buffer

No Other Projects or Activities scoped in for evaluation

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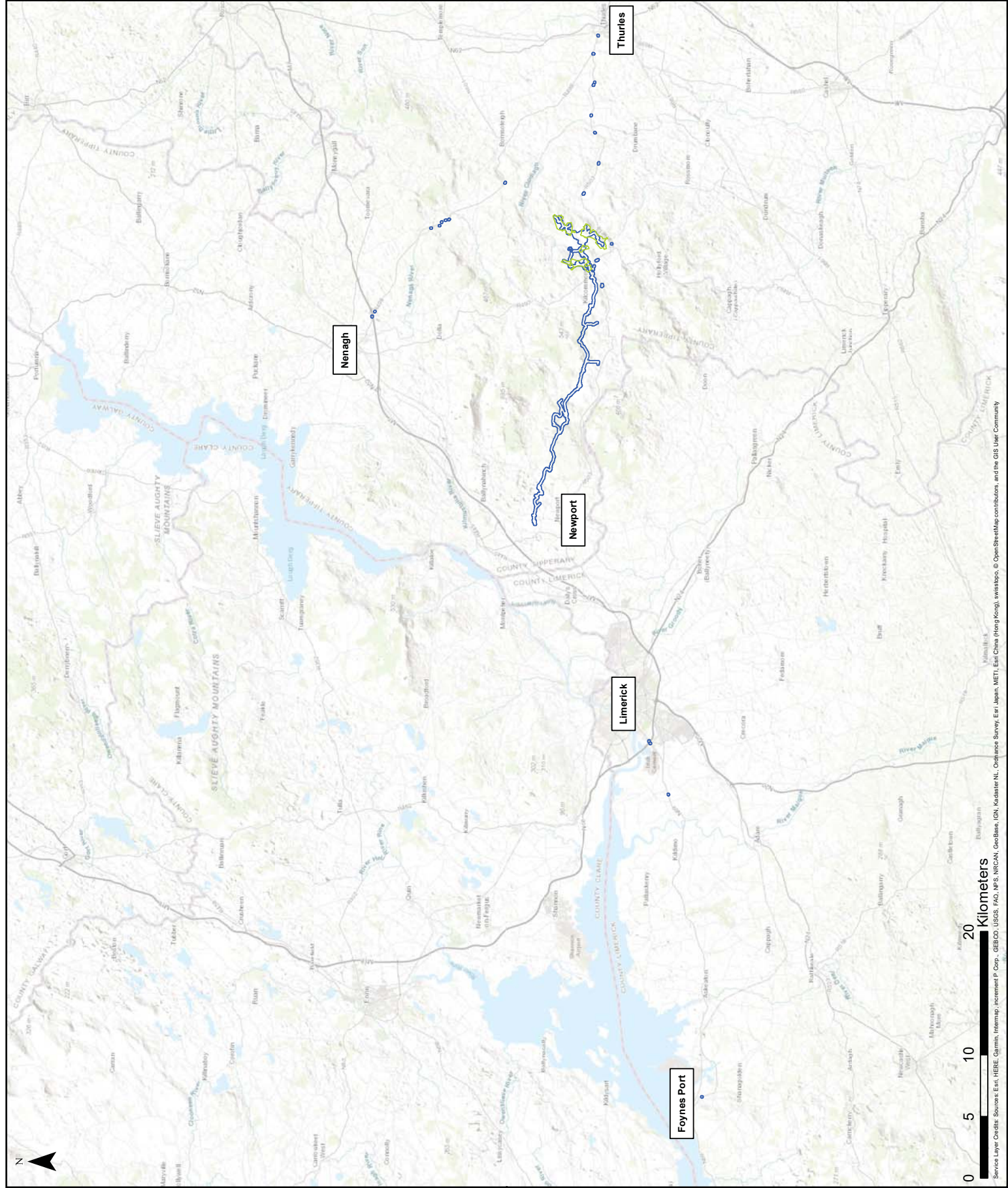
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Project: Whole Windfarm Project

Title:
Figure RW 8.6: Hen Harrier within
the UWF Related Works Study Area.

Legend:

-  Hen Harrier Study Area
-  UWF Related Works
-  Construction Works Area
-  Slievefelim SPA

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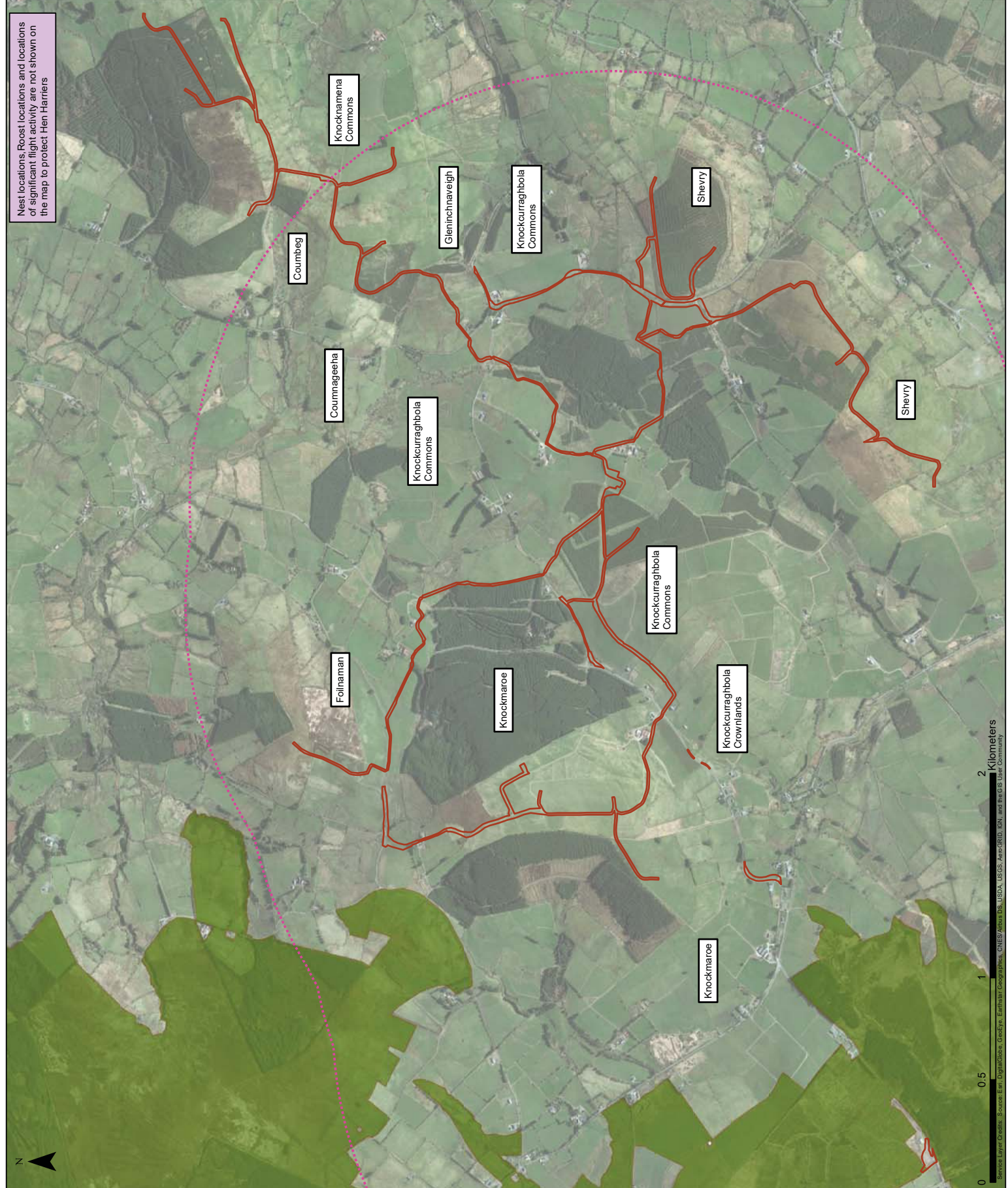
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Nest locations, Roost locations and locations
of significant flight activity are not shown on
the map to protect Hen Harriers



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Project: Whole Windfarm Project


Title:
Figure CE 8.6: Hen Harrier within the Cumulative Evaluation Study Area

- Legend:**
- Projects/Activities
 - Slieveleim to Silvermines Mountains SPA plus Consented Wind Farm plus 5 km Buffer (Hen Harrier)
 - Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Construction Works Area
 - UWF Other Activities Construction Works Boundary

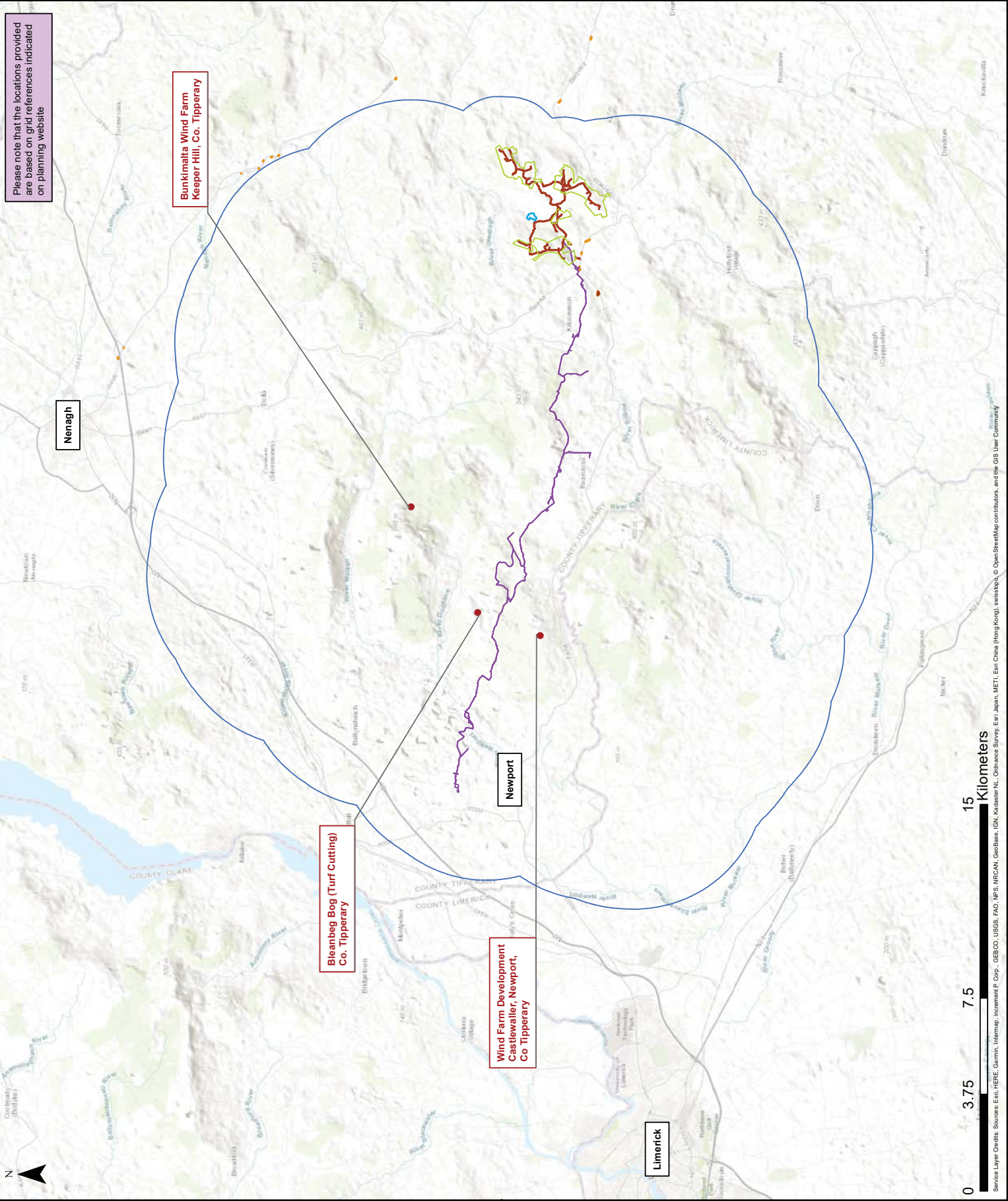
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Title:
Figure RW 8.7: General Bird Species within the UWF Related Works Study Area.

- Legend:**
- UWF Related Works
 - Construction Works Area
 - ▭ Study Area Boundary (50m)
 - Slievefelim SPA
- N/A Observations of Note

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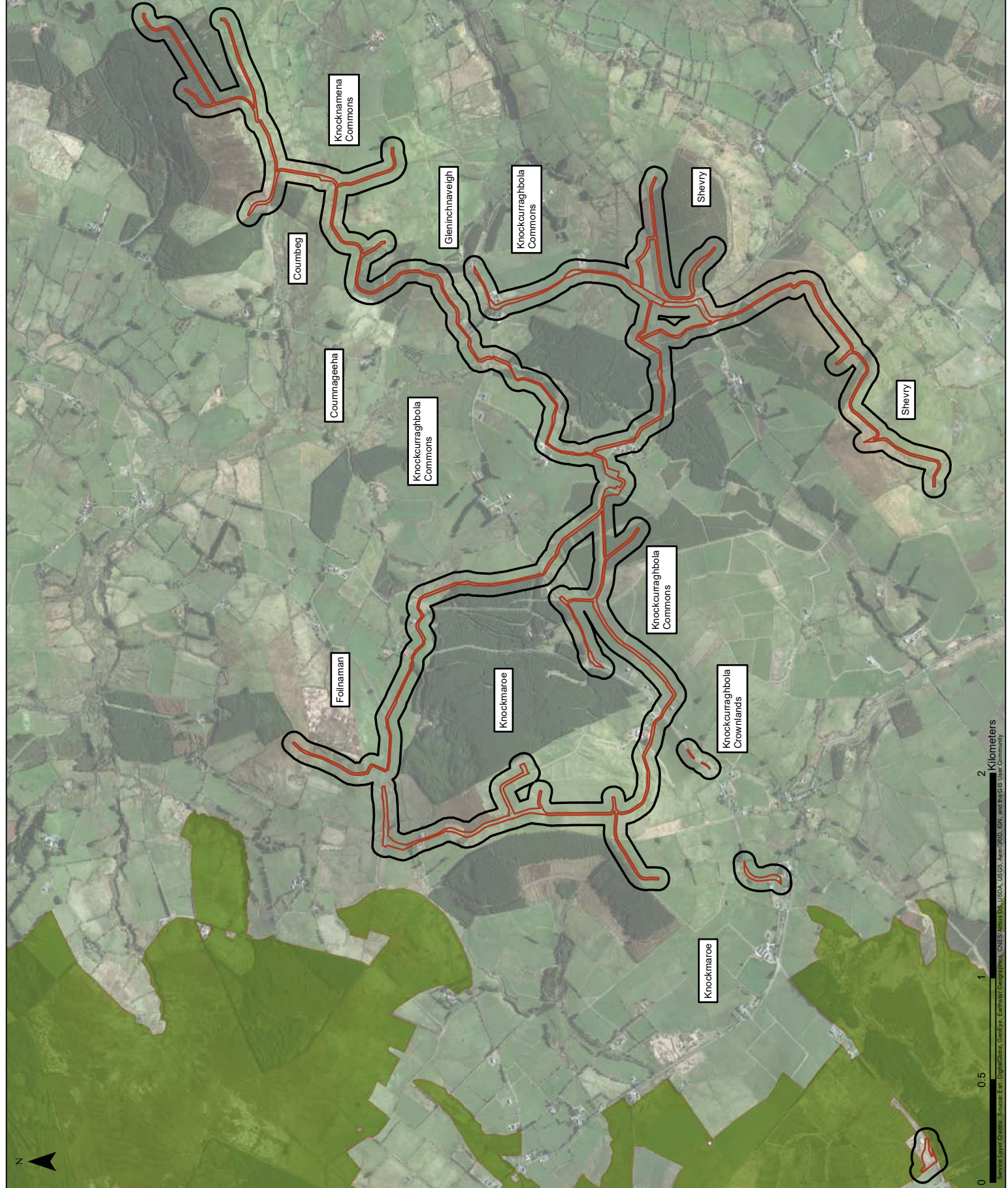
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Title:
Figure CE 8.7: General Bird Species within the Cumulative Evaluation Study Area

- Legend:**
- Project/Activities
 - Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Construction Works Area
 - UWF Other Activities Construction Works Boundary
 - 1km Buffer (General Bird Species)

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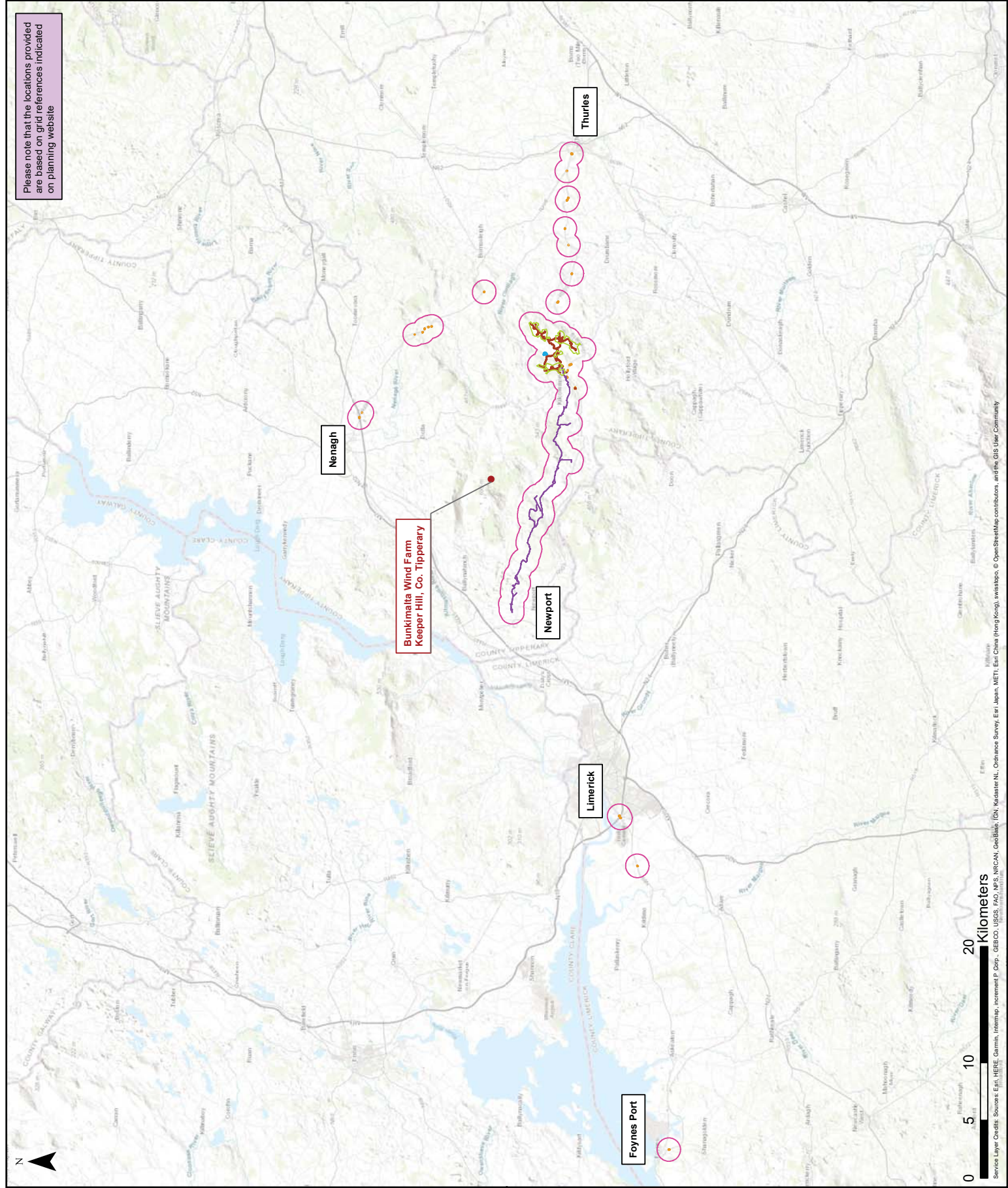
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Project: Whole Windfarm Project

Title:
Figure RW 8.8: Bats within the UWF
Related Works Study Area.

Legend:

- Bat Crossing Locations
- Bat Roost Suitability: ***
- Bridges
- Buildings
- High
- Moderate
- Low
- Negligible
- UWF Related Works Construction Works Area
- Study Area Boundary (50m)
- Study Area Boundary (150m)
- Temporary Construction Compound
- Temporary hedge/tree removal and pruning
- Permanent hedge/tree removal

* Buildings identified are those evaluated as having some suitability for bats. Any other buildings visible on mapping are either outside the study area or are considered to have zero suitability for bats.
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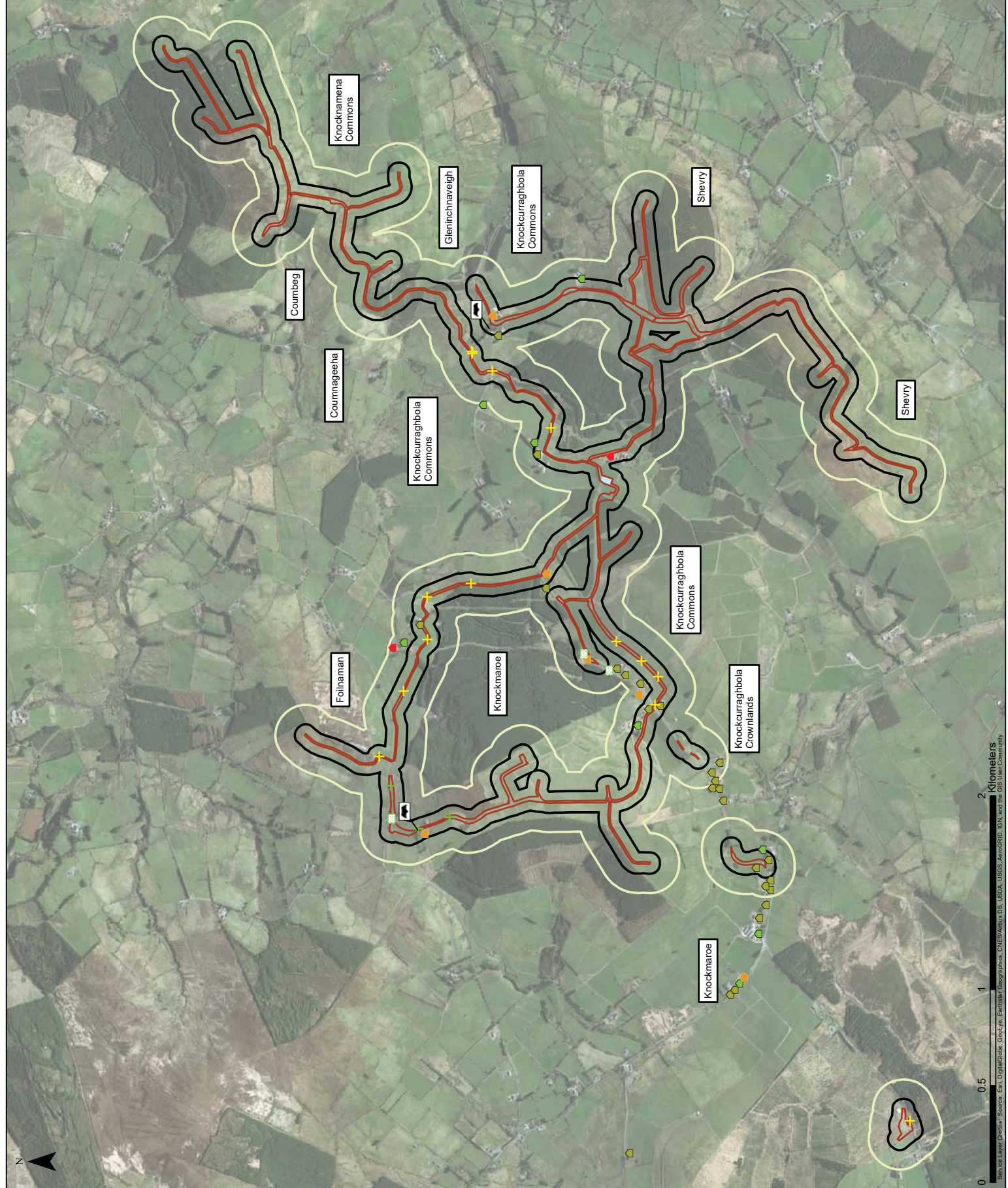
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Title:
Figure CE 8.8: Bats within the Cumulative Evaluation Study Area

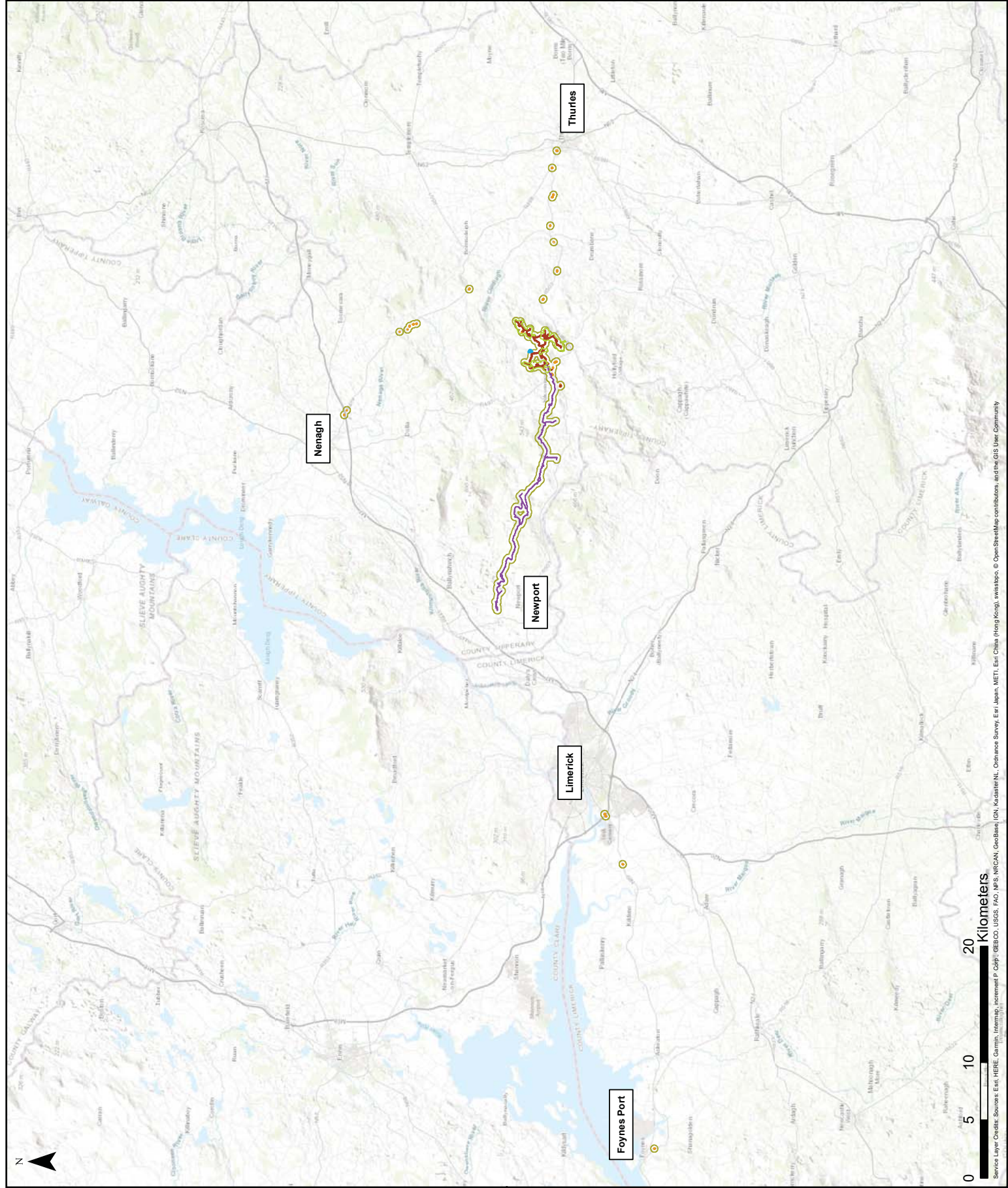
- Legend:**
- Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Construction Works Area
 - UWF Other Activities Construction Works Boundary
 - Bats 300m Buffer

No Other Projects or Activities scoped in for evaluation

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Title:
Figure RW 8.9: Non-Volant Mammals within
the UWF Related Works Study Area

Legend:

- UWF Related Works
- Construction Works Area
- Study Area Boundary (50m)
- Slievefeelim SPA

Survey Results*:

- Badger
- Fox

*Note: Fallow Deer, Pine Martin, Red Squirrel and Irish Hare and Other Mammals were recorded throughout the study. Please refer to appendix for locations.
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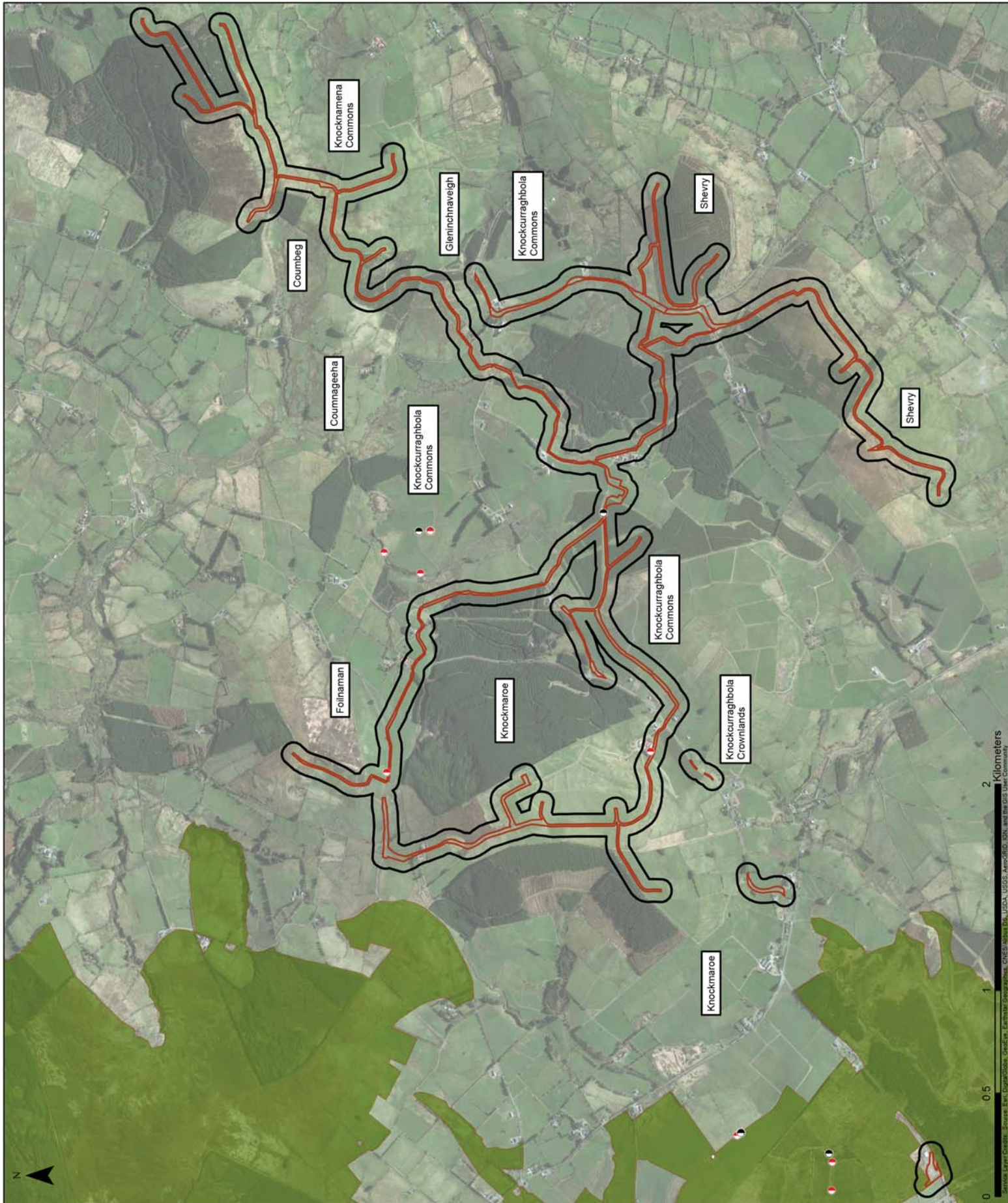
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Title:
Figure CE 8.9: Non-Volant Mammals
within the Cumulative Evaluation Study
Area

- Legend:
- Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Construction Works Area
 - UWF Other Activities Construction Works Boundary
 - General Non-Volant Mammals 100m Buffer
 - Badger 2km Buffer
 - Other 7km Buffer

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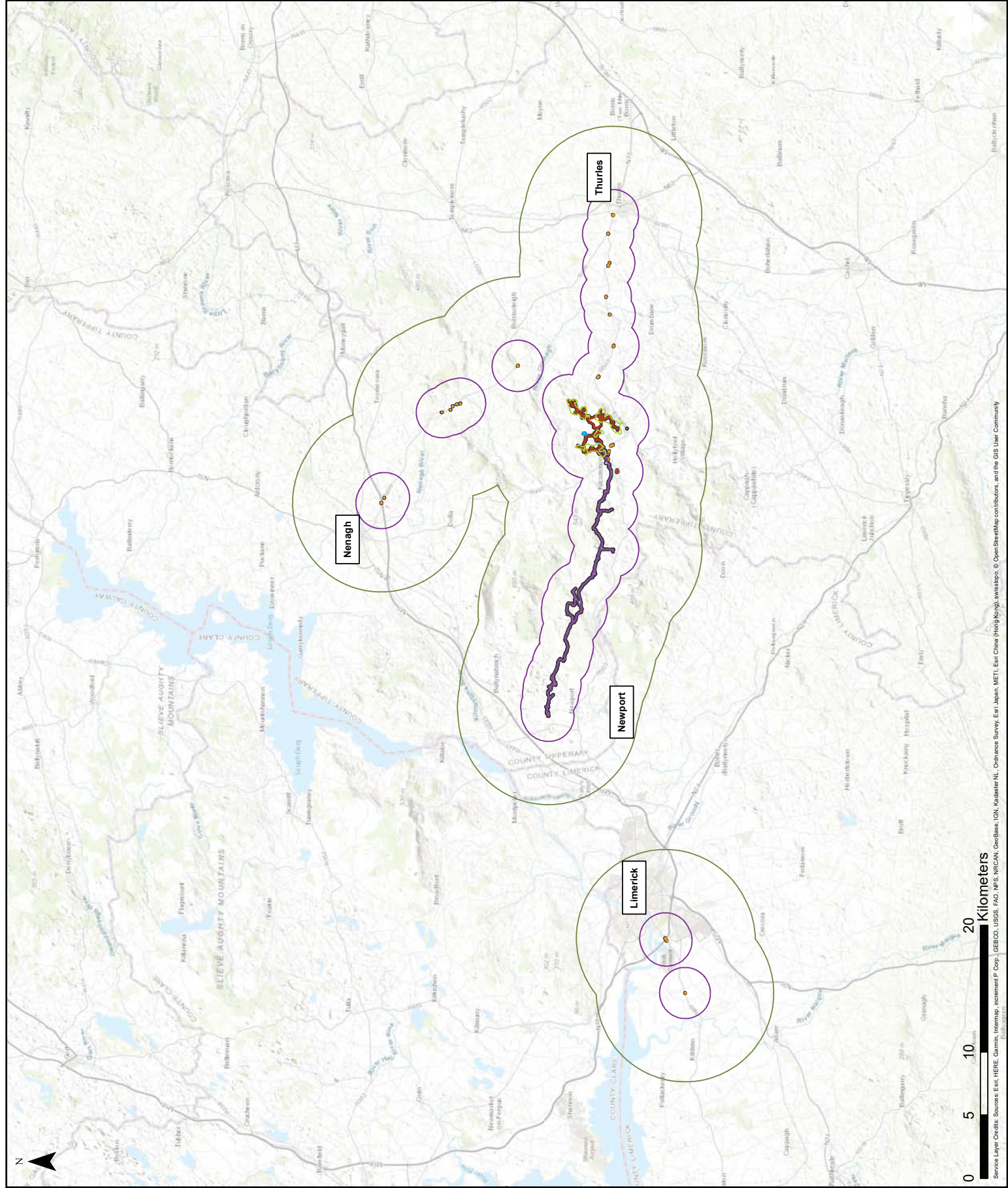
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Title:
Figure RW 8.10: Amphibians & Reptiles
within the UWF Related Works
Study Area

- Legend:
- UWF Related Works
 - Construction Works Area
 - Study Area Boundary (50m)
 - Slievefelim SPA
- Survey Results:
- Viviparous Lizard

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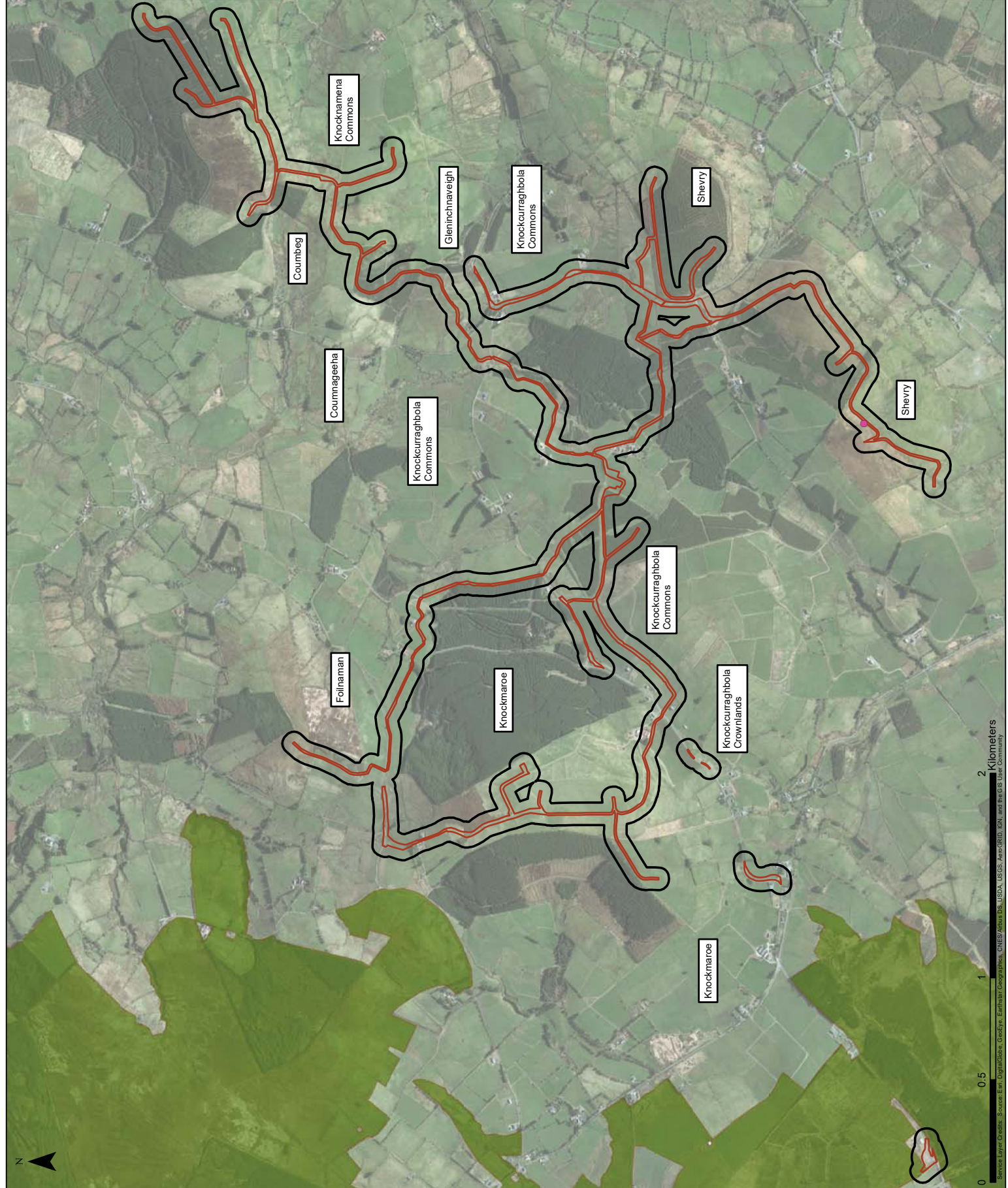
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Title:
Figure CE 8.10: Amphibians & Reptiles within the Cumulative Evaluation Study Area

Legend:
Upperchurch Windfarm 2013 Study Area
Amphibians & Reptiles 100m Buffer

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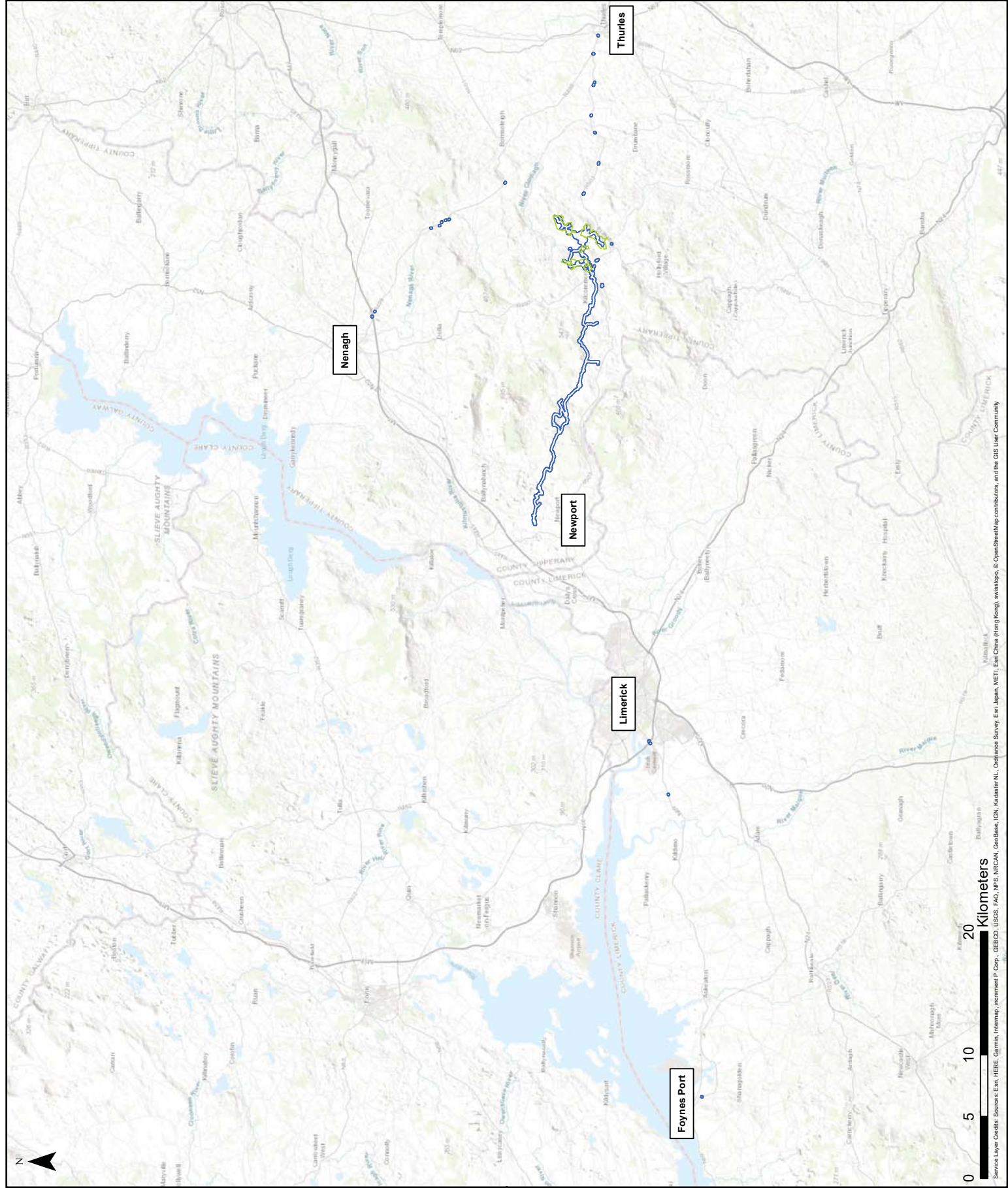
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Title:

Figure RW 8.11: Marsh Fringing within the UWF Related Works Study Area

Legend:

- Study Area Boundary (50m)
- September 2017 Web Locations
- Suitable Marsh Fringing Habitat
- UWF Related Works Construction Works Area
- Section Number

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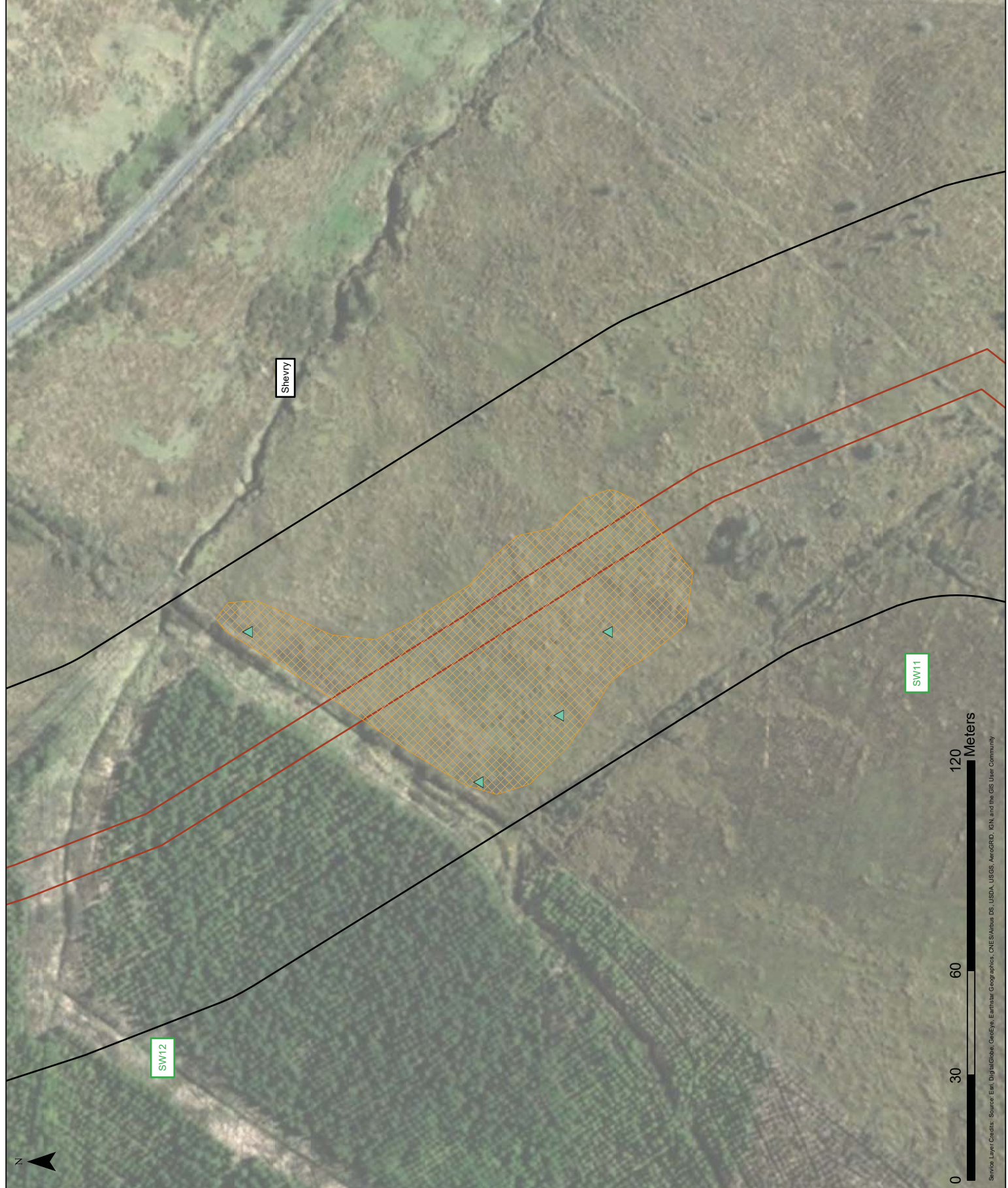
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Figure CE 8.11: Marsh Fritillary within the Cumulative Evaluation Study Area

- Legend:**
- Projects/Activities
 - Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Construction Works Area
 - UWF Other Activities Construction Works Area
 - 2km Buffer (Badger, Invertebrates - Marsh Fritillary)

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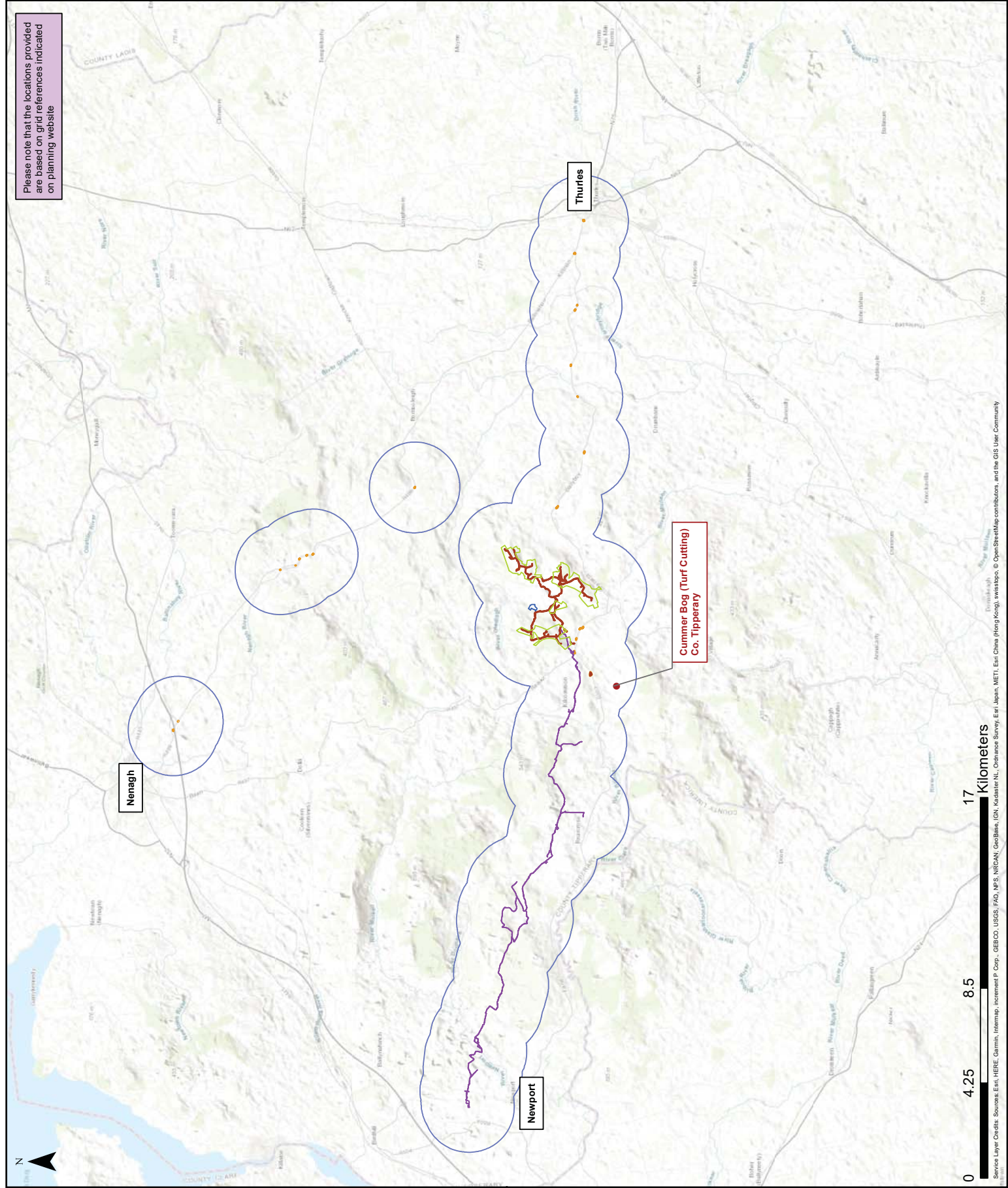
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Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

May 2018

Appendix A13: Biodiversity Information

EIAR for UWF Replacement Forestry Ch.8 Biodiversity



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UWF Replacement Forestry EIA Report

Volume C2: EIAR Main Report

Chapter 8: Biodiversity

Topic Chapter Authors:

Inis

EIAR Coordinator:



Topic
Biodiversity

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Appendix 8-1	Detailed Biodiversity Data and Supplementary Information

Appendices referenced in this topic chapter can be found in **Volume C4 EIAR Appendices**.

Glossary of Terms

<u>Term</u>	<u>Definition</u>
Afforestation	The establishment of a forest or stand of trees (forestation) in an area where there was no previous tree cover
Anadromous	Fish that migrate up rivers from the sea to spawn
Appropriate Assessment	An assessment required by the EU Habitats Directive where a project (or plan) would be likely to have a significant effect on a European site, either alone or in combination with other plans or projects
Avoidance	Prevention of impacts occurring, having regard to predictions about potentially negative environmental effects (e.g. project decisions about site location or design).
Baseline Environment	The conditions that would pertain in the absence of the proposed project at the time that the project would be constructed / operated / decommissioned. The definition of these baseline conditions should be informed by changes arising from other causes (e.g. other consented developments)
Bern Convention	Convention on the Conservation of European Wildlife and Natural Habitats in Bern in 1992 ensures that governments take into account the conservation needs of species during the formulation of planning and development policies
Biodiversity	The biological diversity of the earth’s living resources. The total variability among organisms and ecosystems. In common usage, and within these Guidelines, biodiversity is used to describe the conservation of the natural environment, rather than describing the variation within it.
Catchment	A catchment area is a hydrological unit. Each drop of precipitation that falls into a catchment area eventually ends up in the same river. Catchment areas are separated from each other by watershed
Climate change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Compensation	Measures taken to make up for the loss of, or permanent damage to, ecological features despite mitigation. Any replacement area should be similar in terms of biological features and ecological functions that have been lost or damaged, or with appropriate management have the ability to reproduce the ecological functions and conditions of those biological features.
Competent Authority	An organisation or individual who is responsible for determining an application for consent for a project. Competent authorities in relation to Appropriate Assessment in Ireland are set out in SI 477 of 2011.
Conceptual Site Model	Model used to facilitate the identification of source-pathway-receptor links between a project and the receiving environment
Connectivity	A measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.
Conservation objective	Objective for the conservation of biodiversity (e.g. specific objective within a management plan or broad objectives of policy).
Conservation status	The state of a species or habitat including for example, extent, abundance, distribution and their trends.
Couches	Overground nest like structure used by Otter for resting and/or breeding
Cumulative impact / effect	Additional changes caused by a proposed development in conjunction with other developments or the combined effect of a set of developments taken together.

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Term	Definition
Degradation	The condition or process of degrading or being degraded.
Designated Sites	General term for sites which have been designated for nature conservation and for which legal protection has been conferred onto the sites. In Ireland, these included Special Areas of Conservation and Special Protection Areas. In addition to Natural Heritage Areas designated under national legislation.
Displacement	The action of moving something from its place or position.
Distribution	The geographical presence of a feature. This can depend on factors such as climate and altitude.
Disturbance	Disturbance is a temporary change in environmental conditions that causes a pronounced change in an ecosystem.
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit
Effect	Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow. See also 'Impact'.
EIAR	Environmental Impact Assessment Report
Endangered	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (Section V of IUCN Red List Categories and Criteria (2012) Version 3.1 2nd edn.), and it is therefore considered to be facing a very high risk of extinction in the wild.
Enhancement	The genuine enhancement of the natural heritage interest of a site or area because the project includes improved management or new habitats or features, which are better than the prospective management, or the habitats or features present there now. There is, therefore, a net or new benefit to the natural heritage
Environmental Impact Assessment (EIA)	Assessment of projects carried out under the EIA Directive and Regulations.
Environmental Impact Assessment Report	A document describing the effects of a project on the environment prepared during EIA
European sites	Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs) which comprise the Natura 2000 network which are designated under European legislation
Fauna	Fauna is all of the animal life of any particular region or time.
Favourable condition	Satisfactory condition of an ecological feature. In some cases, favourable condition is specifically defined (e.g. for some designated sites).
Flora	Flora is the plant life occurring in a particular region or time.
Flora Protection Order	The current list of plant species protected by Section 21 of the Wildlife Act, 1976 is set out in the Flora (Protection) Order, 2015, which supersedes orders made in 1980, 1987 and 1999.
Fragmentation	The breaking up of a habitat, ecosystem or land-use type into smaller parcels with a consequent impairment of ecological function.
Groundwater	Groundwater is the water found underground in the cracks and spaces in soil, sand and rock. It is stored in and moves slowly through geologic formations of soil, sand and rocks called aquifers.
Habitat	The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together
Hinterland	Area of surrounding landscape

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Term	Definition
Holts	Created or existing underground shelter used by Otter for resting and/or breeding
Hydrological	Associated with or related to the scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.
Impact	Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow. See also 'Effect'
Important ecological features	Ecological features requiring specific assessment within EclA. Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat / species rarity).
Larvae	Plural form of larva; The active immature form of an insect, especially one that differs greatly from the adult and forms the stage between egg and pupa
Life-cycle stages	In this context, the stages of a project; i.e. Construction, Operational and Decommissioning
Mitigation/Mitigation Measures	Measures taken to avoid or reduce negative impacts. Measures may include: locating the development and its working areas and access routes away from areas of high ecological interest, fencing off sensitive areas during the construction period, or timing works to avoid sensitive periods. An example of a reduction measure is a reed bed silt trap that is designed to minimise the amount of polluted water running directly into an ecologically important watercourse. See also compensation (which is separate from mitigation).
Natura Impact Statement	Under the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), an EclA report including the scientific assessment of a plan or project in relation to relevant Natura 2000 sites and other information required to enable a competent authority to carry out an Appropriate Assessment
Natural Heritage Area	The basic designation for wildlife in Ireland is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.
Non-native invasive species	Any non-native animal or plant that has the ability to spread causing damage to the environment, the economy, our health and the way we live. Equivalent of 'alien species' as used by the Convention on Biological Diversity
Non-volant	Incapable of flight
Population	A collection of individuals (plants or animals), all of the same species and in a defined geographical area.
Precautionary Principle	The principle that the absence of complete information should not preclude precautionary action to mitigate the risk of significant harm to the environment.
Project Design Measure	Measures for environmental protection, incorporated into the design of the project.
Proposed Natural Heritage Area	Proposed NHAs (pNHAs) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats are subject to limited protection, in the form of agri-environmental farm planning schemes, NPWS approval for afforestation schemes on pNHA lands and recognition of the ecological value of pNHAs by Planning and Licencing Authorities
Qualifying Interest	Habitats listed on Annex I and Species listed on Annex II of the EU Habitats Directive for which Special Areas of Conservation have been designated.
Rarity	A measure of relative abundance
Receptors	Any ecological or other defined feature (e.g. human beings) that is sensitive to or has the potential to be affected by an impact.

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Term	Definition
Replacement	The creation of a habitat that is an acceptable substitute for the habitat which has been lost.
Restoration	The re-establishment of a damaged or degraded system or habitat to a close approximation of its pre-degraded condition.
Riparian	Relating to or situated on the banks of a river
Roost	Resting place for a bird or bat
SAC/cSAC	Site designated according to the habitats directive. Special area of conservation means a site of Community importance designated by the Member States through a statutory, administrative and/or contractual act where the necessary conservation measures are applied for the maintenance or restoration, at a favourable conservation status, of the natural habitats and/or the populations of the species for which the site is designated
Scoping	The process of determining the content and extent of the matters which should be covered in the environmental information (the EIA Report) to be submitted to a Competent Authority for developments which are subject to EIA.
Screening	Determination of whether or not an EIA is necessary.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Sett	Series of underground tunnels and chambers of varying complexity used by Badgers for resting and breeding
Significance	The importance of the outcome of the impact (or the consequence of change) for the receiving environment.
Source-Impact-Pathways	Method used to identify the source of any potential impacts, predicting any potential impacts and identifying the pathways by which the potential impacts can reach the sensitive receptor
SPA	Area classified under Article 4 of the birds directive (Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds).
Special Conservation Interest	Species listed on Annex I of the EU Birds Directive as well as wetland habitats for which Special Protection Areas have been designated for the conservation of birds.
Sustainable Development	Sustainable development is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations.
Taxa	Plural form of Taxon; a taxonomic group of any rank, such as a species, family, or class.
Tributary	A river or stream which flows into a larger river or lake
Turbary	Turf-cutting, the legal right to cut turf or peat for fuel on common ground or on another person's ground
Upland	Area of hilly or mountainous land. Upland habitats are defined as unenclosed areas of land over 150 m and contiguous areas of related habitat that extend below this altitude
Vulnerable	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V of IUCN Red List Categories and Criteria (2012) Version 3.1 2nd edn.), and it is therefore considered to be facing a high risk of extinction in the wild.
Zone(s) of Influence	The area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities.

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List of Abbreviations

Abbreviation	Full Term
AA	Appropriate Assessment
ABP	An Bord Pleanála
AMM	Ecopower Additional Mitigation Measure developed by members of the EIAR Team
BCI	Bat Conservation Ireland
BOCCI	Birds of Conservation Concern in Ireland
BPM	Ecopower Best Practice Measure developed by members of the EIAR Team
BWI	Birdwatch Ireland
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
DAHRGA	Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
DoEHLG	Department of Environment, Heritage and Local Government
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ERFB	Eastern Regional Fisheries Board
FPO	Flora Protection Order
GSI	Geological Survey of Ireland
IEEM	Institute of Ecology and Environmental Management
IFI	Inland Fisheries Ireland
IFM	Institute of Fisheries Management
JNCC	Joint Nature Conservation Committee
NBDC	National Biodiversity Data Centre
NGO	Non-Governmental Organisation
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
OSI	Ordnance Survey of Ireland
PD	Ecopower Project Design Environmental Protection Measure developed by members of the EIAR Team
PEA	Preliminary Ecological Appraisal
pNHA	Proposed Natural Heritage Area
RFI	Request for Further Information
SAC/cSAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SNH	Scottish Natural Heritage
SPA	Special Protection Area
UGC	Underground Cable
UWF	Upperchurch Windfarm

Topic Biodiversity

8 Environmental Factor: Biodiversity

8.1 Introduction to the Biodiversity Chapter

8.1.1 What is Biodiversity?

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

8.1.2 Overview of Biodiversity in the Local Environment

The UWF Replacement Forestry is located within the Slievefelim to Silvermines mountains area. The receiving environment is representative of typical upland habitats, and includes lands under active management for agriculture. Features of the local environment on or around the works include tributaries of the Multeen River such as the Clodiagh (wherein the lands are located), Owenbeg and the Turraheen River which form part of the Lower River Suir catchment.

Birds, Bats and other mammals, amphibians, reptiles and invertebrates are present within the receiving environment.

European Sites such as the Slievefelim to Silvermines Mountains SPA, the Lower River Shannon cSAC, and the Lower River Suir cSAC, are found in the surrounding area. Both of the cSACs mentioned are designated for the protection of salmonids and freshwater aquatic species. The Slievefelim to Silvermines Mountains SPA is designated for the protection of Hen Harrier. NHAs and pNHAs are also found within the surrounding area.

The location of the UWF Replacement Forestry is illustrated on OSI Mapping on **Figure RF 8.1: UWF Replacement Forestry Location Map**.

Figures and mapping referenced in this topic chapter can be found in **Volume C3 EIAR Figures**.

8.1.3 Sensitive Aspects of the Biodiversity Environment included for further evaluation

Any sensitive receptor in the local environment which could be impacted by the project is a Sensitive Aspect. The following Sensitive Aspects **are included in this topic chapter** as they could be potentially impacted:

Sensitive Aspect No. 1	European Sites	Section 8.2
Sensitive Aspect No. 2	National Sites	Section 8.3
Sensitive Aspect No. 3	Aquatic Habitats & Species	Section 8.4
Sensitive Aspect No.4	Terrestrial Habitats	Section 8.5
Sensitive Aspect No.5	Hen Harrier	Section 8.6
Sensitive Aspect No.6	General Bird Species	Section 8.7
Sensitive Aspect No.7	Bats	Section 8.8
Sensitive Aspect No.8	Non-Volant Mammals	Section 8.9
Sensitive Aspect No.9	Amphibians & Reptiles	Section 8.10
Sensitive Aspect No.10	Marsh Fritillary	Section 8.11

Each of the above listed Sensitive Aspects are evaluated individually in Sections 8.2 to 8.11 of this Chapter.

To help readers navigate to individual sensitive aspect sections, the colour codes for each Sensitive Aspect used above are also used in the Sensitive Aspect sections Section 8.2 to 8.11. The colour-codes have been applied to section headings, tables and on side-tabs on the edge of the pages.

8.1.4 Sensitive Aspects excluded from further evaluation

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

General Invertebrates other than Marsh Fritillary	Effects evaluated as Neutral ¹ due to the scale of the afforestation works, (and in relation to UWF Related Works and UWF Grid Connection, the scale of the construction, operational and decommissioning works) along with the small number of machines/vehicles at any one location, and the general low ecological value of habitats in the receiving environment in terms of Invertebrate diversity.
Natterjack toad (Bufo (Epidalea) calamita),	Effects evaluated as not likely, due to the location of all of the Elements of the UWF Whole Project beyond the geographical range of this species.
Slow worm (Anguis fragilis)	Effects evaluated as not likely, due to the location of all of the Elements of the UWF Whole Project beyond the geographical range of this legless lizard species.

8.1.5 Overview of the Subject Development

The UWF Replacement Forestry is the subject development, being the subject of a current afforestation license application to the Minister for Agriculture, Food and the Marine.

Table 8-1: Subject Development –UWF Replacement Forestry

<u>Project ID</u>	<u>The Subject Development</u>	<u>Composition of the Subject Development</u>
Element 3	<u>The Subject Development</u> UWF Replacement Forestry (RF)	Replacement Forestry at Foilnaman

Note: The UWF Replacement Forestry is 'Element 3' of the Whole UWF Project.

A description of the location, size and design, life-cycle stages, use of natural resources, emissions and wastes, and the vulnerability to major accidents and natural disasters is provided in **Chapter 5: Description of the Development – UWF Replacement Forestry (Volume C2 EIAR Main Report)**.

This EIA Report is also available on www.upperchurchwindfarm.ie.

8.1.6 The Authors of the Biodiversity Chapter

This report was written by Howard Williams BSc CEnv MCIEEM CBiol MRSB MIFM (Senior Environmental Consultant); Christopher Cullen Dip. Eng. Dip. Ecol. ACIEEM (Senior Ecologist); Sarah Ingham BSc MSc ACIEEM (Project Ecologist/GIS); Peter O Connor MSc. (GIS) and John Deasy BSc. MSc. (Ecologist/GIS) of Inis Environmental Consultants: an established consultancy providing expertise in environmental project management and specialist ecological services.

¹ No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error". See EPA, August 2017, and Table 8-9.

8.1.7 Sources of Baseline Information

The information sources outlined in Table 8-2 were reviewed during desktop studies and confirmed during fieldwork in order to gather information on the baseline environment. The recommendations in the guidelines listed in the table, have been considered during the preparation of this chapter.

Table 8-2: Sources of Baseline Information for Biodiversity

Type	Source
Consultation	<p>Feedback was received from</p> <ul style="list-style-type: none"> • An Bord Pleanála • Tipperary County Council • Developments Application Unit • National Parks and Wildlife Service • Inland Fisheries Ireland • Irish Peatland Conservation Council <p>See Chapter 3: The Scoping Consultations, and Appendices A3.1, A3.2.</p>
Guidelines	<p><u>Ecological Evaluation</u></p> <ul style="list-style-type: none"> • 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). • Barbour, M.T. and Stribling, J.B. (1991) Use of Habitat Assessment in Evaluating the Biological Integrity of Stream Communities. In: Methods in Stream Ecology (Eds. Hauer, F.R. and Lamberti, G.A. Academic Press. • Kelly & King (2001) A review of the ecology and distribution of three lamprey species, Lampetra fluviatilis (L.), Lampetra planeri (Bloch), and Petromyzon marinus (L.): A context for conservation and biodiversity considerations in Ireland. Biology and the Environment. 101B(3):165-185. • Kennedy, GJA & Strange, CD (1986) The effects of intra- and inter-specific competition on the distribution of stocked juvenile Atlantic salmon, Salmo salar L., in relation to depth and gradient in an upland trout, Salmo trutta L., stream. J. Fish. Biol., 29(2):199-214. • Greenberg, L.A. and Dahl, J. 1998. Effect of habitat type on growth and diet of brown trout (Salmo trutta L.) in stream enclosures. Fisheries Management & Ecology 5: 331-348. • Hatfield, T. & Bruce, J. (2000) Predicting Salmonid Habitat–Flow Relationships for Streams from Western North America. North American Journal of Fisheries Management 20:1005–1015, 2000 • O’Grady, M.F., Curtin, J (1993) The Enhancement of drained salmonid rivers in Ireland. A bioengineering perspective. Hydroecol. Appl., 5(2):7-26. • Collins, J. (ed.) (2016). Bat surveys for professional ecologists: good practice guidelines (3rd edn). The Bat Conservation Trust, London. • Billington, G.E. & Norman, G.M. (1997). The Conservation of Bats in Bridges Project – A report on the survey and conservation of bat roosts in bridges in Cumbria. • 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 <p><u>Hen Harrier</u></p> <ul style="list-style-type: none"> • Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. (Scottish Natural Heritage, 2014).

Type	Source
	<ul style="list-style-type: none"> • Raptors: A Field Guide for surveys and Monitoring, third Edition (Hardey <i>et al.</i>, 2014). <p><u>Other Birds</u></p> <ul style="list-style-type: none"> • Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. (Scottish Natural Heritage, 2014). • Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008). • Assessing the effectiveness of monitoring methods for Merlin <i>Falco columbarius</i> in Ireland: the Pilot Merlin Survey 2010. Lusby, J., Fernandez-Bellon, D., Noriss, D., Lauder, A. Kilcoole, Co. Wicklow. : BirdWatch Ireland, 2011, Irish Birds, Vols. Volume 9, Number 2, pp. 143-154. • Bibby CJ, Burgess ND, Hill DA and Mustoe SH (2000). Bird Census Techniques, 2nd Edition. Academic Press, London. • Birdwatch Ireland. An assessment of the effects of Arterial Drainage Maintenance on Kingfisher and other riparian birds. Wicklow: Birdwatch Ireland and OPW, 2010. • Cummins, S., Bleasdale, A., Douglas, C., Newton, S., O'Halloran, J. & Wilson, H.J. (2010) The status of Red Grouse in Ireland and the effects of land use, habitat and habitat quality on their distribution. Irish Wildlife Manuals, No. 50. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. <p><u>Terrestrial Habitats</u></p> <ul style="list-style-type: none"> • A Guide to the Habitats of Ireland. The Heritage Council, Kilkenny. (Fossitt, 2000). • Best Practice Guidance for Habitat Survey and Mapping (Smith <i>et al.</i>, 2011). <p><u>Bats</u></p> <ul style="list-style-type: none"> • Guidelines for the Treatment of Bats during the Construction of National Road Schemes (National Roads Authority, 2005). • Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority, 2005). • Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Ed.) Collins, 2016 <p><u>Badgers</u></p> <ul style="list-style-type: none"> • Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (National Roads Authority, 2005). • Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008). <p><u>Otters</u></p> <ul style="list-style-type: none"> • Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (National Roads Authority, 2006). • The Good Roads Guide: Nature Conservation Advice in Relation to Otters <i>Design Manual for roads and Bridges</i> (Highways Agency, 1999, HA 81/99). • Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008). <p><u>Aquatic Habitats & Species</u></p> <ul style="list-style-type: none"> • Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (National Roads Authority, 2005). • Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016). • Water Framework Directive (2000/60/EC). • UK Pollution Prevention Guidelines (PPG).

Type	Source
	<ul style="list-style-type: none"> • Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board, not dated). • CIRIA (Construction Industry Research and Information Association) 2006: Guidance on ‘Control of Water Pollution from Linear Construction Projects’ (CIRIA Report No. C648. London, 2006). • CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. (CIRIA Report No. C532. London, 2006). <p><u>Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008).</u></p>
Desktop	<ul style="list-style-type: none"> • NPWS website • National Biodiversity Data Centre website(NBDC); • Environmental Protection Agency website (EPA); • Inland Fisheries Ireland (IFI); • Birdwatch Ireland (BWI); • Bat Conservation Ireland (BCI); • Butterfly Ireland; • North Tipperary County Development Plan 2010-2016 (as varied), adopted in December 2015 • Draft North Tipperary Local Biodiversity Action Plan 2007 • North Tipperary Heritage Plan 2013-2018 • Tipperary Renewable Energy Strategy 2016 • South Tipperary Biodiversity Action Plan 2010-2015 <p><u>In co-ordination with and by review of the other EIA Report Chapters as follows:</u></p> <ul style="list-style-type: none"> • Chapter 10: Soils • Chapter 11: Water • Chapter 12: Air <p><u>Consented Upperchurch Windfarm planning documents</u></p> <ul style="list-style-type: none"> • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Environmental Impact Statement 13510003 • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Response to Further Information 13510003 • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Badger Sett Survey prepared by Malachy Walsh and Partners (MWP) • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Bat Survey prepared by Malachy Walsh and Partners (MWP) • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Ecological Management Plan prepared by Malachy Walsh and Partners (MWP) • An Bord Pleanála (2014) Inspectors Report for Upperchurch Windfarm PL22.243040 • An Bord Pleanála (2014) Grant of Permission for Upperchurch Windfarm PL22.243040 <p><u>Other Projects planning documents</u></p> <ul style="list-style-type: none"> • Castlewaller Woodland Partnership (2007) Castlewaller Windfarm Environmental Impact Statement prepared by Fehily Timoney and Company • Castlewaller Woodland Partnership (2007). Response to RFI from North Tipperary County Council prepared by Fehily Timoney and Company

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Type	Source
	<ul style="list-style-type: none"> ESB Wind Development Ltd. and Coillte (2013) Bunkimalta Wind Energy Project Environmental Impact Statement prepared by ESBI An Bord Pleanála (2013) Inspectors Report for Bunkimalta Wind Energy Project PL22.241924
Fieldwork	<ul style="list-style-type: none"> Field Walking Habitat Surveys Species specific surveys

Note: Information from the Upperchurch Windfarm planning documents listed above (2013 EIS, 2013 RFI, 2014 Inspectors report etc.) were used throughout this EIA Report chapter to describe the baseline and receiving environment and to describe the effects of the UWF on the environment.

Further detail on the information referenced in Table 8-2 above is provided in [Appendix 8-1: Section A8-1.2 Baseline Information](#). [Appendix 8-1](#) can be found at [in Volume C4 EIAR Appendices](#) and includes:

- Desktop Review Datasets
- Fieldwork methods per receptor
- Dates and Times of habitat surveys
- Dates and Times of other, species specific surveys

8.1.7.1 Certainty and Sufficiency of Information Provided

A clear documentary trail is provided throughout this chapter, and chapter appendix, Appendix 8.1, to the competency of data and methods used and the rationale for selection of same. The information used to compile this chapter is collated from reports and documents generated by local authorities and statutory agencies, including the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs and North Tipperary County Development Plan 2010 (as varied), with remit in the regulatory field. In all cases the most recent publications available are relied on. All documentation used is referenced at the end of the chapter.

In respect of Biodiversity no significant limitations of difficulties were encountered.

8.1.8 Methodology for Evaluating Effects

8.1.8.1 Determining the Importance of Biodiversity receptors (excluding birds) (NRA 2009)

Table 8-3 outlines the Guidance from which receptor/resource evaluations (excluding birds) have been derived.

Table 8-3: NRA Evaluation Guidance (NRA 2009)

<u>Resource Evaluation</u>	<u>NRA Criteria</u>
International Importance	<ul style="list-style-type: none"> • ‘European Site’ including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (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	<ul style="list-style-type: none"> • Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); • Statutory Nature Reserve; • Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. • Resident or regularly occurring populations (assessed to be important at the national level) 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	<ul style="list-style-type: none"> • Area of Special Amenity. • Area subject to a Tree Preservation Order.

<u>Resource Evaluation</u>	<u>NRA Criteria</u>
	<ul style="list-style-type: none"> • 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. • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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.

8.1.8.2 Percival and NRA Evaluation Criteria for biodiversity receptors (birds)

8.1.8.2.1 Determining Bird Sensitivity (Percival 2007 & NRA 2009)

Table 8-4 outlines the Guidance from which avian (bird) receptor/resource evaluations have been derived.

Table 8-4: Bird Sensitivity Rating Equivalency (Percival 2007 and NRA 2009 Combined)

<u>Sensitivity of Bird receptor</u>	<u>Percival 2007 criteria</u>	<u>NRA Resource Evaluation</u>	<u>NRA Criteria</u>	<u>Combined Criteria</u>
Very High	<p>Species is cited interest of SPA.</p> <p>Species present in Internationally important numbers.</p>	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 and/or referred to in Article 4(2) of the Birds Directive	<p>Species is cited interest of SPA.</p> <p>Species present in Internationally important numbers.</p> <p>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</p>
High	<p>Other non-cited species which contribute to integrity of SPA.</p> <p>Ecologically sensitive species (<300 breeding pairs in UK) and less common birds of prey.</p> <p>Species listed on Annex 1 of the EU bird's directive.</p> <p>Regularly occurring relevant migratory species which are rare or vulnerable</p>	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	<p>Other non-cited species which contribute to integrity of SPA</p> <p>Ecologically sensitive species (<300 breeding pairs nationally) and less common birds of prey.</p> <p>Species listed on Annex 1 of the EU bird's directive.</p> <p>Regularly occurring relevant migratory species which are rare or vulnerable</p> <p>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</p>

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<u>Sensitivity of Bird receptor</u>	<u>Percival 2007 criteria</u>	<u>NRA Resource Evaluation</u>	<u>NRA Criteria</u>	<u>Combined Criteria</u>
				relevant Red Data list (in this case BOCCI Red list).
Medium	<p>Species present in regionally important numbers (>1% of regional population).</p> <p>Species occurring within SPA's but not crucial to the integrity of the site.</p> <p>Species listed as priority species in the UK BAP subject to special conservation measures</p>	County Importance	<p>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;</p> <p>County important populations of species.</p> <p>Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</p>	<p>Species present in regionally important numbers (>1% of regional population).</p> <p>Species occurring within SPA's but not crucial to the integrity of the site.</p> <p>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;</p> <p>County important populations of species.</p> <p>Species that are rare or are undergoing a decline in quality or extent at a national level.</p>
Low	<p>Species covered above which are present very infrequently or in very low numbers.</p> <p>Any other species of conservation interest not covered above, e.g. species listed on the red or amber lists of the BoCCI.</p>	Local Importance (High Value)	<p>Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;</p> <p>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</p>	<p>Locally important populations of priority species identified in the Local BAP, if this has been prepared;</p> <p>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.</p>

<u>Sensitivity of Bird receptor</u>	<u>Percival 2007 criteria</u>	<u>NRA Resource Evaluation</u>	<u>NRA Criteria</u>	<u>Combined Criteria</u>
			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.

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8.1.8.2.2 Determining Magnitude of Effect to Birds (Percival 2007)

Table 8-5 outlines the definition of terms in respect of magnitude for avian receptor evaluations. This rating system has also been used as a general guide for magnitude quantification throughout.

Table 8-5: Birds - Definition of Terms relating to Magnitude (Percival 2007)

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

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8.1.8.2.3 Determining Risk of Effect to Birds (Percival 2007)

Table 8-6 outlines probability rating definitions used to inform avian receptor impact appraisal.

Table 8-6: Birds - Risk classifications or likelihood that an impact will occur (Percival 2007)

<u>Probability</u>	<u>Description</u>	<u>Comments</u>
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

8.1.8.2.4 Determining Significance of Effect to Birds (Percival 2007 & EPA 2017 combined)

Table 8-7 outlines the significance matrix used for avian receptor impact appraisal.

Table 8-7: Birds - Significance Matrix for high probability impacts (Percival 2007 with equivalent EPA Significance Ratings).

<u>Significance</u>		<u>Sensitivity</u>			
		Very High	High	Medium	Low
<u>Magnitude</u>	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

8.1.8.3 EPA EIAR Guidance Definitions of Effects

Table 8-8 to 8-13 outline the EPA evaluation criteria utilised in this appraisal of the Environmental Factor, Biodiversity. This criteria is included in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, August 2017)

Table 8-8: Probability of Effects (EPA, August 2017)

<u>Likely Effects</u>	<u>Unlikely Effects</u>
The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Table 8-9: Quality of Effects (EPA, August 2017)

<u>Quality of Effect</u>	<u>Description</u>
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or removing nuisances or improving amenities)
Neutral Effect	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Table 8-10: Significance of Effects (EPA, August 2017)

<u>Significance of Effect</u>	<u>Description</u>
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Table 8-11: Duration of Effects (EPA, August 2017)

<u>Duration of Effect</u>	<u>Description</u>
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years
Medium-term Effects	Effects lasting seven to fifteen years
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years

Table 8-12: Types of Effects (EPA, August 2017)

<u>Type of Effect</u>	<u>Description</u>
Effect/Impact	A change resulting from the implementation of a project
Likely Effects	The effects that are specifically predicted to take place – based on an understanding of the interaction of the proposed project and the receiving environment.
Indirect Effects (a.k.a. secondary effects)	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
Cumulative Effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
‘Do Nothing’ Effects	The environment as it would be in the future should the subject project not be carried out.
‘Worst Case’ Effects	The effects arising from a project in the case where mitigation measures substantially fail
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Reversible Effects	Effects that can be undone, for example through remediation or restoration
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect
Synergistic Effects	Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

Table 8-13: Definition of Terms – Source, Pathway, Receptor (EPA, August 2017)

<u>Term</u>	<u>Description</u>
Source	The activity or place from which an effect originates
Pathway	The route by which an effect is conveyed between a source and a receptor.
Receptor	Any element in the environment which is subject to impacts
Effect/Impact	A change resulting from the implementation of a project

8.2 Sensitive Aspect No.1: European Sites

This Section provides a description and evaluation of the Sensitive Aspect - European Sites.

We note that findings in respect of Likely Significant effects on European Sites are fully considered and evaluated in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** (herein referred to as the NIS). This NIS is included in **Volume D: Appropriate Assessment Reporting** of the planning application for the UWF Replacement Forestry. In line with EIA Directive Guidance, findings are summarised herein; however, and for the avoidance of doubt, we refer the NIS for detailed examination and analysis of likely significant effects in respect of European Sites.

8.2.1 BASELINE CHARACTERISTICS of European Sites

8.2.1.1 STUDY AREA for European Sites

The study area for European Sites in relation to the UWF Replacement Forestry is described in Table 8-14 and illustrated on **Figure RF 8.2: European Sites within the UWF Replacement Forestry Study Area** (Volume C3 EIAR Figures).

Table 8-14: UWF Replacement Forestry Study Area for European Sites

Study Area for European Sites	Justification for the Study Area Extents
15km from the afforestation lands boundary.	An evaluation distance of 15km is currently recommended in the case of projects (DoEHLG, 2009).

8.2.1.2 Baseline Context and Character of European Sites

European sites such as candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs) designated within the Natura 2000 network are herein considered. A total of 23 European or Natura Sites have been identified within 15km of the Whole UWF Project. Further detail on these sites, including conservation interest, magnitude, and proximity to the subject development are included in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** which can be found in **Volume D Appropriate Assessment Report**. European Sites and their respective distance to the Whole UWF Project are also summarised overleaf.

UWF Replacement Forestry is located entirely in the Clodiagh (Tipperary) River sub-catchment which drains downstream to the Lower River Suir cSAC. The UWF Replacement Forestry is located in its entirety outside the Slieve Felim to Silvermine Mountains SPA.

We refer to **Volume D: Appropriate Assessment Reporting** of the planning application for the UWF Replacement Forestry for the detailed appraisal of likely significant effects on European Sites under consideration

The location of European Sites within 15km of the other elements of the UWF Replacement Forestry is outlined on Table 8-15 and illustrated on **Figure RF 8.2: European Sites within the UWF Replacement Forestry Study Area**.

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Table 8-15: Summary of European Sites within the UWF Replacement Forestry Study Area

<u>European Site</u>	<u>Distance from UWF Replacement Forestry</u>
Anglesey Road SAC (002125)	5 km south of the UWF Replacement Forestry
Bolingbrook Hill SAC (002124)	8.1 km of the UWF Replacement Forestry
Keeper Hill SAC (001197)	12.1km northwest of the UWF Replacement Forestry
Kilduff, Devilsbit Mountain SAC (000934)	16.1 km northeast of the UWF Replacement Forestry
Lower River Shannon SAC (002165)	4.1km west of the UWF Replacement Forestry
Lower River Suir SAC (002137)	4.9km east of the UWF Replacement Forestry
Silvermine Mountain SAC (000939)	12.5km northwest of the UWF Replacement Forestry
Silvermine Mountain West SAC (002258)	13.6km north west of the UWF Replacement Forestry
Slievefelim to Silvermines SPA (004165)	1.4km west of the UWF Replacement Forestry

Features of Interest are summarised in Table 8-16. Further detail on the distinguishing aspects of these designated sites is provided in included in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** which can be found in **Volume D Appropriate Assessment Report**.

Table 8-16: Features of Interest in respect of European Sites under consideration

<u>European Site</u>	<u>Features of Interest</u>
Anglesey Road SAC (002125)	Priority Annex I Habitats: Species-rich Nardus Grassland* (6230)
Keeper Hill SAC (001197)	Priority Annex I Habitats: Blanket Bogs (* if active bog) (7130) Annex I Habitats: Northern Atlantic Wet Heath (4010)
Kilduff, Devilsbit Mountain SAC (000934)	Priority Annex I Habitats: Species-rich Nardus Grassland* (6230) Annex I Habitats: European Dry Heath (4030)
Lower River Shannon SAC (002165)	Priority Annex I Habitats: Alluvial Forests* (91E0) / Coastal Lagoons* (1150) Annex I Habitats: Sandbanks (1110) / Estuaries (1130) /Mudflats and sand flats (1140)/Large shallow inlets and bays (1160)/Reefs (1170)/Vegetation of stony banks (1220)/Vegetated sea cliffs (1230)/Salicornia mudflats (1310) / Atlantic salt meadows (1330)/Mediterranean salt meadows (1410)/Floating river vegetation (3260)/Molinia meadows (6410) Annex II species: Freshwater Pearl-Mussel (Margaritifera margaritifera);Atlantic Salmon (Salmo salar);Sea Lamprey (Petromyzon marinus);Brook Lamprey (Lampetra planeri); River Lamprey (Lampetra fluviatilis); Bottlenose Dolphin (Tursiops truncatus); Otter (Lutra lutra)
Lower River Suir SAC (002137)	Priority Annex I Habitats: Alluvial forests* (91E0) / Yew woodlands* (91J0) Annex I Habitats: Atlantic salt meadows (1330) / Mediterranean salt meadows (1410) / Floating river vegetation (3260) / Hydrophilous tall herb fringe communities (6340) / Old sessile oak woods (91A0) Annex II species: Freshwater Pearl-Mussel (Margaritifera margaritifera); White-clawed Crayfish (Austropotamobius pallipes); Sea Lamprey (Petromyzon marinus);Brook Lamprey (Lampetra planeri);River Lamprey (Lampetra fluviatilis);Twaite Shad (Alosa fallax fallax);Atlantic Salmon (Salmo salar);Otter (Lutra lutra)
Silvermine Mountain SAC (000939)	Priority Annex I Habitats: Species-rich Nardus Grassland* (6230) Annex I Habitats: Northern Atlantic Wet Heath (4010)
Silvermine Mountain West SAC (002258)	Annex I Habitats: Northern Atlantic Wet Heath (4010)/European Dry Heath (4030)/Calaminarian grasslands (6130)

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European Site	Features of Interest
Slievefelim to Silvermines SPA (001179)	Hen Harrier (<i>Circus cyaneus</i>)

8.2.1.3 Importance of European Sites

The EU Habitats Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora formed a basis for the designation of Special Areas of Conservation (SACs). Similarly, Special Protection Areas are legislated for under the Birds Directive (Council Directive 79/409/EEC on the Conservation of Wild Birds). Collectively SACs and SPAs are referred to as Natura 2000 sites, or ‘European’ sites. In general terms, they are considered to be of exceptional importance in terms of rare, endangered or vulnerable habitats and species within the European Community.

8.2.1.4 Sensitivity of European Sites

SAC designated sites are sensitive to hydrological changes to groundwater and surface water quality which may affect water dependant ecosystems. Within individual Designated Sites (both SAC’s and SPA’s), specific species may be sensitive to disturbance, displacement, habitat loss or accidental mortality, which could reduce their favourable conservation status. Designated sites are also sensitive to encroachment by invasive species.

Further detail, including currently known threats and pressures on designated sites are included in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** which can be found in **Volume D Appropriate Assessment Report**.

8.2.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

8.2.1.5.1 Special Protection Areas (SPAs)

Trends in respect of taxa designated under the EU Birds Directive (SPA’s) are reported to the EU under Article 12² of said directive. The most recently available trend information covers the period 2008-2012. Longer term trends in regard to wintering and breeding taxa across the SPA network are largely unknown³.

The 2014 Report covers 196 bird species, including species which live in Ireland all year round and others which migrate here for summer or winter. It provides a picture of both short-term and long-term trends for some species, and similarly a view of the breeding range trends in some species. However, there is an absence of long-term data for some species. The report was required to provide information on trends rather than a conclusive assessment of status, as is the case in the Article 17 report. In summary, 58% of species populations were stable or increasing in the short term, while 27% were decreasing. However, looking at long term data (where available) 36% were stable or increasing, while 28% were decreasing⁴.

8.2.1.5.2 Special Areas of Conservation (SACs)

Reporting on trends with regard to protected habitats and species under the EU Habitats Directive is provided to the EU under Article 17 of said directive. The most recently available trend information in respect of

² https://circabc.europa.eu/sd/a/a211d525-ff4d-44f5-a360-e82c6b4d3367/IE_A12NatSum_20141031.pdf

³ http://cdr.eionet.europa.eu/Converters/run_conversion?file=/ie/eu/art12/envuvesya/IE_birds_reports-14328-144944.xml&conv=343&source=remote#A082_B

⁴ Summarised from “Evaluation study to support the Fitness Check of the Birds and Habitats Directives” available online at <https://www.npws.ie/sites/default/files/publications/pdf/Fitness%20Check%2015%204%2015.pdf>.

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individual habitats and species was published in 2013⁵.

Habitats

In the cited 2013 report on the Habitats Directive, 9% of the 58 listed habitats are assessed as “favourable”, 50% as “inadequate” and 41% as “bad”. Since 2007 nine (16%) habitats demonstrate a genuine improving trend, 18 (31%) habitats are considered to be declining, no change is reported for 28 (48%) habitats and an unknown trend reported for 3 (5%) habitats. Many of the coastal habitats and lakes are assessed as “inadequate”, with ongoing declines. “Inadequate” but improving trends are noted for some marine habitats. Several of the peatland and grassland habitats remain in “bad” status with ongoing declines; however, improvements are noted in some woodland habitats. Fens are assigned a “bad” but unknown trend due to the lack of national data to support the assessments.

There is no evidence that there will be any major decline in pressures over the next 12 years. Some potential improvements however have been noted for the following:

1. A decline in invasive infestation of woodlands due to improved forestry management.
2. Management of aquaculture related pressures impacting Estuaries and Mudflats
3. A reduction in pollution from household waste, sewage systems and pollution arising from agricultural or forestry related activities. These improvements are likely to be observed in certain lake habitats.

There is some evidence that climate change is negatively impacting coastal habitats. Predictions indicate that degraded upland habitats, in particular, will become less resilient to the impacts of climate change in the immediate future. These predictions relate mainly to drier summers and higher levels of more intense rainfall which are likely to result in bog bursts and landslides which may indirectly impact other habitats e.g. lakes. Ecologically unsuitable grazing regimes were one of the highest impacting pressures reported. The grazing pressures noted were both intensive and non-intensive grazing. Non-intensive grazing is assigned as a pressure where a habitat has not recovered from the impacts of overgrazing and even a small amount of grazing is still considered to negatively impact the habitat. Abandonment and succession were also considered to negatively impact habitat quality.

The most prevalent pollution sources are from agricultural or forestry related activities and household sewage systems. Mechanical peat extraction is considered a High intensity pressure for Blanket bog and also indirectly impacts lake and river habitats. Peatlands were also significantly impacted by drainage.

Species

For the 61 resident species (including 3 species groups) 52% are assessed as “favourable”, 20% as “inadequate”, 12% as “bad” and 16% as “unknown” There are less unknowns than reported in 2007 (the previous reporting period), due to improved knowledge of cetaceans; in those cases, the “unknown” ratings were elevated to a “favourable” status in 2013. Therefore, with further improved knowledge of cetaceans it is likely that the proportion of species in “favourable” status will increase.

Since 2007 4 (6%) species demonstrate a genuine improving trend, 6 (10%) species are considered to be declining, with no genuine change reported for 50 species (82%).

Many species remain in “favourable” status. Population increases and Range expansion have been observed for Otter and Pine Marten respectively. Improvements in habitat extent for Natterjack toad have been achieved by conservation action. However, on-going declines are reported for all Vertigo and Pearl mussel species and Marsh fritillary.

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⁵ <https://www.npws.ie/article-17-reports-0/article-17-reports-2013>

Pollution is considered the biggest pressure and threat impacting the conservation status of species. Human intrusion and disturbances was reported frequently but never at a high intensity. Agricultural practices have a high impact on species that occur within agricultural systems, e.g. Vertigo species and Marsh Fritillary.

There is no evidence that there will be any major decline in the incidence of pressures over the next 12 years, however the impact of aquaculture related pressures on Maërl species should reduce. Invasive species are considered likely to increase as a threat to a number of species.

The do-nothing scenario is that in the absence of the subject development these trends would continue as documented above in respect of the species and habitats which form the basis for designation under the respective EU directives of the EU Sites under consideration.

8.2.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to designated sites, as identified above, will be the receiving environment at the time of construction due to the short separation period. Further trends in species and habitats as identified in reporting to Europe are likely overlap the operational phase, dependant on the occurrence of causal mechanisms such as identified pressures.

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8.2.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.2.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to European Sites considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.2.2.2.1](#) below. We also refer to the Natura Impact Statement which accompanies the planning application as Volume D.

The evaluation of cumulative impacts to European Sites also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to European Sites with either the UWF Replacement Forestry or with any of the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter.

The results of this scoping exercise are that: Bunkimalta Windfarm, Castlewaller Windfarm, Gortnahalla Wind Turbine, Newport Distributor Road, Killuragh Digester Plant, Housing Developments in Doon and Annacotty, Agricultural Developments – Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, , Slatted Shed in Gortussa, Industrial warehouse Units at Thurles, Thurles Regional Water Treatment Works and the Activities of Forestry, Agriculture, Turf-Cutting have been scoped in for evaluation of cumulative effects to European Sites.

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8.2.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Replacement Forestry Study Area along with the study areas for Other Elements and Other Projects or Activities which are described in Table 8-17.

Table 8-17: Cumulative Evaluation Study Area for European Sites

<u>Cumulative Project</u>	<u>Cumulative Study Area Boundary</u>	<u>Justification for Study Area Extent</u>
Element 1: UWF Grid Connection	15km from the construction works areas/activity locations/afforestation lands	Professional judgement and as per Best Practice (CIEEM, 2016,NRA, 2008, Lusby et al.,2010,SNH 2014)
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
<u>Other Projects or Activities:</u> Bunkimalta Windfarm Castlewaller Windfarm Gortnahalla Wind Turbine Newport Distributor Road Killuragh Digester Plant Housing Developments in Doon and Annacotty, Agricultural Developments – Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, Slatted Shed in Gortussa, Industrial warehouse Units at Thurles, Thurles Regional Water Treatment Works Forestry Agriculture Turf-Cutting		

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8.2.2.2.1 Potential for Impacts to European Sites

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect European Sites. The results of this evaluation are included in Table 8-18.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on **Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-18: Results of the Evaluation of the Other Elements and Other Projects or Activities

<u>Other Element of the Whole UWF Project</u>	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects
<u>Other Projects or Activities</u>	
Bunkimalta Windfarm Castlewaller Windfarm Gortnahalla Wind Turbine Development, Newport Distributor Road Killuragh Digester Plant Housing Developments in Doon and Annacotty, Agricultural Developments - Milking Parlour in Cappamore, - Milking Parlour in Lisnagry, - Slatted Sheds and Stores in Pallasgreen, - Slatted Shed (Pigs) in Gortussa, Industrial warehouse Units at Thurles, Thurles Regional Water Treatment Works Forestry Agriculture Turf-Cutting	<u>Yes, included</u> for the evaluation of cumulative effects

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8.2.2.3 Cumulative Information: Baseline Characteristics – Context

8.2.2.3.1 Element 1: UWF Grid Connection

The UWF Grid Connection passes through the boundary of the Lower River Shannon cSAC at three locations, two of which occur in proximity to the Newport (Mulkear) River in the townland of Oakhampton (Watercourse Crossing W10 constitutes one instance in addition the 110kV UGC route utilises an *existing* trackway within the SAC boundary *en route* to the above crossing point). The third location is at the Bilboa River west of Kilcommon village (Watercourse Crossing W57). Drilling (Horizontal Directional Drilling) will be used to facilitate the above crossings; therefore no in-stream works will take place within the boundary of a cSAC. The footprint of the majority of the UWF Grid Connection drains downstream to the Lower River Shannon) cSAC, with a smaller area draining to the Lower River Suir cSAC (the easternmost 1.2km of the 110kV UGC).

The UWF Grid Connection traverses the Slievefelim to Silvermines Mountains SPA from the townland of Newross, east of Newport to the townland of Knocknabansha near Upperchurch village, and will require works within the SPA.

The location of European Sites within the UWF Grid Connection Study Area is outlined on Table 8-19 and illustrated on **Figure GC 8.2: European Sites within the UWF Grid Connection Study Area**, watercourse crossing locations are identified on **Figure GC 8.4: Aquatic Habitats & Species within the UWF within the UWF Grid Connection Study Area**. **Figure GC 8.2 and Figure GC 8.4** are part of the EIA Report for the UWF Grid Connection, and are included in **Volume E: Reference Documents** with this planning application.

Table 8-19: Summary of European Sites within the UWF Grid Connection Study Area

<u>European Site</u>	<u>Distance from UWF Grid Connection</u>
Anglesey Road SAC (002125)	3.3 km south of the UWF Grid Connection cable route
Bolingbrook Hill SAC (002124)	6.3 km north of the <u>UWF Grid Connection</u> cable route.
Clare Glen SAC (000930)	4.5 km south of the <u>UWF Grid Connection</u> cable route.
Glenomra Wood SAC (001013)	11.2 km west of the <u>UWF Grid Connection</u> cable route.
Glenstal Wood SAC (001432)	5.8 km south of the <u>UWF Grid Connection</u> cable route.
Keeper Hill SAC (001197)	2.0 km north of the <u>UWF Grid Connection</u>
Lough Derg (Shannon) SPA (004058)	10.4 km north of the UWF Grid Connection
Lower River Shannon SAC (002165)	0 km – The <u>UWF Grid Connection</u> cable route passes through the boundary of the Lower River Shannon SAC at three locations; 70m along a farm track on the northern side of the Mulkear river at Oakhampton and under the Mulkear River at Oakhampton/Newross, Co. Tipperary and under the Bilboa River at Laghile/Churchquarter, Co. Tipperary.
Lower River Suir SAC (002137)	4.4 km east of the <u>UWF Grid Connection</u> cable route.
Philipston Marsh SAC (001847)	13.1 km south of the <u>UWF Grid Connection</u>
Silvermine Mountain SAC (000939)	7.2 km north of the <u>UWF Grid Connection</u>
Silvermine Mountain West SAC (002258)	5.7 km north of the <u>UWF Grid Connection</u>
Slieve Bernagh Bog SAC (002312)	11.5 km west of the <u>UWF Grid Connection</u> cable route.
Slievefelim to Silvermines SPA (004165)	The <u>UWF Grid Connection</u> cable route is within the boundaries of the Slievefelim to Silvermines SPA.

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8.2.2.3.2 Element 2: UWF Related Works

The UWF Related Works are mainly located in the Clodiagh (Tipperary⁶) River sub-catchment of the River Suir which drains downstream to the Lower River Suir cSAC, to the south of Holycross village (no works occur within the SAC). Some of the footprint of the UWF Related Works also drains downstream to the Lower River Shannon cSAC. The UWF Related Works location HW7 is located within the Slieve Felim to Silvermines Mountains SPA- however no works are required at this location..

The location of European Sites within 15km of UWF Related Works is outlined on Table 8-20 and illustrated on **Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area**. European Sites are also illustrated on **Figure RW 8.2: European Sites within the UWF Related Works Study Area**. **Figure RW 8.2** is part of the EIA Report for the UWF Related Works, and is included in **Volume E: Reference Documents** with this planning application.

Table 8-20: Summary of European Sites within the UWF Related Works Study Area

<u>European Site</u>	<u>Distance from UWF Related Works</u>
Anglesey Road SAC (002125)	2.9 km south of the <u>UWF Related Works</u>
Bolingbrook Hill SAC (002124)	7.2 km north west of the UWF Related Works
Keeper Hill SAC (001197)	10.9 km northwest of the UWF Related Works
Kilduff, Devilsbit Mountain SAC (000934)	13.7 km northeast of the UWF Related Works
Lower River Shannon SAC (002165)	1.5km west of the UWF Related Works
Lower River Suir SAC (002137)	3km east of the UWF Related Works
Philipston Marsh SAC (001847)	13.0 km south of the <u>UWF Related Works</u>
Silvermine Mountain SAC (000939)	11.5km northwest of the UWF Related Works
Silvermine Mountain West SAC (002258)	12.5 km north of the <u>UWF Related Works</u>
Slievefelim to Silvermines SPA (004165)	The <u>UWF Related Works</u> is within the boundaries of the Slievefelim to Silvermines SPA.

8.2.2.3.3 Element 4: Upperchurch Windfarm

The already consented Upperchurch Windfarm is located mainly in the Clodiagh (Tipperary) River sub-catchment which drains downstream to the Lower River Suir cSAC. Some of the footprint of the Upperchurch Windfarm does drain downstream to the Lower River Shannon cSAC (we refer chapter 11 Water for further information). The Upperchurch Windfarm is located in its entirety outside the Slieve Felim to Silvermine Mountains SPA.

The location of European Sites within 15km of the other elements of the Whole UWF Project is illustrated on **Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area**.

Table 8-21: Summary of European Sites within the UWF Study Area

<u>European Site</u>	<u>Distance from Upperchurch Windfarm</u>
Anglesey Road SAC (002125)	2.5 km south west

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⁶ We note that there are 2 River Clodiagh's within the River Suir catchment, the above sited Clodiagh (Tipperary) River but also the Clodiagh (Waterford) River (including the only designated Freshwater Pearl Mussel sub-catchment in the Suir catchment). There is no hydrological connection between the two Clodiagh Rivers.

<u>European Site</u>	<u>Distance from Upperchurch Windfarm</u>
Bolingbrook Hill SAC (002124)	6.9 km north west
Keeper Hill SAC (001197)	10.7 km north west
Kilduff, Devilsbit Mountain SAC (000934)	13.3 km north east
Lower River Shannon SAC (002165)	2.7 km west
Lower River Suir SAC (002137)	2.8 km east and c.4.1km downstream
Philipston Marsh SAC (001847)	13.6 km south west
Silvermine Mountain SAC (000939)	11.0 km north west
Silvermine Mountain West SAC (002258)	11.2 km north west
Slievefelim to Silvermines SPA (004165)	Adjacent to the western boundary of turbines T17 to T21.

8.2.2.3.4 Element 5: UWF Other Activities

The UWF Other Activities are partially located in the Clodiagh (Tipperary) River sub-catchment which drains downstream to the Lower River Suir cSAC, where Haul Route Activities HA21-23 and Hen Harrier Habitat Management Activities exist in proximity to the Upperchurch Windfarm. Further Haul Route Activity locations such as tree trimming, overlaying of matting on verges and temporary street furniture removal extend northwards and then west before termination at Foynes. This brings a number of HA locations into closer proximity to European Sites such as the River Shannon and River Fergus SPA, and the Lower River Shannon SAC. No works however are proposed in respect of these activities in proximity to European Sites.

The location of European Sites within 15km of the UWF Other Activities is outlined on Table 8-22 and illustrated on [Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area](#).

Table 8-22: Summary of European Sites within the UWF Other Activities Study Area

<u>European Site</u>	<u>Distance from Other Activities</u>
Anglesey Road SAC (002125)	2.5km south of UWF Other Activities
Askeaton Fen Complex SAC (002279)	7.3km west of UWF Other Activities
Barrigone SAC (000432)	3km east of UWF Other Activities
Bolingbrook Hill SAC (002124)	6.3km north of UWF Other Activities
Clare Glen SAC (000930)	4.5km south of UWF Other Activities
Curraghchase Woods SAC (000174)	9.3km west of UWF Other Activities
Glenomra Wood SAC (001013)	9.1km northwest of UWF Other Activities
Glenstal Wood SAC (001432)	5.8km south of UWF Other Activities
Keeper Hill SAC (001197)	2km north of UWF Other Activities
Kilduff, Devilsbit Mountain SAC (000934)	8.7km northeast of UWF Other Activities
Lough Derg (Shannon) SPA (004058)	8.1 km northwest of UWF Other Activities
Lough Derg, North-East Shore SAC (002241)	12.9km northwest of UWF Other Activities
Lower River Shannon SAC (002165)	0km of UWF Other Activities
Lower River Suir SAC (002137)	0m: The HA19 location on the R503 overlaps the Site boundary
Philipston Marsh SAC (001847)	13.9km southwest of UWF Other Activities
Ratty River Cave SAC (002316)	14.8km of UWF Other Activities
River Shannon and River Fergus Estuaries SPA (004077)	354m northwest of UWF Other Activities
Silvermine Mountain SAC (000939)	8.5km southwest of UWF Other Activities

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<u>European Site</u>	<u>Distance from Other Activities</u>
Silvermine Mountain West SAC (002258)	9.5 km southwest of UWF Other Activities
Slieve Bernagh Bog SAC (002312)	9.6km northwest of UWF Other Activities
Slievefelim to Silvermines SPA (004165)	0m southwest of UWF Other Activities
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	5.9km south of UWF Other Activities
Tory Hill SAC (000439)	10.3km southeast of UWF Other Activities

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8.2.2.3.5 Other Projects or Activities:

Bunkimalta Windfarm: a consented windfarm located within the Slievefelim to Silvermines SPA, c.2.5km to the north of the UWF Grid Connection. The windfarm is also located upstream of the Lower River Shannon SAC.

Castlewaller Windfarm: a consented windfarm located within the Slievefelim to Silvermines SPA, immediately adjacent to the UWF Grid Connection. It is similarly located upstream of the Lower River Shannon cSAC.

Gortnahalla Wind Turbine Development: a consented single turbine development within the Clodiagh River catchment. The turbine development is also located upstream of the Lower River Suir cSAC.

Newport Distributor Road: a consented inner relief road located between the R503 and a local County Road, in Newport town, Co. Tipperary, is located c.150m south east of the Lower River Shannon SAC at its closest.

Killuragh Digester Plant: a digester plant to process farm slurry and other organic material, located in the Lower River Shannon catchment area, near Pallasgreen, County Limerick.

Housing Developments in Doon and Annacotty: construction of 25 No. houses at Doon, 288 no. houses in Annacotty, both developments located in the Lower River Shannon SAC catchment area.

Agricultural Developments: construction of milking parlours in Cappamore and Lisnagry County Limerick, and slatted sheds and stores in Pallasgreen. All of these developments are located in the Lower River Shannon SAC catchment area. A proposed change of use from hay storage to a slatted unit for pigs in Gortussa is located within the Clodiagh (Tipperary) Lower River Suir cSAC catchment area.

Thurles Regional Water Treatment Works comprise consented water treatment works abstracting from the Clodiagh River catchment.

Forestry/Agriculture/Turf-Cutting occur within the Slievefelim to Silvermines SPA, and adjacent to, or in the case of Turf cutting, upstream of the Lower River Shannon cSAC/Lower River Suir cSAC.

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8.2.2.4 Cumulative Information: Baseline Characteristics – Character

Features of Interest are summarised in Table 8-23. Further detail on the distinguishing aspects of the designated sites is provided in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** which can be found in **Volume D Appropriate Assessment Report**, which accompanies the planning application.

Table 8-23: Features of Interest in respect of European Sites under consideration

<u>European Site</u>	<u>Features of Interest</u>
Anglesey Road SAC (002125)	Priority Annex I Habitats: Species-rich <i>Nardus</i> Grassland* (6230)
Askeaton Fen Complex SAC (002279)	Priority Annex I Habitats: <i>Cladium</i> Fens* (7210) Annex I Habitats: Alkaline Fens (7230)
Barrigone SAC (000432)	Priority Annex I Habitats: Orchid-rich Calcareous Grassland* (6210) /Limestone Pavement* (8240) Annex I Habitats: Juniper Scrub (5130) Annex II Species: Marsh Fritillary (<i>Euphydryas aurinia</i>)
Bolingbrook Hill SAC (002124)	Priority Annex I Habitats: Species-rich <i>Nardus</i> Grassland* (6230) Annex I Habitats: Northern Atlantic Wet Heath (4010) / European Dry Heath (4030)
Clare Glen SAC (000930)	Annex I Habitats: Old sessile oak woods (91A0) Annex II Species: Killarney Fern (<i>Trichomanes speciosum</i>)
Curraghchase Woods SAC (000174)	Priority Annex I Habitats: Alluvial Forests* (91E0) / Yew Woodlands* (91J0) Annex II Species: Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)
Glenomra Wood SAC (001013)	Annex I Habitats: Old sessile oak woods (91A0)
Glenstal Wood SAC (001432)	Annex II Species: Killarney Fern (<i>Trichomanes speciosum</i>)
Keeper Hill SAC (001197)	Priority Annex I Habitats: Blanket Bogs (* if active bog) (7130) Annex I Habitats: Northern Atlantic Wet Heath (4010)
Kilduff, Devilsbit Mountain SAC (000934)	Priority Annex I Habitats: Species-rich <i>Nardus</i> Grassland* (6230) Annex I Habitats: European Dry Heath (4030)
Lough Derg (Shannon) SPA (004058)	Cormorant (<i>Phalacrocorax carbo</i>); Tufted Duck (<i>Aythya fuligula</i>); Goldeneye (<i>Bucephala clangula</i>); Common Tern (<i>Sterna hirundo</i>); Wetland and Waterbirds
Lough Derg, North-East Shore SAC (002241)	Priority Annex I Habitats: <i>Cladium</i> Fens* (7210) / Limestone Pavement* (8240)/Alluvial Forests* (91E0)/Yew Woodlands* (91J0) Annex I Habitats: Alkaline Fens (7230) / Juniper Scrub (5130)
Lower River Shannon SAC (002165)	Priority Annex I Habitats: Alluvial Forests* (91E0) / Coastal Lagoons* (1150) Annex I Habitats: Sandbanks (1110) / Estuaries (1130) /Mudflats and sand flats (1140)/Large shallow inlets and bays (1160)/Reefs (1170)/Vegetation of stony banks (1220)/Vegetated sea cliffs (1230)/ <i>Salicornia</i> mudflats (1310) / Atlantic salt meadows (1330)/Mediterranean salt meadows (1410)/Floating river vegetation (3260)/ <i>Molinia</i> meadows (6410) Annex II species: Freshwater Pearl-Mussel (<i>Margaritifera margaritifera</i>);Atlantic Salmon (<i>Salmo salar</i>);Sea Lamprey (<i>Petromyzon marinus</i>);Brook Lamprey (<i>Lampetra planeri</i>);River Lamprey (<i>Lampetra fluviatilis</i>);Bottlenose Dolphin (<i>Tursiops truncates</i>);Otter (<i>Lutra lutra</i>)
Lower River Suir SAC (002137)	Priority Annex I Habitats: Alluvial forests* (91E0) / Yew woodlands* (91J0) Annex I Habitats: Atlantic salt meadows (1330) / Mediterranean salt meadows (1410) / Floating river vegetation (3260) / Hydrophilous tall herb fringe communities (6340) / Old sessile oak woods (91A0) Annex II species: Freshwater Pearl-Mussel (<i>Margaritifera margaritifera</i>); White-clawed Crayfish (<i>Austropotamobius pallipes</i>); Sea Lamprey (<i>Petromyzon marinus</i>);Brook Lamprey (<i>Lampetra planeri</i>);River Lamprey (<i>Lampetra fluviatilis</i>);Twaite Shad (<i>Alosa fallax fallax</i>);Atlantic Salmon (<i>Salmo salar</i>);Otter (<i>Lutra lutra</i>)

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European Site	Features of Interest
Philipston Marsh SAC (001847)	Annex I Habitats: Transition mires and quaking bogs (7140)
Ratty River Cave SAC (002316)	Annex I Habitats: Caves (8310) Annex II Species: Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)
River Shannon and River Fergus Estuaries SPA (004077)	Cormorant (<i>Phalacrocorax carbo</i>);Whooper Swan (<i>Cygnus cygnus</i>);Light-bellied Brent Goose (<i>Branta bernicla hrota</i>);Shelduck (<i>Tadorna tadorna</i>);Wigeon (<i>Anas penelope</i>);Teal (<i>Anas crecca</i>);Pintail (<i>Anas acuta</i>);Shoveler (<i>Anas clypeata</i>);Scaup (<i>Aythya marila</i>);Ringed Plover (<i>Charadrius hiaticula</i>);Golden Plover (<i>Pluvialis apricaria</i>);Grey Plover (<i>Pluvialis squatarola</i>);Lapwing (<i>Vanellus vanellus</i>);Knot (<i>Calidris canutus</i>);Dunlin (<i>Calidris alpina</i>);Black-tailed Godwit (<i>Limosa limosa</i>);Bar-tailed Godwit (<i>Limosa lapponica</i>);Curlew (<i>Numenius arquata</i>);Redshank (<i>Tringa totanus</i>);Greenshank (<i>Tringa nebularia</i>);Black-headed Gull (<i>Chroicocephalus ridibundus</i>);Wetland and Waterbirds
Silvermine Mountain SAC (000939)	Priority Annex I Habitats: Species-rich <i>Nardus</i> Grassland* (6230) Annex I Habitats: Northern Atlantic Wet Heath (4010)
Silvermine Mountain West SAC (002258)	Annex I Habitats: Northern Atlantic Wet Heath (4010)/European Dry Heath (4030)/Calaminarian grasslands (6130)
Slieve Bernagh Bog SAC (002312)	Priority Annex I Habitats: Blanket Bogs (* if active bog) (7130) Annex I Habitats: Northern Atlantic Wet Heath (4010)/European Dry Heath (4030)
Slievefelim to Silvermines SPA (001179)	Hen Harrier (<i>Circus cyaneus</i>)
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	Hen Harrier (<i>Circus cyaneus</i>)
Tory Hill SAC (000439)	Priority Annex I Habitats: Orchid-rich Calcareous Grassland* (6210)/ <i>Cladium</i> Fens* (7210) Annex I Habitats: Alkaline Fens (7230)

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8.2.3 PROJECT DESIGN MEASURES for European Sites

At the conception of the UWF Replacement Forestry, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process. These are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-24 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **European Sites**.

Table 8-24: UWF Replacement Forestry Project Design Measures relevant to European Sites

PD ID	Project Design Environmental Protection Measure (PD)
RF-PD01	All planting and maintenance activities will be carried out during daylight hours
RF-PD02	The lands will be planted by hand, using spades and hand tools.
RF-PD03	No pesticide or fertilizer will be used at the UWF Replacement Forestry site.
RF-PD04	There will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within the site/
RF-PD05	A water setback from the watercourse which flows through the site will be established during planting works. The setback will be 10m from the edge of the watercourse. No planting or other works will be carried out in this 10m wide buffer area. Native woodland will be planted beyond this distance in accordance with Silvicultural Standards for Native Woodland Establishment GP9 & GP10 (Department of Agriculture, Food and the Marine, 2015).
RF-PD06	No planting works will take place within 500m of an active hen harrier nest, or active nesting activity, during the months of March to August. Additionally, during the winter season, October to February, planting works will only be carried out during the period between one hour after sunrise and one hour before sunset in areas within 1000m of an active winter roost.
RF-PD07	The lands will be protected from livestock by the perimeter fence.
RF-PD08	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
RF-PD09	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
RF-PD10	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken <u>while cubs are present in the holt</u> and NPWS will be notified immediately
RF-PD11	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
RF-PD12	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as ‘out of bounds’. Fencing will be in accordance with Clause 303 of the NRA’s Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.

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8.2.4 EVALUATION OF IMPACTS to European Sites

As previously referenced, the likely effects of the UWF Replacement Forestry and then the cumulative effects of the UWF Replacement Forestry together with the other elements of the Whole UWF Project and together with Other Projects or Activities on European Sites are identified and evaluated in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** (herein referred to as the NIS). Conceptual Site Models were used to facilitate the identification of source-pathway-receptor links, between the project and the sensitive Biodiversity receptor - European Sites and is presented in Section 4.2 of the NIS.

As a result of the Conceptual Site Model exercise, a number of effects were screened in for evaluation at Stage Two of the Appropriate Assessment reporting process, and these impacts, are evaluated in **Section 5.3 Potential Impacts on Key Species and Habitats** of the NIS. Identified possible effects (alone or in combination) on Key Habitats or Species where source pathway linkage exists to a European Site(s) include effects on Aquatic Ecology and Fisheries, Otter, and Hen Harrier.

We refer to the Natura Impact Statement for Whole UWF Project Elements 1 to 5, which is included in Volume D: Appropriate Assessment Reporting of the planning application for the UWF Replacement Forestry, for a full evaluation of the likely significant effects of the Whole UWF Project on European Sites under consideration.

8.2.4.1 Description and Rationale for Excluding (Scoping out) Impacts

As a result of this Conceptual Site Model exercise, a number of effects were screened out from evaluation at Stage One of the Appropriate Assessment reporting process. We refer Section 4.2 of the NIS for detailed examination and analysis and **Section 4.3 Stage One Screening Conclusion** of the NIS.

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8.2.5 Mitigation Measures for Impacts to European Sites

Environmental protection measures were incorporated into the project design (Project Design Measures), and that design was subject to examination and analysis in the NIS (see [Volume E: Appropriate Assessment Reporting](#)), following Stage 1 Screening (wherein Project Design was not considered). The examination and analysis conducted at Stage Two of the Appropriate Assessment process has concluded that, following the consideration of Project Design measures at Stage 2, in the absence of additional mitigation, significant effects are likely in respect of the Lower River Shannon cSAC.

Additional Mitigation measures to be introduced in this regard (in particular, Additional Mitigation Measures AMM-01: Disturbance to or Displacement of Otter) are detailed in Section 5.3 of the NIS, along with information of the efficacy of both those additional measures and the considered Project Design in ensuring the avoidance of significant effects on the integrity of European Sites under consideration, in light of their respective Conservation Objectives.

8.2.6 Evaluation of Residual Impacts to European Sites

Potentially significant effects have been evaluated, and it is concluded that neither the UWF Grid Connection, nor the Whole UWF Project, nor any other Element of the Whole UWF Project, alone or in combination, will result in any effects that will adversely affect the integrity of the European Sites under consideration, having regard to their respective conservation objectives, in circumstances where “no reasonable scientific doubt” remains as to the absence of such adverse effects.

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8.2.7 Application of Best Practice and the EMP for European Sites

The UWF Replacement Forestry will be planted and managed in accordance with the Project Design Measures and in accordance with the Department of Agriculture, Food & the Marine Guidance Documents – *Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards (2015)*, *Environmental Requirements for Afforestation (2016)* and *Management Guidelines for Ireland Native Woodlands (2017)*.

Best Practice Measures (BPM), although not part of the Project Design for the UWF Replacement Forestry, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **European Sites**, by the authors of this topic chapter, using industry best practice:

RF-BPM-01	Monitoring of non-native invasive plant species
RF-BPM-02	Management of general non-native invasive species

These Best Practice Measures are included in full at the end of this topic chapter, and are also included as **Appendix 5.1: UWF Replacement Forestry Best Practice Measures** in **Volume C4: EIAR Appendices**.

8.2.7.1 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan is included as **Appendix 5.2: Invasive Species Management Plan** in **Volume C4 EIAR Appendices**.

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8.2.8 Summary of Impacts to European Sites

In summary it can be concluded that in light of the conservation objectives and rationale for designation of the European Sites under consideration; the potential for significant effects exists as a result of the Whole Upperchurch Windfarm Project. These potentially significant effects have been evaluated, and with the implementation of Additional Mitigation Measures AMM-01 in respect of Otter, it is concluded that neither the Other Element, UWF Grid Connection, nor the Whole Upperchurch Windfarm Project, nor any other Element of the Whole UWF Project, alone or in combination, will result in any effects that will adversely affect the integrity of the European Sites under consideration, having regard to their respective conservation objectives, in circumstances where “no reasonable scientific doubt” remains as to the absence of such adverse effects.

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8.3 Sensitive Aspect No.2: National Sites

This Section provides a description and evaluation of the Sensitive Aspect - National Sites, which relates to Irish designated sites of ecological importance and comprises both Natural Heritage Areas (NHAs) and proposed NHAs (pNHA's).

8.3.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

8.3.1.1 Baseline Characteristics of National Sites in relation to UWF Replacement Forestry

There are 2 No. NHAs and 9 No. pNHAs within 15km of the UWF Replacement Forestry. The location and spatial extent of these NHA's and pNHA's is illustrated on **Figure RF 8.3: National Sites within the UWF Replacement Forestry Study Area** (Volume C3 EIAR Figures).

The location of the NHA's in the UWF Related Works Study Area is described in Table 8-25, the distinguishing aspects of these sites are summarized in Table 8-26.

Table 8-25: List of NHAs within 15km of UWF Replacement Forestry

<u>Site name and code</u>	<u>Distance from nearest point of UWF Replacement Forestry</u>
Bleanbeg Bog NHA (Site Code: 002450)	14.4km west
Mauherslieve Bog NHA (Site Code: 002385)	6.1km west

Table 8-26: Features of Interest of NHAs within the UWF Related Works Study Area

<u>Site name and code</u>	<u>Feature of Interest</u>
Bleanbeg Bog NHA (Site Code: 002450)	Bleanbeg Bog NHA consists primarily of upland blanket bog and is located approximately 7 km east of Newport in south Tipperary. The site is situated in the townlands of Bleanbeg, Glencroe, Fiddane and Castlewaller. It incorporates a broad plateau of upland blanket bog habitat that grades into heath, upland grassland on peaty soil, and cutover bog. The western boundary of the site is defined by the transition from intact blanket bog to cutover bog, while the northern, eastern and southern sides of the site are bounded by conifer plantation. Peatlands are the feature of interest for this site. The red data book species Red Grouse and Irish Hare have been recorded on site. A pair of Hen Harriers, also a Red Data Book species, nest within 1 km of the site and are known to forage over the site.
Mauherslieve Bog NHA (Site Code: 002385)	Peatlands are the feature of interest for this site. Irish Hare have been recorded on site. Mauherslieve Bog NHA is a site of considerable conservation value featuring intact upland blanket bog. Blanket bog habitat is a globally scarce resource. It is largely confined to coastal regions at temperate latitudes with cool, wet, oceanic climates. North-west Europe contains some of the best-developed areas of blanket bog in the world.

Further detail on these sites (both NHA's and pNHA's), are included in the **Natura Impact Statement for Whole UWF Project Elements 1 to 5** which can be found in **Volume D Appropriate Assessment Report**.

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8.3.1.2 Evaluation of UWF Replacement Forestry

It was evaluated by the topic authors that the UWF Replacement Forestry has **no potential to cause impacts to National Sites**, for the following reasons:

- The UWF Replacement Forestry will not overlap any NHA or pNHA boundary, the nearest site is over 6km away, as outlined in Table 8-25.
- There is no potential for impacts to the Features of Interest of the National Sites due distance and absence of any ecological connectivity, or source pathway links for hydrological effects (as evaluated in Chapter 11: Water, Section 11.7).

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8.3.1.3 Cumulative Evaluation for the Other Elements of the Whole UWF Project (grey background)

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

UWF Replacement Forestry has no potential to cause impacts to National Sites by itself, and therefore cannot have a cumulative effect. However, the Other Elements must be considered because the UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in Section 8.3.2 to Section 8.3.4 and included in the summary table in Section 8.3.8 in order to show the totality of the project.

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8.3.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

8.3.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to National Sites considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIA Appendices](#). Scoping of these Other Elements is presented in [Section 8.3.2.2.1](#) below.

The evaluation of cumulative impacts to National Sites also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to National Sites with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project, and therefore No Other Projects or Activities are scoped in for evaluation of cumulative effects to National Sites.

8.3.2.2 Cumulative Evaluation Study Area

The study area for the evaluation of cumulative effects is described in Table 8-27.

Table 8-27: Cumulative Evaluation Study Area for National Sites

<u>Cumulative Project</u>	<u>Cumulative Study Area Boundary</u>	<u>Justification for Study Area Extent</u>
Element 1: UWF Grid Connection	15km from the boundary of construction works, activity locations.	Professional Judgement
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities	Not Relevant – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects.	

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8.3.2.2.1 Potential for Impacts to National Sites

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect National Sites. The results of this evaluation are included in Table 8-28.

The location of the Other Elements in relation to National Sites is illustrated on **Figure CE 8.3: National Sites within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures). The Features of Interest for these sites are described in Section 8.3.2.4.

Table 8-28: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 2: UWF Related Works	<p><u>Evaluated as excluded: No potential for effects</u> 4 No. NHA sites and 17 No. pNHA sites are located within 15km of the UWF Related Works. The NHA sites included: Bleanbeg Bog NHA, Mauherslieve Bog NHA, Grageen Fen and Bog NHA, and Gortacullin Bog NHA. It is evaluated that there is no potential for effects to these NHAs, or to the pNHAs within 15km or their Features of Interest due to:</p> <ul style="list-style-type: none"> • The UWF Related Works will not overlap any NHA or pNHA boundary, Mauherslieve Bog NHA is the closest NHA site, located 4.3km to the west. • There is no potential for impacts to the Features of Interest of the National Sites due to distance and absence of any ecological connectivity, or source pathway links for hydrological effects, (as evaluated in Chapter 11: Water, Section 11.7).
Element 4: Upperchurch Windfarm (UWF)	<p><u>Evaluated as excluded: No potential for effects</u> Similar to the UWF Related Works, the Upperchurch Windfarm is within 15km of the Bleanbeg Bog NHA, Mauherslieve Bog NHA (closest), Grageen Fen and Bog NHA and Gortacullin Bog NHA. It is evaluated that there is no potential for effects to these NHAs, or to the pNHAs within 15km or their Features of Interest due to:</p> <ul style="list-style-type: none"> • The Upperchurch Windfarm will not overlap any NHA or pNHA boundary, Mauherslieve Bog NHA is the closest NHA site, located over 4km to the west, • There is no potential for impacts to the Features of Interest of the National Sites due to distance and absence of any ecological connectivity, or source pathway links for hydrological effects (as evaluated in Chapter 11: Water, Section 11.7).
Element 5: UWF Other Activities	<p><u>Evaluated as excluded: No potential for effects/Neutral effects:</u> 8 No. NHA sites are and 60 No. pNHA sites are located within 15km of the UWF Other Activities. The NHA sites include: Bleanbeg Bog NHA, Grageen Fen and Bog NHA, Mauherslieve Bog NHA, Woodcock Hill Bog NHA, Moyreen Bog NHA, Carrigkerry Bogs NHA, Scohaboy Bog NHA and Gortacullin Bog NHA. Mauherslieve Bog NHA is the closest NHA site, located 4.8km to the northwest of the closest location of UWF Other Activities. <u>UWF Other Activities</u> overlap a single pNHA (Inner Shannon Estuary – South Shore) where Haul Route Activities will involve street furniture removal and replacement on existing roadway roundabouts along the N69 (Dock Road, Limerick). Neutral effects are likely to this pNHA due the location of the activity within the public road corridor and the absence of drainage or excavation works. No potential for effects to any NHA or pNHA caused by other activities due the absence of construction excavations or drainage works and the separation distances to sites.</p>

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8.3.2.3 Cumulative Information: Baseline Characteristics – Context

Figure CE 8.3: National Sites within the Cumulative Evaluation Study Area illustrates the locations of all NHA’s and pNHA’s within 15km of the other elements of the Whole UWF Project.

8.3.2.3.1 Element 1: UWF Grid Connection

A total of 3 NHA’s and 21 No. pNHAs are found within 15km of the UWF Grid Connection. The location and spatial extent of these NHA’s and pNHA’s is illustrated on Figure GC 8.3: National Sites within the UWF Grid Connection Study Area (Figure GC 8.3 is part of the EIA Report for the UWF Grid Connection, and is included in Volume E: Reference Documents with this planning application).

The location of the NHA’s within 15km of the UWF Grid Connection is described in Table 8-29. The features of interest of the NHAs are described in Section 8.3.2.4.

Table 8-29: List of NHA’s within 15km of the UWF Grid Connection Study Area

Site name and code	Distance from nearest point of UWF Grid Connection
Bleanbeg Bog NHA (Site Code: 002450)	0 m The UWF Grid Connection overlaps the boundary of Bleanbeg Bog NHA in the townland of Castlewaller where the 110kV UGC will be located within an existing forestry track. The construction of the 110kV UGC does not require works in habitats for which the NHA is designated nor will it affect the hydrology of the NHA (the existing forestry track is located downslope of the bog- we refer Chapter 11 Water). No other aspects of the UWF Grid Connection works are within an NHA or pNHA boundary.
Grageen Fen and Bog NHA (Site Code: 002186)	4.9 km southwest of UWF Grid Connection
Mauherslieve Bog NHA (Site Code: 002385)	6.5 m north of UWF Grid Connection

Further detail on these sites (both NHA’s and pNHA’s), are included in Appendix 8-1: Detailed Biodiversity Information and Data (Section A8-1.2.4.2). Appendix 8-1 can be found at Volume C4 EIAR Appendices.

8.3.2.3.2 Element 3: UWF Replacement Forestry

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.3 Element 4: Upperchurch Windfarm

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.4 Element 5: UWF Other Activities

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.5 Other Projects or Activities

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.3.2.1.

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8.3.2.4 Cumulative Information: Baseline Characteristics – Character

The features of interest of the NHA sites within 15km of the Elements of the Whole UWF Project are described in Table 8-30.

Table 8-30: Features of Interest in respect of National Sites within 15km of the Whole UWF Project

Site name and code	Feature of Interest
Bleanbeg Bog NHA (Site Code: 002450)	Bleanbeg Bog NHA consists primarily of upland blanket bog and is located approximately 7 km east of Newport in south Tipperary. The site is situated in the townlands of Bleanbeg, Glencroe, Fiddane and Castlewaller. It incorporates a broad plateau of upland blanket bog habitat that grades into heath, upland grassland on peaty soil, and cutover bog. The western boundary of the site is defined by the transition from intact blanket bog to cutover bog, while the northern, eastern and southern sides of the site are bounded by conifer plantation. Peatlands are the feature of interest for this site. The red data book species Red Grouse and Irish Hare have been recorded on site. A pair of Hen Harriers, also a Red Data Book species, nest within 1 km of the site and are known to forage over the site.
Grageen Fen and Bog NHA (Site Code: 002186)	Peatlands are the feature of interest for this site. The site is an example of an upland blanket bog and fen habitat.
Mauherslieve Bog NHA (Site Code: 002385)	Peatlands are the feature of interest for this site. Irish Hare have been recorded on site. Mauherslieve Bog NHA is a site of considerable conservation value featuring intact upland blanket bog. Blanket bog habitat is a globally scarce resource. It is largely confined to coastal regions at temperate latitudes with cool, wet, oceanic climates. North-west Europe contains some of the best-developed areas of blanket bog in the world.
Woodcock Hill Bog NHA (Site Code: 002402)	Peatlands are the feature of interest for this site. This site is an area of upland blanket bog and wet heath.
Moyreen Bog NHA (Site Code: 002361)	Peatlands are the feature of interest for this site. This site is a good example of lowland blanket bog. Red Grouse and Common Frog have been recorded on the site.
Carrigkerry Bogs NHA (Site Code: 002399)	Peatlands are the feature of interest for the site. Irish Hare and Red Grouse are plentiful. Also occurring are Snipe, Meadow Pipit and Fox Moth
Scohaboy Bog NHA (Site Code: 000937)	Peatlands are the feature of interest for this site. The site is a large raised bog. The Irish Red Data Book species Bird Cherry (<i>Prunus padus</i>) has been recorded from the site (in the past).
Gortacullin Bog NHA (Site Code: 002401)	Peatlands are the feature of interest for the site. The site contains a mosaic of upland bog and wet heath. Red Grouse has been recorded on the site.

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8.3.2.5 Cumulative Information Baseline Characteristics - Importance of National Sites

Natural Heritage Areas (NHA) are sites of national importance⁷ for nature conservation established under the Wildlife (Amendment) Act, 2000, and protected under the Wildlife Acts, 1976-2000, or through planning legislation. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation. Prior to statutory designation, pNHA’s are subject to limited protection including but not limited to, Agri-environmental schemes, Forest Service requirements (in respect of the approval of lands for forestry) and due recognition by Planning and Licensing Authorities.

8.3.2.6 Cumulative Information Baseline Characteristics - Sensitivity of National Sites

Bleanbeg Bog NHA and other National Sites are sensitive to hydrological changes to groundwater and surface water quality which may affect water dependent ecosystems. Within individual Sites, specific species or features of interest may be sensitive to disturbance and/or displacement, which could reduce their conservation status. Sites are also sensitive to encroachment by invasive species and habitat loss or degradation from human activities such as turf cutting.

8.3.2.7 Cumulative Information Baseline Characteristics - Trends in the Baseline Environment

No trends are currently available in respect of NHA’s or pNHA’s. The do-nothing scenario is therefore that in the absence of the UWF Grid Connection that any existing trends would continue in respect of the features of interest which form the basis for designation.

8.3.2.8 Cumulative Information Baseline Characteristics - Receiving Environment

It is assumed in this report that the baseline environment in relation to National Sites, as identified above, will be the receiving environment at the time of construction (c.late 2018/2019) due to the short separation period. As longer terms trends are unavailable, it is considered that existing pressures (such as turf-cutting) are likely to continue into the operational stage; however, we note that longer term mitigating strategies such as the National Peatlands Strategy 2015 are in place, and may result in longer term positive trends.

⁷ Cited from “Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs Contribution and Observations to National Planning Framework - Ireland 2040, Our Plan Consultation Issues Paper & SEA Scoping Document” available online at <http://npf.ie/wp-content/uploads/2017/09/0633-Department-of-Arts-Heritage-Regional-Rural-and-Gaeltacht-Affairs.compressed.pdf>

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8.3.3 CUMULATIVE INFORMATION: Project Design Measures for National Sites

The potential for impacts to National Sites is limited to the UWF Grid Connection. Potential or likely significant impacts caused by the UWF Grid Connection were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection. These Project Design Measures are included in the description of the UWF Grid Connection which can found in this EIA Report in [Appendix 5.3](#) in [Volume C4: EIAR Appendices](#).

8.3.4 CUMULATIVE INFORMATION: Evaluation Of Impacts to National Sites

It was evaluated, in Section 8.3.1, that UWF Replacement Forestry has no potential to cause impacts to National Sites.

This Section evaluates the likely cumulative effects of the Other Elements of the Whole UWF Project, which is limited to the UWF Grid Connection, and is based on the residual effects of the UWF Grid Connection.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the UWF Grid Connection project (source) and the sensitive aspect (receptor) - National Sites.

As a result of the exercise, **no impacts were included for evaluation.**

Table 8-31: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification in Section 8.3.4.1)
No Impacts were Included	<i>Reduction in habitats for which site is designated, (construction stage)</i>
	<i>Blanket Bog habitat degradation from Surface water and groundwater quality effects resulting from leakages and spillage of oils, fuels and chemicals, (construction stage)</i>
	<i>Blanket Bog Habitat degradation as a result of Water Level Impacts from Excavations and Groundworks, (construction stage)</i>
	<i>Blanket Bog Habitat degradation resulting from Surface and Groundwater Contamination, (construction stage)</i>
	<i>Disturbance to species utilising the site, (construction stage)</i>
	<i>Operational Stage Impacts</i>
	<i>Decommissioning Impacts</i>

The source-pathway-receptor links and the rationale for excluded impacts are described in **Section 8.3.4.1.**

8.3.4.1 CUMULATIVE INFORMATION: Description and Rationale for Excluded Impacts

The source-pathway-receptor links and the rationale for impacts excluded from evaluation in Impact Evaluation Table sections are described in Table 8-32 below.

Table 8-32: Description and Rationale for Excluded Impacts to National Sites

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

<u>Source(s) of Impacts</u>	<u>Project Element</u>	<u>Pathway(s)</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
Construction Stage				
Excavation works	1	Landcover	Reduction in habitats for which site is designated	Rationale for Excluding: No potential for impact No direct loss of habitat for which the site is designated
Oils, Fuels and Chemicals	1	Surface water and Groundwater Flowpaths	Blanket Bog habitat degradation from Surface water and groundwater quality effects resulting from leakages and spillage of oils, fuels and chemicals	Rationale for Excluding: Neutral impact Cross factor effects via habitat degradation are scoped out as: The route of the UWF Grid Connection through the NHA does not intersect blanket bog as it uses an existing forestry track on the verge of the bog. Therefore, there will be no excavation of peat or crossing overland on peat. Also, there will be no refuelling of vehicles or plant permitted within the NHA (Project Design Measure). Any small leaks would be limited to a short section of mineral subsoils underneath the existing access track. The access road exists downslope (down-gradient) of the bog and therefore there can be no surface water or groundwater flow from the works area towards the bog. The overall effects (if any) on the NHA will be Neutral.
Excavation works	1	Surface water and Groundwater Flowpaths	Blanket Bog Habitat degradation as a result of Water Level Impacts from Excavations and Groundworks	Rationale for Excluding: No potential for impacts Cross factor effects via habitat degradation are scoped out as: The route of the UWF Grid Connection through the NHA does not intersect blanket bog as it uses an existing forestry track on the verge of the bog. (Therefore, there will be no excavation of peat). In addition, no groundwater inflows were recorded within the mineral subsoil in any of the trial pits (3 no.) undertaken along the route of the grid connection 110kV UGC within the NHA (the trial pits were undertaken in March 2017 when conditions were seasonally wettest and a low groundwater table would not be expected at this time) and therefore there is no potential for increased groundwater drainage under the bog as a result of the temporary open trench. There was also no evidence of a potentially higher groundwater table in the mineral subsoils below the route within the NHA either. There will be no requirement for dewatering of the cable trench within the NHA. Due to the lack of groundwater seepage noted in the trial holes adjacent to the NHA and the absence of a groundwater table, there will be no potential for the temporary

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Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				trench to act as a preferential flow path for groundwater flow. Also, the trench will be backfilled after the works are complete and there will be no alteration of surface water or groundwater drainage within the NHA.
Cement Based Compounds	1	Soils Subsoil and Bedrock pore space	Blanket Bog Habitat degradation resulting from Surface and Groundwater Contamination	<p>Rationale for Excluding: Neutral impact</p> <p>Cross factor effects via habitat degradation are scoped out as:</p> <p>The route of the UWF Grid Connection through the NHA does not intersect blanket bog as it uses an existing forestry track on the verge of the bog. Therefore, there will be no excavation of peat or placement of cement within peat. There will be no contamination of blanket bog by cement as the proposed works is downslope of the bog and within mineral subsoil. Contact with the cement will be limited to a short section of mineral subsoils underneath the existing access track.</p> <p>The access road exists downslope (down-gradient) of the bog and therefore there can be no indirect effects as a result of contaminated surface water runoff or groundwater flow towards the bog) Only a temporary (and reversible) increase in the pH of the subsoil in direct contact with the cement is likely to occur. The cement will also not come in contact with groundwater as no groundwater table was found during the excavation of the 3 no. trial pits within the NHA. The effects, which will be localised to the cable trench will only persist until after the cement mix has hardened and the residual high alkalinity leachate flushed out / diluted by rainfall. The trench will be backfilled with natural material and therefore there will be no exposed cement material. The overall effects on the NHA will be Neutral</p>
Noise and Human Activity	1	Air and Visibility	Disturbance to species utilising the site	<p>Rationale for Excluding: Neutral effects predicted as:</p> <p>The scale of the machinery involved in the works is relatively minor and will comprise primarily of a tracked excavator to dig the trench where the cable will be laid.</p> <p>Levels of noise are not expected to be sufficient to disturb species within the NHA, will be located off the bog, of short duration, and reversible.</p>
Excavation works	1	Landcover	<u>Mauherslieve Bog NHA</u> - Reduction in	Rationale for Excluding: No potential for impact

<u>Source(s) of Impacts</u>	<u>Project Element</u>	<u>Pathway(s)</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
			habitats for which site is designated	No habitats for which the site is designated will be reduced nor will the extent of the NHA be reduced
Excavation works	1	Surface Water Groundwater	Mauherslieve Bog NHA - Habitat degradation resulting from Water Quality effects	Rationale for Excluding: No potential for cross factor impacts, as the NHA is upslope of construction works areas, therefore no impacts via surface water or groundwater are possible.
All other identified NHAs and pNHA's				Rationale for Excluding: No potential for impacts No direct or indirect impact on identified NHAs or pNHAs due to distance and absence of any ecological connectivity or source pathway links.
<u>Operational Stage</u>				
Operational Stage Impacts on Bleanbeg Bog NHA				Rationale for Excluding: No potential for impacts No works associated with the UWF Grid Connection are expected to take place within the NHA boundary, any infrequent operational maintenance will be carried out at joint bays, which are all located within existing or new access roads, outside of the NHA boundary, will not require any excavation of peat or any works within the NHA, and any works will be downslope of the Bleanbeg Bog NHA, therefore no impacts via surface water or groundwater are possible.
<u>Decommissioning Stage</u>				
The UWF Grid Connection will not be decommissioned; therefore there is no potential for this project to cause any effect on Bleanbeg Bog NHA.				

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8.3.5 UWF Replacement Forestry: Mitigation Measures for Impacts to National Sites

Mitigation measures are not relevant as, due to its location, there is **no potential for UWF Replacement Forestry to cause impacts** to National Sites.

8.3.6 UWF Replacement Forestry: Evaluation of Residual Impacts to National Sites

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. Mitigation measures are not relevant and thus the Residual Impact is the same as the Impact set out in the Evaluation of UWF Replacement Forestry (Section 8.3.1), i.e. **no potential for impacts**.

8.3.7 UWF Replacement Forestry: Application of Best Practice Methods

No UWF Replacement Forestry Best Practice Measures have been developed specifically for National Sites.

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8.3.8 Summary of Impacts to National Sites

No impacts to National Sites are concluded by the topic authors as likely to occur as a consequence of the development of the UWF Replacement Forestry.

Table 8-33: Summary of the impacts to National Sites

Impact to Bleanbeg Bog NHA:	No Impact
<i>Evaluation Table (for Other Elements only)</i>	<i>Section 8.3.4.1</i>
<i>Project Life-Cycle Stage (for Other Elements only)</i>	Construction Stage
<u>UWF Replacement Forestry</u>	No Potential for Impacts Evaluated as Excluded - See Section 8.3.1
Element 1: UWF Grid Connection	No Potential for Impacts / Neutral Impacts
Element 2: UWF Related Works	No Potential for Impacts
Element 4: Upperchurch Windfarm	No Potential for Impacts
Element 5: UWF Other Activities	No Potential for Impacts
CUMULATIVE IMPACTS:	
All Elements of the Whole UWF Project	No Potential for Cumulative Impacts

The greyed out boxes in the summary table below relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to present the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to National Sites with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.3.2.1).

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8.4 Sensitive Aspect No.3: Aquatic Habitats & Species

This Section provides a description and evaluation of the Sensitive Aspect - Aquatic Habitats & Species.

8.4.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

8.4.1.1 Baseline Characteristics of Aquatic Habitats & Species in relation to UWF Replacement Forestry

The UWF Replacement Forestry is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment. One Class 1 stream flows through the UWF Replacement Forestry lands – see **Figure RF 8.4: Aquatic Habitats & Species within the UWF Replacement Forestry Study Area** (Volume C3 EIAR Figures).

8.4.1.2 UWF Replacement Forestry Project Design

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the UWF Replacement Forestry – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-34 are relevant to **Aquatic Habitats & Species**.

Table 8-34: Project Design Environmental Protection Measures relevant to Aquatic Habitats & Species

<u>PD ID</u>	<u>Project Design Environmental Protection Measure (PD)</u>
RF-PD-02	The lands will be planted by hand, using spades and hand tools.
RF-PD-03	No pesticide or fertilizer will be used at the UWF Replacement Forestry site.
RF-PD-04	There will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within the site
RF-PD-05	A water setback from the watercourse which flows through the site will be established during planting works. The setback will be 10m from the edge of the watercourse. No planting or other works will be carried out in this 10m wide buffer area. Native woodland will be planted beyond this distance in accordance with Silvicultural Standards for Native Woodland Establishment GP9 & GP10 (Department of Agriculture, Food and the Marine, 2015).

8.4.1.3 Evaluation of UWF Replacement Forestry

It is evaluated that the UWF Replacement Forestry has no potential to cause impacts to Aquatic Habitats & Species, for the following reasons:

- Neutral habitat deterioration impacts arising from the UWF Replacement Forestry, as there is no requirement for instream works and no sources of significant sediment creation as planting will be carried out by hand.
- Neutral disturbance or displacement effects, as there is no requirement for instream works, and due to the scale of the works with planting being carried out by hand without the use of machines, and low levels of maintenance associated with the growth stage.
- There is no potential habitat quality impacts, as the riparian strips/grassland adjacent to the existing watercourse will be maintained as part of the forestry layout as a water quality protection measure.
- There is no potential for the planting works to spread invasive species, as there are no instream works required.

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- There is no potential for aquatic habitat degradation due to nitrogen deposition, as the new forestry will be a permanent native woodland, therefore no tree-felling/harvesting will be carried out.
- There is no potential for acidification effects during the growth stage, as the UWF Replacement Forestry will be deciduous in nature.
- There is no risk of pollution events as herbicide or fertilizers will not be used and the use of machinery will be minimal.
- There is no risk of aquatic habitat degradation (as a result of nitrogen deposition) as commercial tree felling will not be required – UWF Replacement Forestry will be a permanent native woodland.

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8.4.1.4 Cumulative Evaluation for the Other Elements of the Whole UWF Project (grey background)

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

UWF Replacement Forestry has no potential to cause impacts to Aquatic Habitats & Species by itself, and therefore cannot have a cumulative effect. However, the Other Elements must be considered because the UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in Section 8.4.2 to Section 8.4.4 and included in the summary table in Section 8.4.8 in order to show the totality of the project.

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8.4.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

The evaluation of cumulative impacts to Aquatic Habitats & Species considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at **Appendices 5.3, 5.4, 5.5 and 5.6**, in **Volume C4 EIAR Appendices**. Scoping of these Other Elements is presented in **Section 8.4.2.2.1** below.

The evaluation of cumulative impacts to Aquatic Habitats & Species also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Aquatic Habitats & Species with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in **Appendix 2.3: Scoping of Other Projects or Activities (Section A2.3 .1 and Section A2.3. 8)**.

The results of this scoping exercise are that: no other projects or activities will cause cumulative effects to Aquatic Habitats & Species with UWF Replacement Forestry, however in order to present the totality of the project- Bunkimalta Windfarm and Newport Distributor Road (both consented) have been scoped in for evaluation of cumulative effects relating to the Other Elements.

8.4.2.1 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area, comprises two different areas - one extent for cumulative evaluation of all of the Other Elements of the Whole UWF Project and a second extent for the cumulative evaluation of Other Projects or Activities, see Table 8-35.

Table 8-35: Cumulative Evaluation Study Area for Aquatic Habitats & Species

<u>Cumulative Project</u>	<u>Cumulative Study Area Boundary</u>	<u>Justification for Study Area Extent</u>
Element 1: UWF Grid Connection	Watercourse Crossing Locations	As per Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Scheme, NRA, (2008)
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities: Bunkimalta Windfarm Newport Distributor Road Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is no potential for cumulative effects with the UWF Replacement Forestry.	The regional Mulkear River catchment The regional Clodiagh River catchment	The location of the Whole UWF Project drains into both the Mulkear River catchment and the Clodiagh River catchment. Due to the vast scale of the catchments into which the Mulkear and Clodiagh rivers drain (River Shannon catchment and the River Suir catchment respectively), Neutral cumulative effects are likely in the broader River Shannon and River Suir catchments.

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8.4.2.1.1 Potential for Impacts to Aquatic Habitats & Species

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect Aquatic Habitats & Species. The results of this evaluation are included in Table 8-36.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on **Figure CE 8.4: Aquatic Habitats & Species within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-36: Results of the Evaluation of the Other Elements and Other Projects or Activities

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<p><u>Evaluated as excluded</u>: no potential for adverse effects: The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment.</p> <ul style="list-style-type: none"> • There is no potential for habitat effects as there are no instream works or sediment creating activities adjacent to watercourses required as a result of UWF Other Activities (including Overhead Line Activities, Haul Route Activities, and the Upperchurch Hen Harrier Scheme). • No potential for disturbance effects due to the small scale of activities and no activities within the riparian corridor of Class 1 or Class 2 watercourses. The Upperchurch Hen harrier Scheme will include planting of 1.4km of woody scrub species along riparian corridors and fencing of watercourse corridors to prevent access to the watercourses by live-stock, which will enhance the quality of riparian habitats. • No potential for impacts to aquatic habitat quality arising from the spread of invasive species, as there are no instream works or activities adjacent to watercourses required as a result of UWF Other Activities. • No potential for impacts to aquatic habitats due to tree felling, as no tree felling of conifer plantations is required.
Other Projects or Activities	
Bunkimalta Windfarm Newport Distributor Road	<p><u>Yes, included</u> for the evaluation of cumulative effects relating to decreases in instream habitat quality.</p> <p><u>Excluded from evaluation</u> of cumulative effects in relation to the following impacts- changes in flow regime, disturbance/displacement and riparian habitat degradation, as any cumulative effects will be Neutral.</p> <p>Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is <u>no potential for cumulative effects with the UWF Replacement Forestry</u>.</p>

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8.4.2.2 Cumulative Information: Baseline Characteristics – Context & Character

In respect of aquatic habitats and aquatic species, the existing environment comprises surface water bodies and their affected sub-catchment areas within the upper reaches of tributaries draining to the River Shannon and River Suir regional catchments.

8.4.2.2.1 Element 1: UWF Grid Connection

90 no. watercourses flow through the construction works area boundary associated with the UWF Grid Connection. The majority of the watercourses which occur within the UWF Grid Connection Study Area are located in the River Shannon regional catchment (W1 to W63, and W66 to W90), with just 2 No. watercourses located in the River Suir regional catchment (W64 and W65).

There are three main watercourses along the route of the 110kV UGC, all of which are within the Mulkear sub-catchment; the Newport (Mulkear) River (W10) itself, the Clare River (W36) and the Bilboa River (W57). At the proposed crossing locations all three watercourses are evaluated as containing good salmonid habitat, with good/high biological water quality and good ecological status.

The Newport (Mulkear) River (W10), Clare River (W36) and Bilboa River (W57), which flow through the study area, were generally 4 to 6 metres wide. The smaller Munnia River (W7), Reardnogy Beg River (W43 and W44) are c.1-2m wide, and the remaining Class 1 or Class 2 watercourses were generally shallow fast flowing streams which ranged between 0.5m and 2m wide.

All watercourse crossing locations were subject to a site visit by an aquatic ecologist and surveyed to evaluate fisheries habitat suitability, riparian and instream habitat and potential for protected aquatic species. In summary the majority of watercourse crossings for all project elements are minor streams and land drains, which have been subject to previous anthropogenic modification (arterial drainage, drainage maintenance, channel modification, abstractions, diversions, etc.). This has resulted in the reduction of ecological status and fisheries potential in the majority of cases. A number of watercourse crossing points are heavily poached by cattle and in poor condition due to effluent run-off. A summary of the results of the field surveys for the UWF Grid Connection is included in Table 8-37.

Table 8-37: Summary of Watercourses within the UWF Grid Connection Study Area

<u>Class</u>	<u>Watercourse Description</u>	<u>Watercourse Crossing ID</u>	<u>Total No. of Water-courses</u>	<u>Total With In-Stream Works</u>
Class 1	EPA mapped blue line, major river or stream (fisheries value)	W7, W8, W10 , W11, W12, W27, W32, W36 , W42, W47, W48, W55, W57 , W61 W66, W67, W74, W76, W84, W89,	20	9
Class 2	Headwater Stream Equivalent to EPA blue line but not mapped (fisheries value)	W1, W3, W4, W13, W38, W46, W50, W54, W56, W70, W72, W73, W75, W90	14	6
Class 3	Sub-optimal, heavily vegetated with low or no flow during dry periods (low fisheries value)	W2, W6, W35, W49, W62 W83, W85, W86, W87, W88	10	4
Class 4	Drain (no fisheries value)	W5, W9, W14, W15, W16, W17, W18, W19, W20, W21, W22, W23, W24, W25, W26, W28, W29, W30, W31, W33, W34, W37, W39, W40, W41, W43, W44, W45, W51, W52, W53, W58, W59, W60, W63, W64, W65, W68, W69, W71, W77, W78, W79, W80, W81, W82	46	19
	Total		90	38

Note: UWF Related Works WW23 and UWF Grid Connection W63 are both crossings of one watercourse at one location.

Watercourse crossing locations, watercourse classifications and the boundary of various sub-catchments are identified on **Figure GC 8.4: Aquatic Habitats & Species within the UWF Grid Connection Study Area**. **Figure GC 8.4** is part of the EIA Report for the UWF Grid Connection, and is included in **Volume E: Reference Documents** with this planning application.

Further details on the site visits and the fisheries appraisals for each watercourse are included in **Appendix 8-1: Detailed Biodiversity Information and Data (Section A8-1.2.4.4)**. **Appendix 8-1** can be found in **Volume C4 EIA Appendices**.

8.4.2.2.2 Element 2: UWF Related Works

The majority of the footprint of the UWF Related Works is located within the River Suir regional catchment – mainly in the Clodiagh (Tipperary) River sub-catchment, with the remainder within the Turraheen River (Multeen East) and Owenbeg River sub-catchments. A small proportion of the footprint of the UWF Related Works is located in the Bilboa River sub-catchment of the River Shannon. UWF Related Works will involve 32 no. watercourse crossings. UWF Related Works WW23 and UWF Grid Connection W63 are crossing point of the same watercourse.

Table 8-38: Summary of Watercourses within the UWF Related Works Study Area

<u>Class</u>	<u>Watercourse Description</u>	<u>Watercourse Crossing ID</u>	<u>Total No.</u>	<u>Total With In-Stream Works</u>
Class 1	EPA mapped blue line, major river or stream (fisheries value)	WW19	1	1
Class 2	Headwater Stream Equivalent to EPA blue line but not mapped (fisheries value)	WW2, WW4, WW7, WW22, WW28,	5	4
Class 3	Sub-optimal, heavily vegetated with low or no flow during dry periods (low fisheries value)	WW14, WW18,	2	2
Class 4	Drain (no fisheries value)	WW1, WW3, WW5, WW6, WW8, WW9, WW10, WW11, WW12, WW13, WW15, WW16, WW17, WW20, WW21, WW23, WW24, WW25, WW26, WW27, WW29, WW30, WW31, WW32	24	18
	Total		32	25

Watercourse crossing locations, watercourse classifications and the boundary of various sub-catchments are identified on **Figure RW 8.4: Aquatic Habitats & Species within the UWF Related Works Study Area**. **Figure RW 8.4** is part of the EIA Report for the UWF Related Works, and is included in **Volume E: Reference Documents** with this planning application.

8.4.2.2.3 Element 4: Upperchurch Windfarm

The area of the Upperchurch Windfarm is predominantly situated in the River Suir regional catchment (Clodiagh (Tipperary) River and Multeen River sub-catchments). The remaining proportion of the footprint of the Upperchurch Windfarm is located in the Bilboa River sub-catchment of the River Shannon. As per the EIS 2013, the Upperchurch Windfarm involves 1 no. watercourse crossings, this watercourse is included in Table 8-38 as WW2 (Class 1).

8.4.2.2.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 8.4.2.2.1.

8.4.2.2.5 Other Projects or Activities: Bunkimalta Windfarm & Newport Distributor Road

Bunkimalta Windfarm (consented, not yet built) is located in the River Shannon regional catchment area, with 5 turbines located in the Clare River catchment and the remaining 11 turbines located in the Newport River (Mulkear) catchment. The construction of the consented windfarm will involve both instream works and works in close proximity to watercourses.

Newport Distributor Road (consented, not yet built) is located within the Newport River catchment, c.150m from the Newport River and also located upstream of the Lower River Shannon SAC. No instream works are planned as part of this road development.

Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is no potential for cumulative effects with the UWF Replacement Forestry.

8.4.2.3 Cumulative Information: Baseline Characteristics - Sensitivity of Aquatic Habitats & Species

Aquatic ecological receptors, including fisheries, are dependent on prevailing good to high water quality conditions; this includes the chemical water quality character, as well as sediment and nutrient loadings within the affected streams. Both aquatic macroinvertebrates (Freshwater pearl mussel, White-clawed crayfish and pollution sensitive lotic communities generally) and fish communities are sensitive to suspended solids loading (turbidity), as well as the associated effects of siltation within the river channel. Siltation and turbidity 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). Suspended solids may be mobilised downstream and affect reaches remote from the source of the suspended solids. Furthermore, fish populations and macroinvertebrate communities may be sensitive to vibration affecting the aquatic environment, arising during construction activities such as drilling.

8.4.2.4 Cumulative Information: Baseline Characteristics - Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

The UWF Grid Connection and the other elements of the Whole UWF Project are located in the Mulkear River catchment of the River Shannon, the Clodiagh (Tipperary) catchment and to a lesser degree the Multeen catchment of the River Suir. Both the Mulkear and Clodiagh river catchments were classified as ‘catch and release’ by IFI in 2017 (Salmon Angling Regulations: Management of the Wild Salmon Fishery 2017) for the conservation of Atlantic Salmon stocks, indicating the ongoing pressures on the salmon populations in these catchments. There is an ongoing and persistent decline in Atlantic Salmon stocks in Irish freshwaters overall, pertaining specifically to the European Sites which list this species as a qualifying interest (NPWS, 2013). Pressures and threats affecting the freshwater habitat of salmon correlate directly to those pressures affecting other aquatic ecological interests including lamprey species, aquatic invertebrates and other salmonids (siltation; channelization; drainage maintenance; invasive species and disease vectors; and direct/diffuse pollution from agriculture, forestry and direct discharges). Please refer to Chapter 11 – Water for details of trends relating to water quality and as such, also aquatic habitats and species, in summary the WFD status of watercourses within the Mulkear, Bilboa and Multeen catchments are evaluated as ‘Not at Risk’, while the WFD status of the Clodiagh is ‘At Risk’ due to morphological pressures arising from channelization.

Aquatic Habitats & Species

Sensitive Aspect

Biodiversity

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Aquatic Habitats & Species

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8.4.2.5 Cumulative Information: Baseline Characteristics - Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to Aquatic Habitats & Species, as identified above, will be the receiving environment at the time of construction, on the basis of the relative stability of the pertinent aquatic ecological receptors (identified in long-term trends) in the catchments under consideration herein. Identified trends will overlap the operational phase of the elements under consideration.

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8.4.3 CUMULATIVE INFORMATION: Project Design Measures for Aquatic Habitats & Species

Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Related Works, and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4 and 5.5](#), in [Volume C4: EIAR Appendices](#).

8.4.4 CUMULATIVE INFORMATION: Evaluation Of Impacts to Aquatic Habitats & Species

It was evaluated, in Section 8.4.1, that **UWF Replacement Forestry has no potential to cause impacts** to Aquatic Habitats & Species.

This Section evaluates the likely cumulative effects of the Other Elements of the Whole UWF Project and Other Projects or Activities. This evaluation is based on the residual effects of the Other Elements of the Whole UWF Project and of Other Projects.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Aquatic Habitats & Species.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-39: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
Decrease in instream aquatic habitat quality, (construction stage)	<i>Aquatic Habitat Degradation (as a result of increased nitrogen deposition) such as temporary oxygen shortages (construction stage)</i>
Changes to flow regime, (construction stage)	<i>Decommissioning Stage Effects</i>
Disturbance/displacement to fish and aquatic species, (construction stage)	
Riparian habitat degradation, (construction stage)	
Spread of aquatic invasive species, (construction stage)	

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.4.4.1 to 8.4.4.5.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.4.4.6.

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8.4.4.1 Impact Evaluation Table: Decrease in instream aquatic habitat quality

Evaluation of UWF Replacement Forestry Excluded: As there will be no requirement for instream works or works in close proximity to the watercourse within the site, the UWF Replacement Forestry will not cause habitat quality effects to Aquatic Habitats & Species by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: <i>(for Other Elements only)</i>	Construction stage
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Cumulative Impact Source: Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Hydrocarbons; Reinstatement; Earthworks and Groundwork

Impact Pathway: Soils; Surface water, Runoff and surface water, Flowpaths

Impact Description: Aquatic habitat relates to the instream features supporting aquatic biodiversity (bed substrate, morphology, water quality, etc.). Watercourses are highly sensitive to change, containing sensitive aquatic ecological receptors including salmonids, lamprey species, and a diverse macroinvertebrate community. Instream works at some watercourses will require direct excavation of the banks and bed of the watercourse, which can change the physical character of the watercourse and has the potential to degrade the quality of the baseline habitat which supports the structure, function and diversity of aquatic species. Although erosion and deposition are natural process in watercourses⁸, 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.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

General Impact Magnitude: Of the 90 No. watercourse crossings along the Grid Connection, 34 No. have been evaluated to have fisheries value. Of these 34 No. watercourses, 15 No. will be subject to instream works (the remaining crossings are over existing crossing structures which do not require any works and cables will be installed either under or over the structure).

The effect on the physical instream habitat i.e. watercourse channel morphology, substrate, and flow character due to instream works has been evaluated as a Slight to Moderate adverse impact on availability, diversity and quality of habitat supporting aquatic species. This in line with the impact magnitude evaluation presented for instream works in Chapter 11 Water (Moderate impact taking account of instream works).

Specifically in relation to the Clare River (see cumulative impacts with other Projects below): Approximately 7km of the 110kV UGC exists within the Clare River catchment. Effects on surface water are likely to arise mainly from trench excavation works and watercourse crossings in-stream works. There are 47 no. watercourse crossings (including haulage routes) within the Clare River catchment (W24-W49 and W67-W89).

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⁸ EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems,

Specifically in relation to the Newport River (see cumulative impacts with other Projects below): Approximately 8.7km of the 110kV UGC exists within the Newport River catchment (and Small River catchment) including the Mountphilips Substation site. Effects on surface water are likely to arise mainly from trench excavation, watercourse crossings in-stream works and overburden storage. There are 24 No. watercourse crossings (including haulage routes) within the Newport (and Small River) River catchment (W1-W23 and W66).

Significance of the Impact: Slight to moderate in the local context, Slight in the Clare River catchment, Slight in the Newport River catchment.

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September;
- The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (we refer to outline OCM’s as provided in Appendix 5.1 of the EIA Report for UWF Grid Connection). This will be completed by over pumping, flume (pipe) or channel diversion methods;
- There will be no direct discharge of pumped water into the watercourse during the works (we refer to outline OCM’s as provided in Appendix 5.1 of the EIA Report for UWF Grid Connection);
- The spatial extent of effects to the watercourse channel will occur within the footprint of the instream works,
- The frequency of such an event is once of for cables trenches with or without new permanent culverts and twice for temporary culverts (once for installation and once for removal),and;
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat.
- Impacts to the watercourse channel are temporary and reversible with reinstatement. The duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible.
- Clare River catchment:
 - The majority of the watercourse crossings (32 of 47 no.) within the catchment are drains (Class 3 and Class 4 Watercourse) and therefore the potential for downstream water quality effects is much less due to their low or absent flows;
 - Watercourse crossings at Class 1 and Class 2 watercourses will only be completed between the IFI permitted season of July to September (Project Design Measure);
 - It’s likely only between 100 – 200m of the trench will be excavated in any day with only 1 – 2 watercourse crossings being completed in any one day (assumed 1 -2 work crews); and,
 - The short-term, temporary nature of the works within the catchment;
 - All effects will be brief to temporary in nature and reversible
- Newport River catchment
 - The majority of the watercourse crossings within the Small River catchment are drains (Class 4);
 - The majority of the watercourse crossings within the Newport River catchment are streams (Class 1 and Class 2 Watercourse) and therefore works will only be completed between the IFI permitted season of May and September (Project Design Measure);
 - It’s likely only between 200 – 300m of the trench will be excavated in any day with only 2 – 3 watercourse crossings being completed in any one day (assumed 2 – 3 work crews);
 - All effects will be brief to temporary in nature and reversible.

Element 2: UWF Related Works

Impact Magnitude: There are 32 no. watercourse crossings required by the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works and in-stream works will be required at 25 no. of these locations. 26 no. of the total 32 no. crossings are located within the Clodiagh River catchment, 5 no. in the Owenbeg catchment and 1 no. in the Bilboa catchment. Of these crossings, which will be subject to instream works, a potential decrease in fisheries habitat quality is identified at 5 No. watercourse crossings evaluated as having fisheries value. The spatial extent of such effects will occur within the footprint of the instream works, and also downstream within the zone of sediment transport.

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The effect on the physical instream habitat i.e. watercourse channel morphology, substrate, and flow character due to instream works has been evaluated as a Slight to Moderate adverse impact on availability, diversity and quality of habitat supporting aquatic species. This in line with the impact magnitude evaluation presented for instream works in Chapter 11 Water (taking account of instream works).

Significance of the Impact: imperceptible to moderate in the local context

- Rationale for Impact Evaluation:
- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure);
 - The Class 1 and Class 2 watercourses where in-stream works are required (5 No.) are largely small headwater streams and therefore are likely to have relatively low flows during July to September;
 - The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (we refer to outline OCM’s as provided in Appendix 5.1 of the EIA Report for UWF Related Works). This will be completed by over pumping, flume (pipe) or channel diversion methods;
 - There will be no direct discharge of pumped water into the watercourse during the works (we refer to outline OCM’s as provided in Appendix 5.1 of the EIA Report for UWF Related Works);
 - The spatial extent of effects to the watercourse channel is limited to the footprint of the instream works, and;
 - The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat, and
 - Impacts to the watercourse channel are temporary and reversible with reinstatement.
 - The duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible.

Element 4: Upperchurch Windfarm

Impact Magnitude: There is 1 no. watercourse crossing within the Upperchurch Windfarm Site, evaluated as having fisheries value (Class 1, WW2). This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Baseline conditions indicated that the aquatic species were present year-round, and impacts were evaluated as being of high magnitude for aquatic species. However, it was identified that significant impacts were not probable/likely post-mitigation. The 2013 EIS concludes that water quality effects will not be significant

Significance of the Impact: imperceptible

- Rationale for Impact Evaluation:
- A clear-span bridge will be used where a natural stream (Class 1 watercourse) will be crossed and therefore no in-stream works are required;
 - All effects were evaluated as reversible and temporary in the short-term and impacts were associated with construction phase works.

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1.

Cumulative Information: Individual Evaluations of Other Projects or Activities
 (Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is no potential for cumulative effects with the UWF Replacement Forestry)

Other Project: Consented Bunkimalta Windfarm

Impact Magnitude: Clare River catchment: 5 no. of the 16 no. consented Bunkimalta Windfarm turbines are located within the Clare River catchment.
 Newport River catchment: 11 no. of the 16 no. consented Bunkimalta Windfarm turbines are located within the Newport River catchment

Significance of the Impact: Not Significant residual effect

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<p><u>Rationale for Impact Evaluation:</u> As per Bunkimalta WF EIS (2013)</p> <ul style="list-style-type: none"> • Construction activities will be at least a minimum of 50m where possible; • A Sediment Control Plan will be put in place during the construction phase to control runoff.
<p>Other Project: Newport Distributor Road</p>
<p><u>Impact Magnitude:</u> Newport River catchment: Localised work adjacent to the Newport River downstream of Newport town. Road development includes surface water drainage system and attenuation tanks, and will be connected into existing sewers.</p>
<p><u>Significance of the Impact:</u> No impact</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • As per planning conditions surface water controls will be in place
<p>Evaluation of Cumulative Impacts – Decrease in instream aquatic habitat quality</p>
<p>All Elements of the Whole UWF Project</p>
<p><u>Cumulative Impact Magnitude:</u> A potential decrease in aquatic habitat quality is identified at 20 No. watercourse crossings where instream works are required within watercourses evaluated as having fisheries value. The spatial extent of such effects will occur within the footprint of the instream works, dispersed between two regional catchments and within several local sub-catchments. Impact range is located downstream within the zone of sediment transport.</p>
<p>Significance of the Cumulative Impact: Imperceptible to moderate in the local context</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The watercourse crossing works required for the 110kV UGC are largely located within the River Shannon catchment while the watercourse crossings required for the Upperchurch Windfarm and UWF Related Works are largely located in the River Suir surface water catchment; • The presence of sensitive salmonid fish habitat within the works area and protected Annex II (and Annex IV listed) species within the affected catchments downstream. • The spatial extent of effects to watercourse channels will occur within the footprint of the instream works, and; • The frequency and duration is limited to the specific works period within or adjacent to the aquatic habitat. • Impacts at the works site are temporary; however, downstream siltation effects are short-term and not reversible.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p><u>Cumulative Impact Magnitude:</u></p> <p>In relation to cumulative effects within the Clare River catchment; Approximately 7km of the 110kV UGC exists within the Clare River catchment and 5 no. of the 16 no. consented Bunkimalta Windfarm turbines are located within the Clare River catchment.</p> <p>In relation to cumulative effects within the Newport River catchment; Approximately 8.7km of the 110kV UGC exists within the Newport River catchment including the Mountphilips Substation site, along with 11 no. of the 16 no. consented Bunkimalta Windfarm turbines and the consented Newport Distributor Road.</p>
<p>Significance of the Cumulative Impact: Slight for the Clare River catchment, and Slight to Moderate for the Newport River catchment.</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <p><u>Clare River:</u></p> <ul style="list-style-type: none"> • The relatively small number of the Bunkimalta Windfarm turbines within the Clare River catchment; • The relatively large surface water catchment area of the Clare River – 71km²; • The short-term temporary nature of the 110kV UGC works within the Clare River catchment.

Aquatic Habitats & Species	<p><u>Newport River</u></p> <ul style="list-style-type: none"> • The relatively small scale of the 110kV UGC works within the Newport River catchment (8.7km of temporary access roads); • No watercourse crossings are proposed for the Newport Distributor Road; • The large surface water catchment area of the Newport River and Small River catchment – 126km²; • The relatively large upstream distance of the Bunkimalta Windfarm site (~10km) from the 110kV works; • The temporary and short-term nature of the proposed 110kV UGC works within the Newport River catchment; • Sediment Control Plans will be in place at the Bunkimalta Windfarm
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8.4.4.2 Impact Evaluation Table: Changes to Flow Regime

Evaluation of UWF Replacement Forestry Excluded: As there will be no requirement for instream works and no major sediment creating works, the UWF Replacement Forestry has no potential to cause changes to flow regime effects to Aquatic Habitats & Species by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: <i>(for Other Elements only)</i>	Construction stage
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Cumulative Impact Source: Sediment; Instream works; Machinery movement;
Impact Pathway: Surface water; Land cover

Impact Description: Watercourse morphology relates to the shape of a watercourse channel, its bed and banks and how erosion, transportation of water, sedimentation and the composition of riparian vegetation changes this shape over time. As per Section 11.2.4 of Chapter 11: Water, direct impacts are identified to channel morphology and geomorphology (bed and banks of watercourses) due to instream works and sediment deposition. Aquatic species, which are likely to be present in fishery value watercourses at instream construction works locations, are reliant on instream 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. Any change in watercourse morphology which affects channel flow regimes can result in cross factor effects on aquatic ecological communities, which are likely to be present in fishery value watercourses at instream construction works locations, These communities are reliant on instream 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.

Instream works are limited to the individual crossing points and include trenching works for underground cables, installation of temporary or permanent crossing structures and reinstatement works.

The reinstatement works will maintain the channel morphology, in line with IFI (2016) and will include site-specific bank stabilisation measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels where necessary; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles.

The creation of adverse flow conditions or habitat limitations due to changes to flow or morphology will be limited to the specific works period within or adjacent to the aquatic habitat.

Project Design Measures include the use of culverts at all new permanent watercourse crossings which will be a minimum of 900mm in diameter and will be bottomless or clear spanning on all Class 1 and Class 2 type watercourse and the use of reinstatement of the banks and beds at crossing locations. In addition in-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure).

Impact Quality: Negative

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Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Construction works will require crossings of 34 No. watercourses with fisheries value ((i.e. Class 1 or Class 2 watercourses); however, of these, instream works in watercourses with fisheries value will take place at 15 No. watercourse crossing locations, 9 of these crossings relate to temporary trenching works and/or the installation of a temporary crossing structure, while 6 No. relate to the installation of permanent crossing structures.

At the 9 no. crossing points, changes to the flow regime will be brief to temporary and for the duration of the immediate works. Any temporary alteration to flows or morphology will be reversible and will be subject to seasonal constraints during sensitive aquatic species life stages (Project Design Measure).

At the 6 no. new permanent crossing points, changes to the flow regime will be long-term and permanent; alteration to flow morphology will be subject to Project Design Measures including the reinstatement of watercourses at crossing locations.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are mostly small headwater streams;
- The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture);
- The limited extent of direct instream works potentially affecting flow, and the sensitive crossing designs to be implemented following consultation with IFI.
- The brief to temporary duration and reversibility of any effects.

Element 2: UWF Related Works

Impact Magnitude:

Construction works will take place in close proximity to 6 No. watercourses with fisheries value ((i.e. Class 1 or Class 2 watercourses). Instream works in watercourses with fisheries value will take place at 5 No. watercourse crossing locations, 3 of these crossings relate to temporary trenching works and/or the installation of a temporary crossing structure, while 2 No. relate to cable trenching and the installation of permanent crossing structures.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are mostly small headwater streams;
- The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture);
- The limited extent of direct instream works potentially affecting flow, and the sensitive crossing designs to be implemented in consultation with IFI.
- The brief to temporary duration and reversibility of any effects.

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Element 4: Upperchurch Windfarm
<p><u>Impact Magnitude:</u> Construction works will take place in close proximity to 1 No. watercourses with fisheries value. No instream works are required at this location and this watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works.</p>
<p><u>Significance of the Impact:</u> Slight</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No instream works are required on the watercourse crossing within the Upperchurch Windfarm site • Implementation of the Sediment & Erosion Control Plan
Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1.
Evaluation of Cumulative Impacts – Changes to Flow Regime
All Elements of the Whole UWF Project
<p><u>Cumulative Impact Magnitude:</u> A potential decrease in aquatic habitat (via changes to flow regime) is identified at 20 No. watercourse crossings where instream works are required within watercourses evaluated as having fisheries value. The spatial extent of such effects will occur within the footprint of the instream works, dispersed between two regional catchments and within several local sub-catchments.</p>
Significance of the Cumulative Impact Slight
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Instream works potentially affecting the flow regime are required at a limited number of locations; the majority of which require temporary works and a smaller sub-set require permanent instream structures. • Implementation of Project Design Measures at all stream crossing and instream works locations to minimize effects • Implementation of the sensitive crossing designs to be implemented in consultation with IFI. Provision of reinstatement works including: site-specific bank stabilization measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels where necessary; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles.

Note: There is no cumulative evaluation of Other Projects or Activities included in the table above, as the Other Projects or Activities were evaluated as excluded from the above impact table (see Section 8.4.2.2.1).

8.4.4.3 Impact Evaluation Table: Disturbance or Displacement

Evaluation of UWF Replacement Forestry Excluded: As there will be no requirement for instream works or works in close proximity to the watercourse within the site, the UWF Replacement Forestry has no potential to cause disturbance or displacement effects to Aquatic Habitats & Species by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: <i>(for Other Elements only)</i>	Construction stage
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Cumulative Impact Source: Instream works; Operating machinery; Excavation works; Noise and human disturbance; Drilling; Reinstatement

Impact Pathway: Surface water; Direct contact; Ground and air vibrations

Impact Description: Instream works and machinery operation within or in close proximity to any watercourse has the potential to directly disturb or displace salmonid fish and aquatic species within fish-bearing streams, or sensitive aquatic receptors such as white-clawed crayfish. 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 and are scoped out from evaluation of disturbance/displacement effects. The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the direct footprint of any instream works within watercourses which support anadromous Atlantic salmon and resident Brown trout populations – i.e. Class 1 or Class 2 watercourses. Disturbance or displacement effects will be brief to temporary in nature, lasting for the duration of works at or in close proximity to Class 1 or Class 2 watercourses.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Of the 90 No. watercourse crossings within the UWF Grid Connection construction works area boundary, 34 No. have been evaluated to have fisheries value.

Of these 34 No. watercourses, 15 No. will be subject to instream works and 3 no. will be subject to drilling activities, any fish present are likely to be affected for between 1 – 2 days at instream works locations and c.1 week at drilling locations. The frequency of these disturbance effects is once of for drilling activities, once for cables trenches with or without new permanent culverts and twice for temporary culverts (once for installation and once for removal).

The remaining crossings are over existing crossing structures which do not require any works and cables will be installed either under or over the structure, disturbance effects at this locations are Imperceptible.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September;

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<ul style="list-style-type: none"> • The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure);; • There will be no direct discharge of pumped water into the watercourse during the works (we refer to outline OCM’s as provided Appendix 5.1 of the EIA Report for UWF Grid Connection); • The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the direct footprint of any instream works within watercourses which support anadromous Atlantic salmon and resident Brown trout populations. Additional disturbance effects will occur at the three river crossings, where the 110kV UGC will be installed using drilling techniques, where disturbance effects within the watercourse channel will be limited to the spatial extent of drilling activities. • The frequency of disturbance will be singular in the case of half of the locations • The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.
<p>Element 2: UWF Related Works</p> <p><u>Impact Magnitude:</u> Of the 32 No. watercourse crossings within the UWF Related Works construction works area boundary, 6 No. have been evaluated to have fisheries value. Of these 6 No. watercourses, 5 No. will be subject to instream works (the remaining 1 no. crossing WW2 will use a clear span structure with no requirement for instream works). Any fish present are likely to be affected for between 1 – 2 days during instream works. The frequency of these disturbance effects is once for half of the locations (cables trenches with or without new permanent culverts) and twice for the remaining locations (temporary culverts (once for installation and once for removal)).</p> <p><u>Significance of the Impact:</u> Slight</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure); • The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure); • The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure); • There will be no direct discharge of pumped water into the watercourse during the works (Project Design Measure); • The singular frequency of any disturbance events at the half of the locations, and; • The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.
<p>Element 4: Upperchurch Windfarm</p> <p><u>Impact Magnitude:</u> None: 1 No. watercourse with fisheries value occurs within the footprint of the Upperchurch Windfarm site. This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Disturbance effects are limited to the construction works for the new bridge along with the subsequent use of the new bridge throughout the construction period.</p> <p><u>Significance of the Impact:</u> Imperceptible</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The Upperchurch Windfarm impacts were evaluated as being of high magnitude for aquatic species; however, it was identified that significant impacts were not probable/likely post-mitigation. A clear-span bridge will be

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	Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1
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	All Elements of the Whole UWF Project
	<u>Cumulative Impact Magnitude:</u> Direct disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the footprint of any instream works and directly upstream and downstream of all crossings, temporary and permanent instream works structures and bank-side works. The watercourse crossings are dispersed between two regional catchments and within several local sub-catchments. In total there are 20 No. instream works locations where crossings of fish-bearing streams are required, all of which will be sensitive to disturbance. However, at the local level in the context of individual receptors, temporary displacement will be limited to the affected stretch of watercourse, without cumulative population-level impacts at a watercourse or catchment level. Additional disturbance effects within the watercourse channel will be limited to the spatial extent of drilling vibrations, trenching and ducting activities.
	Significance of the Cumulative Impact: Slight
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure); • The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure); • The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure); • There will be no direct discharge of pumped water into the watercourse during the works (Project Design Measure); • The singular frequency of any disturbance events at the half of the locations, and; • The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.

Note: There is no cumulative evaluation of Other Projects or Activities included in the table above, as the Other Projects or Activities were evaluated as excluded from the above impact table (see Section 8.4.2.2.1).

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8.4.4.4 Impact Evaluation Table: Riparian habitat degradation

Evaluation of UWF Replacement Forestry Excluded: As there will be no requirement for instream works or removal of riparian habitats, the UWF Replacement Forestry has no potential to cause riparian habitat degradation effects to Aquatic Habitats & Species by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: <i>(for Other Elements only)</i>	Construction stage
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Cumulative Impact Source: Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Reinstatement
Impact Pathway: Soils; Direct contact

Impact Description: The riparian corridor along a watercourse relates to the interface between the aquatic habitat, the bankside vegetation and terrestrial environment. An intact, semi-natural riparian zone has significant beneficial services in the protection of instream aquatic habitat quality, food/nutrient contributions, and temperature regulation. Existing riparian habitat quality within the study area is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works.

The removal of, or damage to, riparian vegetation during instream works or excavation/ground clearance works in close proximity to any watercourse has the potential to impact on the quality of riparian habitats which in turn can affect watercourse morphology, shading, bank stability, and nutrient and sediment loading and result in indirect effects on aquatic species.

Project design: following works at or in close proximity to watercourses (Class 1 or Class 2), reinstatement works will be carried out which will include site-specific bank stabilisation measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels where necessary; and replanting of riparian buffer zones with suitable native species to manage flood flows and buffer run-off.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude: From a total of 90 No. watercourse crossings within the construction works area boundary associated with the UWF Grid Connection, riparian habitat will be affected at **34 No.** watercourse crossings identified as having fisheries value within the UWF Grid Connection construction works area boundary. The effect on the riparian and bankside habitat will be greatest at instream works locations (15 No.).

The duration of any loss of well-structured riparian habitat impacts is evaluated with regard to the direct aquatic habitat services provided by the riparian zone (bank stabilization and erosion control, shading and temperature regulation), as well as the indirect inputs such as habitat for invertebrate food for fish and aquatic biota, reduction in light for aquatic flora, flood control and buffering effects in relation to run-off. Riparian habitat impacts will be reversible with reinstatement and will be temporary to short-term, limited to the construction phase and early operational stage until vegetation has re-established.

Significance of the Impact: Slight to Moderate

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Rationale for Impact Evaluation:

- Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations at watercourse crossing locations within minor watercourses;
- The general context of the watercourses affected comprises managed agricultural lands and open uplands with poorly-developed riparian habitat, where well-developed riparian habitat occurs it comprises willow species which regenerate quickly;
- Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations; alternatives to riparian clearance are not available.
- Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible;
- Impacts to the riparian habitat are temporary to short-term and reversible with reinstatement.

Element 2: UWF Related Works

Impact Magnitude:

Riparian habitat will be affected at **6 No.** watercourse crossings identified as having fisheries value, out of a total of 32 watercourse crossings within the construction works area boundary associated with the UWF Related Works.

The duration of any loss of well-structured riparian habitat impacts is evaluated with regard to the direct aquatic habitat services provided by the riparian zone (bank stabilization and erosion control, shading and temperature regulation), as well as the indirect inputs such as habitat for invertebrate food for fish and aquatic biota, reduction in light for aquatic flora, flood control and buffering effects in relation to run-off. Riparian habitat impacts will be reversible with reinstatement and will be temporary to short-term, limited to the construction phase and early operational stage until vegetation has re-established.

Significance of the Impact: slight to moderate

Rationale for Impact Evaluation:

- Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations at watercourse crossing locations within minor watercourses;
- The general context of the watercourses affected comprises managed agricultural lands and open uplands with poorly-developed riparian habitat, where well-developed riparian habitat occurs it comprises willow species which regenerate quickly;
- Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible;
- Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations; alternatives to riparian clearance are not available.
- Impacts to the riparian habitat are temporary to short-term and reversible with reinstatement.

Element 4: Upperchurch Windfarm

Impact Magnitude:

As per the 2013 EIS, **1 No.** watercourse with fisheries value will be crossed. The crossing method will use using a clear span bridge design, which will avoid the requirement for instream works; however, works within the riparian zone will be required.

Significance of the Impact: imperceptible

Rationale for Impact Evaluation:

- No requirement for instream works on fisheries value watercourses
- Limited scale of works within the riparian corridor at the 1 no. stream crossing
- All effects were evaluated as reversible and temporary in the short-term;

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• Riparian habitats within the Upperchurch Windfarm which are directly affected by construction works were not identified as being of significant conservation value.

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1

Evaluation of Cumulative Impacts – Riparian habitat degradation

All Elements of the Whole UWF Project

Cumulative Impact Magnitude:

Riparian habitat will be affected at **40 No.** watercourse crossings identified as having fisheries value (one watercourse, WW2 associated with both the UWF Related Works and the Upperchurch Windfarm). The effect on the riparian and bankside habitat with implications for the structure and function of the habitat services with regard to aquatic ecological receptors has been evaluated as a Slight to Moderate adverse. This in line with the impact magnitude evaluation presented for instream works in Chapter 11 Water. The spatial extent of such effects will occur within the footprint of the instream works, with the potential for direct impacts at the approach to watercourse crossing works areas.

Significance of the Cumulative Impact: Slight to Moderate

Rationale for Cumulative Impact Evaluation:

- The watercourse crossing works required for the 110kV UGC are largely located within the River Shannon catchment while the watercourse crossings required for the Upperchurch Windfarm and UWF Related Works are largely located in the River Suir surface water catchment;
- The limited extent of instream works, within defined works areas will reduce the potential spatial area.
- The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September;
- Existing riparian habitat quality within the works areas is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works.
- Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations; alternatives to riparian clearance are not available
- The duration of the impact is evaluated with regard to the aquatic habitat services and buffering effects provided by riparian habitats at each discrete works location. Such impacts are limited to the specific works location and do not interact with riparian habitat communities within the watercourse as a whole, or at a catchment level, in view of cumulative or synergistic project effects. Riparian habitat impacts are once-off, restricted to the period of works within or adjacent to the aquatic habitat and are thus not subject to sequential project effects.
- Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible;
- Impacts to the riparian habitat are temporary to short-term and reversible with reinstatement.

Note: There is no cumulative evaluation of Other Projects or Activities included in the table above, as the Other Projects or Activities were evaluated as excluded from the above impact table (see Section 8.4.2.2.1).

8.4.4.5 Impact Evaluation Table: Spread of Aquatic Invasive Species

Evaluation of UWF Replacement Forestry Excluded: As there will be no requirement for instream works or works in close proximity to the watercourse within the site, the UWF Replacement Forestry is not likely to spread aquatic invasive species by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: <i>(for Other Elements only)</i>	Construction stage
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Cumulative Impact Source: Instream works; Excavation works
Impact Pathway: Surface water; Movement of soils and machinery

Impact Description: Invasive aquatic species include non-native, invasive flora and also fish and invertebrate fauna. Aquatic invasive species may be introduced to unaffected catchments or spread within infected watercourses during the course of instream works or transported via excavation material by site machinery. Aquatic invasive species have the potential for significant ecosystem disturbance, disrupting the predator/prey balance or affecting significant habitat disruption within aquatic systems. The spread of aquatic invasive species is not restricted in extent to the footprint of construction/instream works, but can be transported both upstream and downstream within a watercourse, potentially extending throughout the catchment.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:
 There is the potential for introduction of non-native, invasive aquatic species at all **90 No.** watercourse crossings associated with the grid connection works.

Significance of the Impact: Slight to Moderate

Rationale for Impact Evaluation:

- The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, spread of aquatic invasive species is evaluated as non-reversible.

Element 2: UWF Related Works

Impact Magnitude:
 There is the potential for introduction of non-native, invasive aquatic species at all **32 No.** watercourse crossings associated with the UWF Related Works.

Significance of the Impact: Slight to Moderate

Rationale for Impact Evaluation:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.

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<ul style="list-style-type: none"> • In this respect, the spread of aquatic invasive species is evaluated as non-reversible.
<p>Element 4: Upperchurch Windfarm</p>
<p><u>Impact Magnitude:</u> There is the potential for introduction of non-native, invasive aquatic species at the 1 No. watercourse crossing associated with the Upperchurch Windfarm works.</p>
<p><u>Significance of the Impact:</u> Slight to Moderate</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The Upperchurch Windfarm impacts were evaluated as being of high magnitude for aquatic species, in the absence of mitigation. However, it was identified that significant impacts were not probable/likely. • Baseline conditions indicated that the aquatic species were present year-round and impacts were associated with construction phase works. • All effects were evaluated as reversible and temporary in the short-term; however, in the case of potential spread of aquatic invasive species, there is the potential for long-term, irreversible impacts
<p>Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1</p>
<p>Evaluation of Cumulative Impacts – Spread of Aquatic Invasive Species</p>
<p>All Elements of the Whole UWF Project</p>
<p><u>Cumulative Impact Magnitude:</u> There is the potential for introduction of non-native, invasive aquatic species at the 121 No. stream crossing associated with the Upperchurch Windfarm works (1 no. occur on both the UWF Related Works and the Upperchurch Windfarm and 1 no. occurs on both the UWF Related Works and the UWF Grid).</p>
<p>Significance of the Cumulative Impact: Slight to moderate</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication. • In this respect, the spread of aquatic invasive species are evaluated as non-reversible

Note: There is no cumulative evaluation of Other Projects or Activities included in the table above, as the Other Projects or Activities were evaluated as excluded from the above impact table (see Section 8.4.2.2.1).

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8.4.4.6 Cumulative Information: Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-40 below.

Table 8-40: Description and Rationale for Excluded Impacts to Aquatic Habitats & Species

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Storage of Brash	1,2,4	Nitrogen Deposition	Aquatic Habitat Degradation (as a result of increased nitrogen deposition) such as temporary oxygen shortages.	Rationale for Excluding: The scale of tree-felling is insufficient to result in additive nitrogen deposition effects – any effects will be Neutral.
Operational Stage				
Rationale for Excluding: Access routes and permanent watercourse crossing structures will be in place. Operational Works will be minimal, with no works to watercourse crossing structures expected.				
Decommissioning Stage				
Rationale for Excluding: UWF Related Works, Upperchurch Windfarm: Access routes and permanent watercourse crossing structures will be in place. Works will be subject to best practice management measures. UWF Grid Connection will not be decommissioned.				

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8.4.5 UWF Replacement Forestry: Mitigation Measures for Impacts to Aquatic Habitats & Species

Mitigation measures were incorporated into the UWF Replacement Forestry project design including the Project Design Measures. No additional mitigation measures are required as the topic authors conclude that **there is no potential for impacts** to occur to Aquatic Habitats & Species as a consequence of the UWF Replacement Forestry.

8.4.6 UWF Replacement Forestry: Evaluation of Residual Impacts to Aquatic Habitats & Species

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in the Evaluation of UWF Replacement Forestry (Section 8.4.1), i.e. **no potential for impacts**.

8.4.7 UWF Replacement Forestry: Application of Best Practice and the EMP

The UWF Replacement Forestry will be planted and managed in accordance with the Project Design Measures and in accordance with the Department of Agriculture, Food & the Marine Guidance Documents – *Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards (2015)*, *Environmental Requirements for Afforestation (2016)* and *Management Guidelines for Ireland Native Woodlands (2017)*.

Best Practice Measures (BPM), although not part of the Project Design for the UWF Replacement Forestry, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Aquatic Habitats & Species**, by the authors of this topic chapter, using industry best practice:

RF-BPM-01	Monitoring of non-native invasive plant species
RF-BPM-02	Management of general non-native invasive species

These Best Practice Measures are included in full at the end of this topic chapter, and are also included as **Appendix 5.1: UWF Replacement Forestry Best Practice Measures** in **Volume C4: EIAR Appendices**.

8.4.7.1 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan is included as **Appendix 5.2: Invasive Species Management Plan**.

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8.4.8 Summary of Impacts to Aquatic Habitats & Species

No impacts to Aquatic Habitats & Species are concluded by the topic authors as likely to occur as a consequence of the development of UWF Replacement Forestry.

Table 8-41: Summary of the impacts to Aquatic Habitats & Species

Impact to Aquatic Habitats & Species	Decrease in instream aquatic habitat quality	Changes to flow regime	Disturbance or displacement	Riparian habitat degradation	Spread of aquatic invasive species
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Section 8.4.4.1</i>	<i>Section 8.4.4.2</i>	<i>Section 8.4.4.3</i>	<i>Section 8.4.4.4</i>	<i>Section 8.4.4.5</i>
Project Life-Cycle Stage (for Other Elements only)	Construction	Construction	Construction	Construction	Construction
<u>UWF Replacement Forestry</u>	No Potential for Impacts Evaluated as Excluded - - See Section 8.4.1				
Element 1: UWF Grid Connection	Slight to Slight-Moderate	Slight	Slight	Slight to Moderate	Slight to Moderate
Element 2: UWF Related Works	Imperceptible to Moderate	Slight	Slight	Slight to Moderate	Slight to Moderate
Element 4: Upperchurch Windfarm	Imperceptible	Slight	Imperceptible	Imperceptible	Slight to Moderate
Element 5: UWF Other Activities	No Potential for Impacts - Evaluated as Excluded, see Section 8.4.2.2.1				
<u>Cumulative Impact:</u>					
All Other Elements of the Whole UWF Project	Imperceptible to Moderate	Slight	Slight	Slight to Moderate	Slight to Moderate
All Elements of the Whole UWF Project <i>cumulatively with</i> Other Projects or Activities Bunkimalta Windfarm, Newport Distributor Road	Slight to Slight-Moderate	N/A - Evaluated as excluded, see Section 8.4.2.2.1			

The greyed out boxes in the summary table below relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is no potential for cumulative effects with the UWF Related Works.

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8.5 Sensitive Aspect No.4: Terrestrial Habitats

This Section provides a description and evaluation of the Sensitive Aspect - Terrestrial Habitats.

8.5.1 UWF Replacement Forestry – EVALUATED AS EXCLUDED

8.5.1.1 Baseline Characteristics of Terrestrial Habitats in relation to UWF Replacement Forestry

Terrestrial Habitats recorded within the UWF Replacement Forestry lands, and within 50m of the lands are illustrated on **Figure RF 8.5: Terrestrial Habitats within the UWF Replacement Forestry Study Area** (Volume C3 EIA Figures).

Seven habitat types comprising 11.6Ha were recorded within the lands and within 50m of the lands. The dominant habitats present are improved agricultural grassland (GA1), Wet Grassland (GS4) and conifer plantation (WD4) which together make up 10.4Ha or 89% of all habitats present. Scrub (WS1) and built land and artificial surfaces (BL3) make up the majority of the remaining habitats (9%). Linear habitats are primarily composed of spoil and bare ground (ED2), tree lines (WL2), hedgerows (WL1) and earth banks (BL2). The total area of linear hedgerow and treelines (or mosaics of both), comprises 134m. No non-native invasive plant species were recorded. Terrestrial Habitats of Local Importance, Higher Value are broadleaf woodland (WD1) and Scrub (WS1). Linear hedgerow and tree lines (or mosaics of both) are evaluated as of Local Importance, Higher Value.

8.5.1.2 Evaluation of UWF Replacement Forestry

It is evaluated that **Neutral impacts to Terrestrial Habitats are likely to occur** due to the development of the UWF Replacement Forestry, for the following reasons:

- Neutral habitat loss as no permanent land take will be required of Terrestrial Habitats evaluated as of Local Importance (Higher Value) or greater,
- No potential for hedgerow severance impacts as zero hedgerow is to be removed,
- No potential for loss of High Nature Value trees, as no mature trees will be removed,
- No potential for cross factor habitat degradation effects, as effects to Local Surface Water Bodies will not be greater than imperceptible, and no likely effects to Local Groundwater Bodies is expected.
- No direct loss of Flora Protection Order species, as none were recorded at the site,
- No fragmentation is expected from UWF Replacement Forestry with positive effects likely to accrue,
- No likely spread of invasive species as none recorded within the afforestation site. Notwithstanding this point a comprehensive Invasive Species Management Plan (**App 5.2**) has been developed and will be implemented by all personnel at the UWF Replacement Forestry site during its planting and growth stages.

8.5.1.3 Cumulative Evaluation for the Other Elements

(grey background)

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

UWF Replacement Forestry will cause Neutral impacts to Terrestrial Habitats by itself, and therefore cannot have a cumulative effect. However, the Other Elements must be considered because the UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in **Section 8.5.2 to Section 8.5.4** and included in the summary table in **Section 8.5.8** in order to show the totality of the project.

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8.5.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

8.5.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Terrestrial Habitats considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.5.2.2.1](#) below.

The evaluation of cumulative impacts to Terrestrial Habitats also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Terrestrial Habitats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project, and therefore No Other Projects or Activities are scoped in for evaluation of cumulative effects to Terrestrial Habitats.

8.5.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area is described in Table 8-42.

Table 8-42: Cumulative Evaluation Study Area for Terrestrial Habitats

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	construction works area boundary/activity locations plus 50m in all directions	Professional judgement and as per Best Practice (CIEEM, 2016)
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities	Not Relevant – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects.	

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8.5.2.2.1 Potential for Impacts to Terrestrial Habitats

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Terrestrial Habitats. The results of this evaluation are included in Table 8-43.

The location of, and study area boundary associated with the Other Elements which are included for cumulative evaluation is illustrated on [Figure CE 8.5: Terrestrial Habitats within the Cumulative Evaluation Study Area](#) (Volume C3 EIAR Figures).

Table 8-43: Results of the Evaluation of the Other Elements of the Whole UWF Project

<u>Other Element of the Whole UWF Project</u>	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects

8.5.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.5.2.3.1 Element 1: UWF Grid Connection

Terrestrial Habitats within the UWF Grid Connection Study Area comprise a mosaic of agricultural grassland, commercial forestry plantations, peatlands, hedgerows, wet grassland, private roads and public roads. For the most part the landscape is dominated by the Slievefelim to Silvermine Mountain upland area with habitats recorded reflective of this.

Twenty habitat area types (including four types of habitat mosaic) comprising 407.5Ha were recorded along the survey corridor. The dominant habitats present are improved agricultural grassland (GA1) and conifer plantation (WD4) which together make up 74.8% of all habitats present. Wet grassland (GS4), scrub (WS1) and buildings and artificial surfaces (BL3) make up the majority of the remaining habitats (16.9%). Further detail is provided in [Appendix 8-1, Section A8-1.2.4.6](#).

Fourteen Linear habitat feature types including upland/eroding (FW1) and lowland/depositing rivers (FW2), Stone Walls/Earthen Banks (BL1/BL2), Hedgerows (WL1) and Tree lines (WL2) were also recorded. Further detail is provided in [Appendix 8-1, Section A8-1.2.4.6](#).

Habitats of Local Importance (Higher Value) include buildings and artificial surfaces (BL3) (based on importance to bats), mixed broadleaf woodland (WD1) (based on importance to birds/mammals), mixed broadleaf/conifer woodland (WD2) (based on importance to birds and mammals), hedgerows (WL1) (level of maturity and value to birds and mammals), tree lines (WL2) (local importance to birds and mammals), riparian Woodland (WN5) (Importance to local diversity) and scrub (WS1) (importance to local diversity). Upland Blanket Bog (PB2) of County Importance is present within the study area at Bleanbeg and at Laghile.

The total length of linear hedgerow and treelines (or mosaics of both) present within the study area comprises 13.6km.

Respective areas of each habitat type (evaluated as of Local Importance (Higher Value) or above) are presented in full in [Appendix 8-1: Detailed Biodiversity Information and Data](#), (Volume C4 EIAR Appendices), and illustrated on [Figure GC 8.5: Terrestrial Habitats within the UWF Grid Connection Study Area](#). [Figure GC](#)

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8.5 is part of the EIA Report for the UWF Grid Connection, and is included in [Volume E: Reference Documents](#) with this planning application.

No Flora Protection Order (FPO) species are present within the construction area boundary; however, Bog Rosemary was identified c. 120 m north of the construction area boundary at Bleanbeg.

Non-native invasive plant species listed on the Third Schedule subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) are herein described.

The greater area surrounding the UWF Grid Connection includes Giant Hogweed (*Heracleum mantegazzianum*), and Rhododendron (*Rhododendron ponticum*) at a number of locations such as at Bleanbeg Bog. Neither of these species occur within construction works areas or in close proximity (</=7m).

Japanese knotweed or Himalayan knotweed infestations were recorded at 5 locations during habitat assessments on the UWF Grid Connection. All infestations are located at distances greater than 7 metres of the construction works area boundary.

'Medium impact' non-native invasive plant species (Kelly *et al.*, 2013, O' Flynn *et al.*, 2014) recorded included Sycamore (*Acer pseudoplanatus*), Butterfly bush (*Buddleja davidii*) and Himalayan honeysuckle (*Leycesteria Formosa*).

Respective locations of non-native invasive plant species are illustrated in [Figure GC 8.5](#) with further, detailed mapping provided in [Appendix A8, Section A8-1.6](#).

8.5.2.3.2 Element 2: UWF Related Works

Terrestrial Habitats within the UWF Related Works Study Area comprise a mosaic of agricultural grassland, commercial forestry plantations, hedgerows, wet grassland, private roads and public roads.

Twenty-two habitat types (including six types of habitat mosaic) comprising 190.5Ha were recorded. The dominant habitats present are improved agricultural grassland (GA1) and conifer plantation (WD4) and Wet Grassland (GS4) which together make up 168Ha or 88% of all habitats present. Scrub (WS1), built land and artificial surfaces (BL3), Wet Heath (HH3) and Upland Blanket Bog (PB2) make up the most of the remaining habitats (7.3%). Linear habitats are primarily composed of Buildings and Artificial Surfaces (BL3), earth banks (BL2), and Eroding/Upland Rivers (FW1).

Respective areas of each habitat type (evaluated as of Local Importance (Higher Value) or above) are presented in full in [Appendix 8-1: Detailed Biodiversity Information and Data](#), (Volume C4 EIAR Appendices), and illustrated on [Figure GC 8.5: Terrestrial Habitats within the UWF Related Works Study Area](#). Figure RW 8.5 is part of the EIA Report for the UWF Related Works, and is included in [Volume E: Reference Documents](#) with this planning application.

No Flora Protection Order (FPO) species are present within the construction area boundary.

Non-native invasive plant species listed on the Third Schedule subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) are herein described.

Japanese knotweed or Himalayan knotweed infestations were recorded at 1 location during habitat assessments on the UWF Related Works. The infestation is located at a distance greater than 7 metres of the construction works area boundary.

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8.5.2.3.3 Element 4: Upperchurch Windfarm

The terrestrial habitats present in the Upperchurch Windfarm have been previously described in the 2013 EIS and 2013 RFI and include 13 distinct classifications and 3 types of habitat mosaic. Habitats are broadly similar to that described elsewhere with the addition of upland blanket bog (PB2), acid grassland (GS3) and neutral grassland (GS1) in addition to the aforementioned mosaics.

Total length of linear hedgerow/treeline/field boundary within the Upperchurch Windfarm study area is 25km, with grass dominated banks described as the dominant type of field boundary.

Within the 2013 EIS, a single (roadside) record of Japanese Knotweed was recorded within the study area for the Upperchurch Windfarm.

8.5.2.3.4 Element 5: UWF Other Activities

Haul Route Activity Locations

Fourteen habitat types comprising 36.4Ha were recorded. The dominant habitats present are improved agricultural grassland (GA1), Built Land and Artificial Surfaces (BL3), Mixed Broadleaf Woodland (WD1) and Dry Meadows and Grassy Verges (GS2) which together make up 30.2Ha or 83.2% of all habitats present. Scrub (WS1), Wet Grassland (GS4) and Amenity Grassland (GA2) make up the majority of the remaining habitats (11.3%). Linear habitats are primarily composed of spoil and bare ground (ED2), Dry Meadows and Grassy Verges (GS2), Hedgerows (WL1), Tree lines (WL2), Tree lines (WL2), Hedgerows (WL1) and Earth Banks (BL2).

The total area of linear hedgerow and treelines (or mosaics of both) present comprises 2,031m.

Japanese knotweed was recorded c.15m from the haul route location HA15 on the R503 east of Ballycahill. This was the only record of non-native invasive plant species associated with the UWF Other Activities survey corridor. The infestation is located at a distance greater than 7 metres (c.15m) to the activity location.

Upperchurch Hen Harrier Scheme Area

A total of 128 Hectares of land has been put forward as alternative habitat for the Upperchurch Hen Harrier Scheme. The habitat types are a mixture of wet grassland (GS4) and improved grassland (GA1), with some smaller areas of willow scrub. We refer to the consented Upperchurch Windfarm Ecological Management Plan (2013) for further information in this regard (contained in [Volume E: Reference Documents](#)).

Overhead Line Activities

A total of 18 habitats were recorded within a 50-metre buffer of the Overhead Line Activities. The majority of the study area was composed of improved agricultural grassland. See [Appendix A8-1.2.4.6 Table 56](#) for further detail.

8.5.2.3.5 Other Projects or Activities:

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.5.2.1.

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8.5.2.4 Cumulative Information Baseline Characteristics - Importance of Terrestrial Habitats

UWF Grid Connection:

Habitats of international conservation importance are located at two locations where the UWF Grid Connection passes through the boundary of the Lower River Shannon SAC. These rivers and riparian habitats support habitats and species listed on Annex I and II, respectively, of the EU Habitats Directive 92/43/EEC which are listed as qualifying interests for the Lower River Shannon SAC.

Aquatic habitats of National Importance include the Clare River, east of Bealaclave as it is hydrologically connected to the Lower River Shannon SAC and Clare Glen SAC.

Wet heath (HH3) habitat at Baurnadomeeny was assessed to correspond with EU Habitats Directive 92/43/EEC Annex I habitat 'Northern Atlantic wet heaths with *Erica tetralix* (4010)' and is of National Importance.

Upland blanket bog (PB2) habitat at Bleanbeg and Laghile corresponds to EU Habitats Directive 92/43/EEC Annex I habitat to 'Blanket bogs (priority if active)' and is of National Importance. In addition, the bog at Bleanbeg has been designated to be of National importance for peatland habitats under Natural Heritage Area (Bleanbeg Bog NHA 002450) Order 2005 (S.I. No. 497 of 2005).

A range of Terrestrial Habitats have been identified as being of Local Importance (Higher Value) due to their importance for local biodiversity and supporting bats, birds and mammal species. These habitats include buildings and artificial surfaces (BL3), mixed broadleaf woodland (WD1), mixed broadleaf/conifer woodland (WD2), hedgerows (WL1), tree lines (WL2), riparian Woodland (WN5) and scrub (WS1).

Due to their presence within an SPA designated for Hen Harrier, a number of habitats serve an important role in supporting the structure and function of the SPA. This primarily includes suitable breeding and roosting habitat. See [Sensitive Aspect Hen Harrier Section 8.6](#) for further information.

UWF Related Works:

Upland/Eroding Streams habitats present are evaluated as of National Importance based on connectivity to the Clodiagh (Tipperary) and Multeen River sub-catchments. Upland Blanket Bog (PB2) of County Importance is present. Terrestrial Habitats of Local Importance Higher Value are Wet Grassland (GS4), Scrub and Immature Woodland (WS1/2), Wet Heath (HH3), Dry-humid Acid Grassland (GS3), Dry Siliceous Heath (HH1) and Cutover Bog (PB4).

Linear hedgerow and treelines (or mosaics of both), are evaluated as of Local Importance, Higher Value.

Upperchurch Windfarm

Upland Blanket Bog (PB3) of County Importance is described in the Upperchurch Windfarm EIS. Sixteen habitat types are present which are of Local Importance, Higher Value. All remaining habitats are of lesser importance.

UWF Other Activities

Haul Route Activity Locations

Habitats of Local Importance, Higher Value present within the previously identified study area (including areas within 50m of the public road network) are Eroding/Upland Rivers (FW1), Mixed Broadleaf woodland (WD1), Hedgerows (WL2) and Scrub (WS1). Linear hedgerow and treelines (or mosaics of both) present are of Local Importance, Higher Value.

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Overhead Line Activities

Habitats of Local Importance (Higher Value) present at or within 50m of pole/structure locations includes Wet Grassland (GS4), Oak-ash-hazel Woodland (WN2), Riparian woodland (WN5), Wet willow-alder-ash woodland (WN6), Mixed Broadleaf/Conifer Woodland (WD2), Broadleaved Woodland WD1/Wet Grassland (GS4) mosaic, Cutover Bog (PB4), Hedgerows (WL1), and Treelines (WL2). The Newport (Mulkear) River, present as Depositing/Lowland Rivers (FW2) between structures is evaluated as of International Importance, based on its status as a cSAC.

8.5.2.5 Cumulative Information Baseline Characteristics - Sensitivity of Terrestrial Habitats

Terrestrial Habitats are sensitive to direct land take, pollution, and environmental changes resulting from modification such as increased drainage. Groundwater dependant habitats such as bog and peatland habitats may be sensitive to changes in groundwater regimes or changes in ground water quality. The diversity of habitats is particularly sensitive to encroachment from invasive species which may out-compete local native species. Habitats are also sensitive to Human activities such as burning and recreational use.

8.5.2.6 Cumulative Information Baseline Characteristics - Trends in the Baseline Environment (the 'Do-Nothing' scenario)

The present survey forms a baseline classification of habitats on or near the subject development. No previous habitat information at a suitable scale is available from which trends can be identified or changes evaluated.

Reporting on trends with regard to protected habitats and species under the EU Habitats Directive is provided to the EU under Article 17 of said directive. Overall trends for some Annex quality habitats present within the receiving environment such as Wet Heath are included therein and evaluated nationally (stable in the case of Wet Heath for example). Availability of trends in respect of locally important habitats is limited (Browne, 2007). We would note that the onsite Wet Heath was subject to cattle grazing at the time of the windfarm EIS (2013), and this is still the case. Likewise, in respect of Upland Blanket Bog, the windfarm EIS has previously identified degradation from peat extraction, land reclamation, conifer planting, grazing and drainage. The latter 2 pressures are still present and therefore represent an ongoing trend.

As such, a scenario in which the Subject Development does not take place would result in a continuation of current trends relating to habitats within the study area however we would note that the enhancement proposed as part of the Upperchurch Hen Harrier Scheme would have a beneficial effect on habitats present over the operational phase of the project and represents a positive trend in respect of habitat conservation.

8.5.2.7 Cumulative Information Baseline Characteristics - Receiving Environment (the Baseline + Trends)

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 and during the operational phase. The implementation of the Upperchurch Hen Harrier scheme will produce an upward trend in respect of habitat diversity and preservation.

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8.5.3 CUMULATIVE INFORMATION: Project Design Measures for Terrestrial Habitats

Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Related Works and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4 and 5.5](#), in [Volume C4: EIA Appendices](#).

8.5.4 CUMULATIVE INFORMATION: Evaluation Of Impacts to Terrestrial Habitats

It was evaluated, in Section 8.5.1, that Neutral impacts to Terrestrial Habitats are likely to occur due to the development of the UWF Replacement Forestry.

This Section evaluates the likely cumulative effects of the Other Elements of the Whole UWF Project and Other Projects or Activities. This evaluation is based on the residual effects of the Other Elements of the Whole UWF Project and of Other Projects.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Terrestrial Habitats.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-44: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
Reduction in Terrestrial Habitats (construction stage)	Habitat degradation (construction stage)
Hedgerow Severance (construction stage)	Direct loss of Flora Protection Order species (construction stage)
Loss of High Nature Value Trees (construction stage)	Landscape level Habitat fragmentation (construction stage)
	Introduction or spread of invasive species (construction stage)
	Introduction or spread of invasive species (operational stage)
	Introduction or spread of invasive species (decommissioning stage)

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The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. The Impact Evaluation Tables are presented in the following sections 8.5.4.1 to 8.5.4.3.

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.5.4.4.

8.5.4.1 Impact Evaluation Table: Reduction in Terrestrial Habitats

Evaluation of UWF Replacement Forestry Excluded: As no permanent land take will be required of Terrestrial Habitats evaluated as of Local Importance (Higher Value) or greater, the effect of UWF Replacement Forestry to Terrestrial Habitats will be Neutral by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Cumulative Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage:
(for Other Elements only) Construction stage

Cumulative Impact Source: Excavation works
Impact Pathway: Land Cover

Impact Description: Land take during the construction stage may cause a direct reduction in habitats present. Whilst the majority of land use change is temporary in nature with immediate re-instatement for works such as cable trenching and temporary berms, land use change for project infrastructure such as permanent roads, permanent berms and other features may reduce the respective area of some higher value habitats or habitats which are important from a Biodiversity perspective.

Some land use change associated with the project (and which overlaps the SPA) will be offset by the provision of concealed geocell roadways, which will be mainly be planted with vegetation (heathers or grass or a combination of both) to match the previously existing habitat. An example of this as part of Project Design, concealed geocell roadways will be constructed at Castlewaller on the 110kV UGC, and these will be replanted with native Irish or Scottish heather (propagated in Ireland or Scotland); this land cover change is considered a positive effect on Biodiversity. Project Design Measures such as the use of flagmen at entrances has also reduced land cover change. Permanent storage berms (8 in total), mainly located along the verges of roadways or forestry tracks will be re-instated immediately with native grasses or native heather as appropriate. All re-instatement will be overseen by the Project Ecologist. As per Best Practice all habitats described and evaluated herein are those evaluated as of Local Importance (Higher Value) and above - we note that no habitats evaluated as of County, National, or International Importance are affected by permanent land use change.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Permanent habitat loss will comprise 0.51Ha, limited to 4 no. habitat types (Wet Grassland (0.3Ha), Wet Grassland/Scrub mosaic (.04Ha), Deciduous woodland (.09Ha) and Scrub (.11Ha)) with an importance evaluation of Local Importance (Higher Value). The magnitude of change represents 5.6% of the total habitat within the study area, and 0.6%, 2.7%, 1.6% and 0.7% respectively of the habitats described.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The low sensitivity of the habitats for which change will occur (context), and;
- The extent of Habitat Loss, with none of the individual habitat changes representing more than 2.7% of the respective habitat present, which is;
- Only a minor shift away from baseline conditions, notwithstanding;

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Terrestrial Habitats	<ul style="list-style-type: none"> • The permanent duration, and; • Low reversibility with permanent land use change likely.
	Element 2: UWF Related Works
	<u>Impact Magnitude:</u> Permanent habitat loss will comprise 0.07Ha, which will be limited to 2 no. habitat types (Wet Grassland (0.7Ha)) and Scrub (.004Ha)) The magnitude of change represents 0.64% of the total habitat within the study area and 0.5% and 0.01% respectively of the habitats described.
	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • The low sensitivity of the habitats for which change will occur (context), and; • The extent of Habitat Loss, with none of the individual habitat changes representing more than 1% of the respective habitat present, which is; • Only a minor shift away from baseline conditions, notwithstanding; • The long term duration, and; • Low reversibility with permanent land use change likely.
	Element 4: Upperchurch Windfarm
	<u>Impact Magnitude:</u> “In terms of the habitat loss arising from the construction of roads, foundations and hardstandings, this was determined as 9.65Ha, primarily in the improved agricultural grass land and conifer plantations.”
	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> “In relation to the details submitted, I consider that the potential impact on habitats on the site is not therefore significant. The impacts largely occur on areas with a long history of human intervention through farming and forestry cultivation. I also consider that subject to the mitigation measures as outlined that the Whole UWF Project is not likely to result in significant impacts and effects on any designated sites.”
	Element 5: UWF Other Activities
<u>Impact Magnitude:</u> None	
<u>Significance of the Impact:</u> Neutral Effect	
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • No permanent land use change is proposed of Terrestrial Habitats evaluated as of Local Importance (Higher Value) or greater. 	
Evaluation of Cumulative Impacts – Reduction in Terrestrial Habitats	
Biodiversity	All Elements of the Whole UWF Project
	<u>Cumulative Impact Magnitude:</u> Habitat loss in respect of the UWF Grid Connection, the UWF Related Works, UWF Replacement Forestry and UWF Other Activities will be limited to 4 no. habitat types with an importance evaluation of Local Importance (Higher Value). The total magnitude of habitat loss is 0.58Ha, primarily associated with the UWF Grid Connection.
	Habitat loss from equivalent sources has already been described as not significant for the Upperchurch Windfarm.
Topic	Significance of the Cumulative Impact: Not Significant

Rationale for Cumulative Impact Evaluation:

- The overall extent of Habitat Loss, and;
- Changes from baseline conditions are very slight-minor, notwithstanding;
- The long term to permanent duration, and;
- Low reversibility with permanent land use change likely.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

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8.5.4.2 Impact Evaluation Table: Hedgerow Severance

Evaluation of UWF Replacement Forestry Excluded: As no hedgerow removal or trimming will be required, the UWF Replacement Forestry will not cause hedgerow severance effects to Terrestrial Habitats by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: (for Other Elements only)	Construction stage
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Cumulative Impact Source: Excavation Works
Impact Pathway: Land cover

Impact Description: Construction stage works will cause both temporary and permanent severance of existing field boundaries. This is primarily to facilitate the linear nature of project elements such as the UWF Grid Connection and cabling as part of UWF Related Works. Any temporary hedgerow loss, such as at field boundary crossings and at entrances, will be immediately re-instated once works are complete with like for like vegetation and therefore Neutral effects are considered likely. Project Design Measures such as the use of flagmen at entrances has reduced the extent of field boundaries to be removed, even if only temporarily. Permanent severance if of sufficient magnitude may affect habitat connectivity. As per Best Practice all habitats described and evaluated herein are those evaluated as of Local Importance (Higher Value) and above - we note that no hedgerows or field boundaries were evaluated as of County, National, or International Importance. This is reflective of the landscape present with many field boundaries comprising earthen banks, or lower value hedgerows.

The Upperchurch Hen Harrier Scheme is to incorporate significant planting of hedgerows (2.8km), and additional Hedgerows will be planted as part of the UWF Grid Connection (700m of new hedgerow), UWF Related Works (370m of new hedgerow) and Upperchurch Windfarm (360m as mitigation). Additionally bat mitigation measures as part of Project Design will involve enhancement of hedgerow severance locations by the further planting of like for like trees on either side of crossings.

Impact Quality: Negative and positive

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:
 Permanent Habitat loss is limited to 45m of permanent hedgerow removal from 9 no. locations each of 5m in length. 700m of new hedgerow will be planted.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The extent of severance, with;
- No individual severed sections are sufficient in magnitude to result in fragmentation effects, and;
- A significant contrast with baseline conditions is not expected, when considered with proposed new planting;
- The permanent duration, and;
- Low reversibility with land use change likely

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<p>Element 2: UWF Related Works</p> <p><u>Impact Magnitude:</u> Habitat loss is limited to 170m of hedgerow comprising primarily earthen banks (only 1 mature tree and 3 immature trees are to be removed).</p> <p><u>Significance of the Impact:</u> Not Significant</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of severance, with; • No individual severed sections evaluated as sufficient in magnitude to result in fragmentation effects, and; • A significant contrast with baseline conditions is not expected, notwithstanding; • The long term duration, and; • Low reversibility with land use change likely
<p>Element 4: Upperchurch Windfarm</p> <p><u>Impact Magnitude:</u> As per the windfarm EIS, 980m of hedgerow will be removed. 980m of hedgerow will be replanted to mitigate this loss.</p> <p><u>Significance of the Impact:</u> Not Significant</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • “However the extent is relatively low particularly as there is an abundance of this habitat and many of the hedgerows dividing fields have very little cover within the region. Therefore, it is near certain that the impact on this habitat will not be significant.”
<p>Element 5: UWF Other Activities</p> <p><u>Impact Magnitude:</u> The Upperchurch Hen Harrier scheme activities will include improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs. Ongoing farming practices will also be restricted to preclude further hedgerow removal. No hedgerow loss is associated with Overhead Line Activities under consideration.</p> <p><u>Significance of the Impact:</u> Significant (positive)</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of new hedgerow to be planted, and; • The long-term duration equivalent to the lifetime of the project
<p>Evaluation of Cumulative Impacts – Hedgerow Severance</p> <p>All Elements of the Whole UWF Project</p> <p><u>Cumulative Impact Magnitude:</u> Permanent hedgerow loss will be limited to total of 1045m within the Whole UWF Project study area. Temporary hedgerow/field boundary removal relates to a total of 710m (585m within the UWF Grid Connection study area and 145m within the UWF Related Works Study Area, 20m of which occur at the same locations) much of which comprises earthen banks.</p> <p>In total 3800m of new hedgerow will be planted within the Whole UWF Project study area. Habitat loss of Hedgerow has already been described as not significant for the Upperchurch Windfarm.</p> <p>Significance of the Cumulative Impact: Not Significant</p> <p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of Habitat Loss overall, with limited removal of trees and; • Individual severance locations will not result in any corridor fragmentation, and;

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- A significant contrast with baseline conditions is not predicted, additionally;
- Significant positive effects from Hedgerow enhancement and planting of 2.8km of new hedgerows will occur as a result of the Upperchurch Hen Harrier Scheme, over the lifetime of the project, notwithstanding;
- The long-term duration, and;
- Low reversibility with land use change likely

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

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8.5.4.3 Impact Evaluation Table: Loss of High Nature Value Trees

Evaluation of UWF Replacement Forestry Excluded: As no loss or trimming of Trees will be required, the UWF Replacement Forestry will not cause loss of High Nature Value trees effects to Terrestrial Habitats by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: (for Other Elements only)	Construction stage
<p><u>Cumulative Impact Source:</u> Excavation Works <u>Impact Pathway:</u> Land cover</p> <p><u>Impact Description:</u> Habitats including mature trees such as hedgerows, deciduous woodland and scrub are herein evaluated for loss of mature trees of Biodiversity value. Construction stage works will cause both temporary and permanent loss of existing field boundaries, and other habitats which may contain or include mature trees of Biodiversity Value. Permanent loss of mature trees may affect connectivity / result in fragmentation and have secondary effects on other Biodiversity receptors which utilise mature trees for breeding or resting. Project Design Measures such as the use of flagmen at entrances has reduced the extent of trees to be removed. Trees evaluated herein are of Local Importance (Higher Value) in accordance with their respective habitat classification.</p> <p>We note that the Upperchurch Hen Harrier Scheme is to incorporate significant planting of trees, in addition the UWF Replacement Forestry will comprise deciduous trees in its entirety. Further instatement of trees will occur at hedgerows evaluated as ‘Bat Crossing’ locations.</p> <p><u>Impact Quality:</u> Negative and positive</p>	

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

<p><u>Impact Magnitude:</u> Tree loss is limited to 26 no. mature trees and 4 immature trees. 25 of the 26 mature trees will be lost from a single plantation of beech.</p> <p><u>Significance of the Impact:</u> Not Significant</p>

<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The low magnitude of Loss overall, and; • Will not result in any corridor fragmentation, and; • A significant contrast with baseline conditions is not predicted, notwithstanding; • The permanent duration, and; • Low reversibility with permanent loss likely.
--

Element 2: UWF Related Works

<p><u>Impact Magnitude:</u> Tree loss is limited to 1 no. mature tree and 3 immature trees- primarily from hedgerow crossing locations.</p> <p><u>Significance of the Impact:</u> Not Significant</p> <p><u>Rationale for Impact Evaluation:</u></p>

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- The extent of Loss is low overall, and;
- Will not result in any corridor fragmentation, and;
- A significant contrast with baseline conditions is not predicted, notwithstanding;
- The long term duration, and;
- Low reversibility with permanent loss likely

Element 4: Upperchurch Windfarm

Impact Magnitude:

Tree loss is Medium and will be limited to 24 no. mature trees - primarily from hedgerow crossing locations and site entrances.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The low magnitude of loss, which;
- Will not result in any corridor fragmentation, and;
- A significant contrast with baseline conditions is not predicted, notwithstanding;
- The long-term duration, and;
- Low reversibility with permanent loss likely

Element 5: UWF Other Activities

Impact Magnitude:

Neutral Effect for Haul Route Activity locations or Monitoring Activity locations as no permanent removal of trees is proposed in respect of these works.

The Upperchurch Hen Harrier scheme does include the planting of 2.2 Ha of tree and shrub species in scrub areas, improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs. In addition, 1.4km of woody scrub species will be planted along riparian corridors.

No trees will be removed to facilitate Overhead Line Activities as described.

Significance of the Impact: Moderate (positive)

Rationale for Impact Evaluation:

- The extent of replanting of trees, and;
- A significant contrast with baseline conditions is predicted.
- The long-term duration, and;
- Low reversibility.

Evaluation of Cumulative Impacts – Loss of High Nature Value Trees

All Elements of the Whole UWF Project

Cumulative Impact Magnitude:

Tree loss is limited to 51 no. mature trees and 7 immature trees.

The Upperchurch Hen Harrier scheme does include the planting of 2.2 Ha of tree and shrub species in scrub areas, improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs. In addition, 1.4km of woody scrub species will be planted along riparian corridors.

Cumulative Whole Project Impact Evaluation: Moderate (positive)

Rationale for Cumulative Impact Evaluation:

- The extent of replanting of trees, and;
- The duration which is long term and over the lifetime of the project, and;

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- A significant contrast with baseline conditions is predicted, with;
- Limited reversibility

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

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8.5.4.4 Cumulative Information: Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-45 below.

Table 8-45: Description and Rationale for Excluded Impacts to Terrestrial Habitats

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Movement of soils and machinery	1,2,4,5	Ground-water	Habitat degradation	Rationale for Excluding; No significant adverse impacts to Local Groundwater Bodies are likely to occur as a consequence of the development of the individual Elements or the implementation of all of the Individual Project Elements as the Whole UWF Project (refer Chapter 11 Water). Cross-factor effects by virtue of same are accordingly excluded from further evaluation.
Movement of soils and machinery	1,2,4,5	Surface Water	Habitat degradation	Rationale for Excluding; No significant adverse impacts to Local Surface Water Bodies are likely to occur as a consequence of the development of the individual Elements or the implementation of all of the Individual Project Elements as the Whole UWF Project (refer Chapter 11 Water). Cross-factor effects by virtue of same are accordingly excluded from further evaluation.
Excavation works	1,2,4,5	Soils	Direct loss of Flora Protection Order species	Rationale for Excluding; None were recorded within the Construction Works Boundaries.
Excavation works	1,2, 4,5	Landcover	Landscape Habitat fragmentation level	Rationale for Excluding: Neutral Landscape level effect is predicted. Permanent entrances to 1 will be re-instated; hedgerow crossings for 1 are narrowed to 5m to avoid/reduce fragmentation effects, Minimal trees are to be removed for element 2 which correlates with Upperchurch windfarm roads 4.5. Upperchurch Hen Harrier Scheme will increase connectedness through planting of hedgerows/trees. No habitat removal is required for Overhead Line Activities.
Movement of soils and machinery	1,2,4,5	Soils	Introduction or spread of invasive species	Rationale for Excluding: All pertinent locations of Invasive Species are >7metres from any works areas. Notwithstanding this point a comprehensive Invasive Species Management Plan has been developed, and will be implemented by the Contractor to ensure that none of the identified Invasive Species infestations poses a risk to the environment. The Invasive Species Management Plan can be found in Volume D: Environmental Management Plan.

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Operational Stage				
Movement of soils and machinery	1,2,4,5	Soils	Introduction or spread of invasive species	Rationale for Excluding: All pertinent locations of Invasive Species are >7metres from any works areas. Notwithstanding this point a comprehensive Invasive Species Management Plan has been developed, and will be implemented by the Contractor to ensure that none of the identified Invasive Species infestations poses a risk to the environment. The Invasive Species Management Plan can be found in Volume D: Environmental Management Plan.
Decommissioning Stage				
Movement of soils and machinery	1,2,4,5	Soils	Introduction or spread of invasive species	Rationale for Excluding: All pertinent locations of Invasive Species are >7metres from any decommissioning works areas. Notwithstanding this point a comprehensive Invasive Species Management Plan has been developed, and will be implemented by the decommissioning Contractor to ensure that none of the identified Invasive Species infestations poses a risk to the environment. The Invasive Species Management Plan can be found in Volume D: Environmental Management Plan.

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8.5.5 UWF Replacement Forestry: Mitigation Measures for Impacts to Terrestrial Habitats

Mitigation measures were incorporated into the location, layout and design of the UWF Replacement Forestry. No additional mitigation measures are required as the topic authors conclude that **Neutral impacts** are likely to occur to Terrestrial Habitats as a consequence of the UWF Replacement Forestry.

8.5.6 UWF Replacement Forestry: Evaluation of Residual Impacts to Terrestrial Habitats

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. Mitigation measures are not relevant and thus the Residual Impact is the same as the Impact set out in the Evaluation of UWF Replacement Forestry (Section 8.5.1), i.e. **Neutral impacts**.

8.5.7 UWF Replacement Forestry: Application of Best Practice and the EMP

Best Practice Measures (BPM), although not part of the Project Design for the UWF Replacement Forestry, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of Terrestrial Habitats, by the authors of this topic chapter, using industry best practice:

RF-BPM-01	Monitoring of non-native invasive plant species
RF-BPM-02	Management of general non-native invasive species

These Best Practice Measures are included in full at the end of this topic chapter, and are also included as **Appendix 5.1: UWF Replacement Forestry Best Practice Measures** in **Volume C4: EIAR Appendices**.

8.5.7.1 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan is included as **Appendix 5.2: Invasive Species Management Plan**.

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8.5.8 Summary of Impacts to Terrestrial Habitats

Neutral impacts to Terrestrial Habitats are concluded by the topic authors as likely to occur as a consequence of the development of UWF Replacement Forestry.

Table 8-46: Summary of the impacts to Terrestrial Habitats

Impact to Terrestrial Habitats:	Reduction in Terrestrial Habitats	Hedgerow Severance	Loss of High Nature Value Trees
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Section 8.5.4.1</i>	<i>Section 8.5.4.2</i>	<i>Section 8.5.4.3</i>
Project Life-Cycle Stage (for Other Elements only)	Construction	Construction	Construction
<u>UWF Replacement Forestry</u>	Neutral Effect/No Potential for Impact Evaluated as Excluded - - See Section 8.5.1		
Element 1: UWF Grid Connection	Not Significant	Not Significant	Not Significant
Element 2: UWF Related Works	Not Significant	Not Significant	Not Significant
Element 4: Upperchurch Windfarm	Not Significant	Not Significant	Not Significant
Element 5: UWF Other Activities	Neutral	<u>Significant (positive)</u>	Moderate (positive)
<u>Cumulative Impact:</u>			
All Elements of the Whole UWF Project	Not Significant	Not Significant	Moderate (positive)

The greyed out boxes in the summary table below relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

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8.6 Sensitive Aspect No.5: Hen Harrier

This Section provides a description and evaluation of the Sensitive Aspect - Hen Harrier.

8.6.1 BASELINE CHARACTERISTICS of Hen Harrier

8.6.1.1 STUDY AREA for Hen Harrier

The study area for Hen Harrier in relation to the UWF Replacement Forestry is described in Table 8-47 and illustrated on **Figure RF 8.6: Hen Harrier within the UWF Replacement Forestry Study Area** (Volume C3 EIAR Figures).

Table 8-47: UWF Replacement Forestry Study Area for Hen Harrier

Study Area for Hen Harrier	Justification for the Study Area Extents
Afforestation lands plus 50m in all directions	Published literature (e.g. Pearce-Higgins <i>et al.</i> 2009), and; Professional Judgement

8.6.1.2 Baseline Context and Character of Hen Harrier in the UWF Replacement Forestry Study Area

The Replacement Forestry location comprises primarily improved agricultural grassland, which is of low attractiveness for foraging Hen Harrier. No breeding or winter roost habitat is present.

8.6.1.3 Importance of Hen Harrier

Hen Harrier is listed on Annex I of the EU Birds Directive 2009/147/EC. In 2007, six Special Protection Areas (including the Slieve Felim to Silvermines Mountains SPA) were designated across the country with breeding populations of Hen Harrier as the sole Special Conservation Interest to ensure the conservation of the species. The breeding population of Hen Harrier is Amber listed on the most recent Birds of Conservation Concern in Ireland 2014 – 2019 (Colhoun and Cummins, 2013). No areas are designated solely in respect of wintering populations. Both breeding and wintering Hen Harrier present are evaluated as Internationally Important and assigned a sensitivity rating of Very High (equivalent to NRA International Importance) for the purpose of evaluation, as per Table 8-3.

8.6.1.4 Sensitivity of Hen Harrier

Hen Harriers are known to be sensitive to disturbance (Masden 2010, Pearce-Higgins *et al.*, 2012). The effects of significant disturbance to Hen Harrier may be nest desertion, reduced incubation periods (resulting in embryo mortality), or additional stress on adult bird’s due to their propensity to alarm at intruders. Some or all of these effects may result in longer term abandonment of (traditionally held) nesting areas, with resultant local and/or population level effects. Whilst raptors in general may accept short infrequent disturbance events proximal to nests, and may even be highly tolerant of certain sources of disturbance, sudden changes during critical periods such as the start of the breeding season may provoke a higher level of response (Petty, 1998) with consequent effects on breeding success and local reproductive rates.

Research on the spatial ecology of Hen Harriers has shown that foraging females spend most of their time within 1km of the nest, while males hunt mostly within 2km of the nest (Arroyo *et al.*, 2009, Irwin *et al.*, 2012, Arroyo *et al.*, 2014). Therefore, landscape and habitat changes within 1km of the nest may impact on both male and female foraging; while changes up to 2km from the nest are more likely to affect males only (Arroyo *et al.*, 2014). Foraging habitat loss therefore, especially within 2km of nesting attempts may have negative effects on breeding success.

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Hen Harriers are positively sensitive to the creation of or sympathetic management of foraging and nesting habitat within their traditional range (Forrest *et al.*, 2011).

8.6.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

Four national surveys have been undertaken to assess the conservation status of Hen Harrier in Ireland (Norriss *et al.*, 2002; Barton *et al.*, 2006; Ruddock *et al.*, 2012; Ruddock *et al.*, 2016). The most recent survey recorded 108 to 157 breeding pairs (Ruddock *et al.*, 2016). This was lower than the breeding population estimate for 2010 of 128 to 172 breeding pairs (Ruddock *et al.*, 2012), similar to the estimate of breeding pairs in 2005 of 132 to 153 (Barton *et al.*, 2006) and slightly higher than the results of the first national survey which estimated 102 to 129 breeding pairs (Norriss *et al.*, 2002).

The Slievefelim to Silvermines Mountains SPA was one of only two SPAs to record an increase in breeding territories between 2005 and 2015. The remaining four SPAs designated for the conservation of Hen Harrier all showed reductions in the number of breeding territories recorded from 2005 to 2015 (Ruddock *et al.*, 2016).

8.6.1.6 Receiving Environment (the Baseline + Trends)

At a national level, 5-year interval trends show that the Hen Harrier population appears to be in decline, however the population in Slievefelim to Silvermines Mountains SPA is at least stable or on the increase. Changes in the supporting habitat, such as the maturation of 2nd rotation forestry (selected for nesting) or land management changes to further nesting and foraging habitat, are unlikely to produce a declining trend by the time the subject development is under construction. It is assumed in this report that the baseline environment in relation to Hen Harrier, as identified above, will be the receiving environment at the time of construction. Longer term trends have been identified with respect to Forestry, such as a declining trend in the amount of foraging habitat available, and are likely to overlap the operation phase. The following is cited directly from the document titled "Hen Harrier Conservation and the Forestry Sector in Ireland", published by NPWS in 2015:

"Forests less than 15 years old constitute to varying degrees a potential foraging resource for Hen Harriers. In line with the forecasted reduction in the extent of the forest nesting resource, indicative future estimates of the extent of the potential *forest foraging* resource within the SPA network shows an acute declining trend over the next 10 years⁹"(emphasis added). This negative trend is also applicable to the Slieve Felim to Silvermines Mountains SPA.

In relation to forest nesting habitat, it is projected for the period 2012 – 2025 that all SPAs will undergo an acute reduction in the extent of forest that is of use to the Hen Harrier as a nesting resource. The overall decline is estimated to be 42% for this period when only 11% of the entire forest estate in the SPA network will constitute a potential nesting resource for forest nesting Hen Harrier. The projected decline of this resource varies between the SPAs from approximately 24% (Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA) to 82% in Slieve Beagh SPA. Accordingly, it will likely be after 2035 before the net estimated usable forest nesting habitat will exceed present levels. Within the Slieve Felim to Silvermines SPA the estimated extent of forest within the SPA that is potentially usable as Hen Harrier nesting habitat is expected to decline from 23% (in 2012) to 11% within the period 2012-2025 and thereafter increase up to 44% by the year 2045.

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⁹ NPWS.2015. Hen Harrier Conservation and the Forestry Sector in Ireland.

8.6.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

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8.6.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Hen Harrier considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.6.2.2.1](#) below.

The evaluation of cumulative impacts to Hen Harrier also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects with either the UWF Replacement Forestry or with any of the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of these Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: Bunkimalta Windfarm, Castlewaller Windfarm (both consented) and the activities: Forestry, Agriculture and Turf-Cutting have been scoped in for evaluation of cumulative effects to Hen Harrier.

8.6.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Replacement Forestry Study Area along with the study areas for Other Elements and Other Projects or Activities which are described in Table 8-48.

Table 8-48: Cumulative Evaluation Study Area for Hen Harrier

<u>Cumulative Project</u>	<u>Cumulative Study Area Boundary</u>	<u>Justification for Study Area Extent</u>
Element 1: UWF Grid Connection	2km from the construction works area boundary in all directions	As per SNH (2014) guidance
Element 2: UWF Related Works	Construction works area boundary or activity location (plus 50m in all directions)	Published literature (e.g. Pearce-Higgins <i>at al.</i> 2009), and; Professional Judgement
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities: Bunkimalta Windfarm Castlewaller Windfarm Forestry Agriculture Turf-Cutting	The boundary of the Slievefelim to Silvermines SPA plus 5km in addition to the footprint of all Elements of the Whole UWF Project plus 2km.	Research on the spatial ecology of Hen Harriers has shown that foraging females spend most of their time within 1km of the nest, while males hunt mostly within 2km of the nest (Arroyo <i>et al.</i> , 2009, Irwin <i>et al.</i> , 2012, Arroyo <i>et al.</i> , 2014). Therefore, landscape and habitat changes

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Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
		within 1km of the nest may impact on both male and female foraging, while changes up to 2km from the nest are more likely to affect males only (Arroyo <i>et al.</i> , 2014). SNH (2014) also recommend a 2km study area extent from a proposal site within which data should be collected. A 5km area around the SPA in conjunction with a 2km area around the various elements of the Whole UWF Project will ensure all likely effects are evaluated in the context of the Species and the SPA

8.6.2.2.1 Potential for Impacts to Hen Harrier

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect Hen Harrier. The results of this evaluation are included in Table 8-49.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on [Figure CE 8.6: Hen Harrier within the Cumulative Evaluation Study Area](#) (Volume C3 EIAR Figures).

Table 8-49: Results of the Evaluation of the Other Elements and Other Projects or Activities

<u>Other Element of the Whole UWF Project</u>	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects (with the exception of Haul Route Activities HA 1 to HA20, which are evaluated as excluded as these activities do not have potential to act as a source for impacts on Hen Harriers due again to their location on public roads and have been scoped out accordingly).
<u>Other Projects or Activities</u>	
Bunkimalta Windfarm Castlewaller Windfarm Forestry Agriculture Turf-Cutting	<u>Yes, included</u> for the evaluation of cumulative effects

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8.6.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.6.2.3.1 Element 1: UWF Grid Connection

Breeding Context

The 2km study area for the UWF Grid Connection comprises a range of habitats typical of the Slieve Felim to Silvermine Mountains SPA and includes forestry at differing age classes, open moorland and bog, in addition to rough grazing and improved agricultural lands. In general, and as expected given the overlap with a European Site designated for Hen Harrier, habitats within the 2km study area are considered of high quality for the species. In this regard however, it should be noted that no currently suitable breeding habitat overlaps the UWF Grid Connection construction works area.

Note: Following scoping and formal consultation with NPWS as described, it was established that, based on likely sensitivities, and source-pathways linkages in respect of disturbance and displacement, the primary objective of Hen Harrier surveys should be to identify all Hen Harrier breeding and winter roosting sites in suitable habitat within a 2km radius of the works (2km being the radius stipulated by SNH guidance)- with an emphasis on establishing the locations of any previously unknown nesting territories, given the information available on known and historical nest sites. This is further defined in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.3.3\)](#).

Breeding season surveys following Best Practice (Hardey et al., 2014) confirmed 3 no. Hen Harrier breeding attempts within 2km of the UWF Grid Connection in 2016. A further nesting attempt was confirmed at 2.15km from the UWF Grid Connection. Of the four breeding attempts described, 3 successfully fledged young. The distance from the UWF Grid Connection (construction area boundary) in respect of each nest location was 154m, 500m, 903m, and 2.15km respectively. Habitat types in which nests were located comprised Heath and Bog (1nests) and pre-thicket (pre-canopy closure) forestry (3 nests).

In 2017, one nesting attempt was confirmed ~500m from the UWF Grid Connection. A second nest was located 680m distant. In both instances, the nesting territory corresponded to a similar territory from the previous year (2016) which is typical of year to year fidelity shown by this species. Both nesting attempts described successfully fledged young in 2017. Habitat types in which nests were located comprised Heath and Bog (further details on see [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.3 Table 25\)](#). Appendix 8-1 can be found in [Volume C4 EIAR Appendices](#).

Also in 2017 two additional breeding attempts were unconfirmed but are considered likely based on records of pairs in territorial display within ~2km. For the avoidance of doubt these are considered as valid nesting attempts for the purpose of the current appraisal however the outcome of the breeding attempt is classified as unsuccessful (only territorial pairs/activity observed). All nesting attempt locations in 2017 were again within the SPA and in similar locations to 2016.

Wintering Context

Hen Harrier winter roost surveys were undertaken to Best Practice (SNH) in the 2km hinterland of the UWF Grid Connection between September 2016 and February 2017, and also during the period September to February 2018, during which 3 no. winter roosts were identified – all within the SPA. One of these was situated within 500m of the UWF Grid Connection construction area boundaries and found to be utilised during both survey winters. The remaining 2 no. roosts were within 1km and 2km respectively of the UWF Grid Connection construction area boundaries and were more variable in their usage, used less frequently and only during the winter period of 2016/17. Roosting habitats in all instances comprised upland heath and bog, which is typical as birds mainly roost on the ground. Habitat types are described in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.3 Table 26\)](#).

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Based on studies conducted for the current appraisal the roost population of the UWF Grid Connection study area is estimated as 0-5 birds (based on a maximum of 5 birds recorded concurrently across all roosts on any given day, from 2 winter seasons of effort). This has the potential to increase or decrease dependent on inter-annual variation, weather or other factors. The maximum count of 5 birds at any individual roost (comprising 4 adult males and one female) was only recorded on a single occasion, in January 2018.

Further information on surveys and results are included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.3\)](#) and maps illustrating UWF Grid Connection sections with high sensitivity in respect of breeding Hen Harrier are provided in [Figure GC 8.6: Hen Harrier within the UWF Grid Connection Study Area](#) (the exact locations of Hen Harrier nesting attempts or communal roosting locations are not publically provided due to the sensitivity of this species to persecution/disturbance, as agreed in consultation with NPWS). [Figure GC 8.6](#) is part of the EIA Report for the UWF Grid Connection, and is included in [Volume E: Reference Documents](#) with this planning application.

Character

The harriers (genus *Circus*) are all fairly large hawks with long, broad wings, long tails and legs and slim bodies (Watson 1977). In Ireland the Hen Harrier *Circus cyaneus* is confined largely to heather moorland and young forestry plantations, where they nest on the ground. They are found mainly in Counties Laois, Tipperary, Cork, Clare, Limerick, Galway, Monaghan, Cavan, Leitrim, Donegal and Kerry. The current national breeding population is estimated at 108-157 breeding pairs (Ruddock *et al.*, 2016). The most recent estimate of the national wintering population, from Irelands Article 12 submission to the EU, is 269-349 individuals. Foraging habitat preferences are generally biased towards moorland, grassland mosaics and pre-thicket forest habitats which support larger numbers of prey species. Hen Harrier wintering grounds are typically lowland sites below 100m. During winter, Hen Harriers gather at communal or solitary roost sites. In Ireland the majority of these roost sites are located in reed beds, heather/bog and rank/rough grassland but also fen, bracken, gorse or saltmarsh. Approximately 20% of known roosting sites in Ireland occur within close proximity to core nesting areas. In 2014, approximately 96 confirmed solitary and communal roosts were known in Ireland.

8.6.2.3.2 Element 2: UWF Related Works

The location of the UWF Related Works includes habitat which may be used occasionally by foraging Hen Harrier as already established in the 2013 EIS for the Upperchurch Windfarm. No suitable breeding habitat is present. Similarly habitats may be utilised for foraging during the winter months, however no suitable winter roost habitat is present.

8.6.2.3.3 Element 4: Upperchurch Windfarm

The Upperchurch Windfarm is the subject of a Hen Harrier Management Plan as part of the 2014 Grant of Permission, this Hen Harrier Management Plan is described in the 2013 RFI and sets out to enhance and promote habitat on lands close to the windfarm site to benefit foraging Hen Harrier. The Hen Harrier Management Plan is evaluated in this application as part of the UWF Other Activities and referred to as the 'Upperchurch Hen Harrier Scheme'.

With regard to the Upperchurch Windfarm Hen Harrier were not recorded as breeding within the study area for the 2013 EIS and the habitat was evaluated as sub-optimal for nesting. The Upperchurch Windfarm is outside the Slievefelim to Silvermines Mountains SPA. Foraging at low frequency during the summer months has been described in the 2013 EIS. Similarly habitats may be utilised for foraging during the winter months, however no suitable winter roost habitat is present.

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8.6.2.3.4 Element 5: UWF Other Activities

The Upperchurch Hen Harrier Scheme is located in Knockcurraghbola Commons, Coumnageeha, Foilnaman, Knockmaroe and Grousehall townlands on agricultural lands between the Slievefelim to Silvermines SPA and the Upperchurch Windfarm.

Haul Route Activities are also located outside the SPA. By their nature these locations are located on existing public roadways and roadside verges and do not comprise or include foraging or breeding habitat for Hen Harrier. Similarly, habitats are not suitable for foraging during the winter months, and no suitable winter roost habitat is present. Those locations in closest proximity to the already consented Upperchurch Windfarm (HA21-23) whilst unsuitable in themselves do occur adjacent to lands as part of the Consented Windfarm where foraging at low frequency has been recorded. Similarly Monitoring Activities during the construction of the Windfarm will take place on lands which may be utilized for foraging albeit at low frequency.

Suitable foraging habitat for Hen Harrier is present at locations of wet grassland along the route of the overhead line relating to Overhead Line Activities; in addition suitable foraging habitat is present at Shower Bog adjacent to the overhead line.

8.6.2.3.5 Other Projects or Activities

Both the Consented Bunkimalta Windfarm and the Consented Castlewaller Windfarm are located within the Slievefelim to Silvermines SPA, c.2.5km to the north of the UWF Grid Connection (Bunkimalta Windfarm), and in the area of the UWF Grid Connection respectively (Castlewaller Windfarm). Both of these windfarms are located within areas containing suitable foraging and nesting Hen Harrier habitat and in close proximity to known historical and more recent nesting attempts. Both developments are or will be subject to significant management plans in respect of Hen Harrier.

Forestry is widespread within the SPA (approximately half of the site is afforested, including both first and second rotation plantations and clear fell areas) and is consequently listed as one of the most important activities with high effect on the SPA (High negative rank).

Agriculture (hill farming) constitutes roughly one half of the land use within the SPA, and is mainly based on the usage of rough grassland. Grazing is a medium ranked activity both in terms of negative and positive impacts on the SPA.

Turf-Cutting or Peat Extraction, both mechanically and by hand is also a medium ranked negative pressure on the SPA.

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8.6.3 PROJECT DESIGN MEASURES for Hen Harrier

At the conception of the UWF Replacement Forestry, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-50 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Hen Harrier**.

Table 8-50: UWF Replacement Forestry Project Design Measures relevant to Hen Harrier

PD ID	Project Design Environmental Protection Measure (PD)
RF-PD 06	No planting works will take place within 500m of an active hen harrier nest, or active nesting activity, during the months of March to August. Additionally, during the winter season, October to February, planting works will only be carried out during the period between one hour after sunrise and one hour before sunset in areas within 1000m of an active winter roost.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Related Works and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4 and 5.5](#) in [Volume C4: EIAR Appendices](#).

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8.6.4 EVALUATION OF IMPACTS to Hen Harrier

In this Section, the likely direct and indirect effects of the UWF Replacement Forestry are identified and evaluated. Then the likely cumulative effects of the UWF Replacement Forestry together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Hen Harrier.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-51: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Reduction in or loss of Suitable Foraging Habitat (construction/operational stages)	<i>Reduction in Prey Item Species (construction stage)</i>
	<i>Reduction in or Loss of Suitable Nesting Habitat, (construction stage)</i>
	<i>Mortality of Hen Harrier in or at Nest Sites, (construction stage)</i>
	<i>Reduction in or Loss of Winter Roosts, (construction stage)</i>
	<i>Mortality of Winter Roosting Hen Harrier, (construction stage)</i>
	<i>Disturbance/Displacement of Nesting or Roosting Hen Harrier, (construction stage)</i>
	<i>Additive mortality/disturbance, (construction stage)</i>
	<i>Disturbance/displacement, (construction stage)</i>
	<i>Disturbance/displacement, (construction stage)</i>

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Table in the **following Section 8.6.4.1**.

The source-pathway-receptor links and the rationale for impacts excluded are described in the section directly after the Impact Evaluation Table in Section 8.6.4.2.

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8.6.4.1 Impact Evaluation Table: Reduction in or Loss of Suitable Foraging Habitat

Hen Harrier

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Impact Description

Project Life Cycle Stage: Planting/growth stage

Impact Source: afforestation
Cumulative Impact Source: provision of windfarm access roads, turbine hardstanding areas and substation compounds; Land cover change from Agricultural Practices such as drainage, Direct habitat loss through peat extraction of intact bog, and habitat loss through forest maturation.
Impact Pathway: Land cover

Impact Description: Hen Harrier is a very high sensitivity receptor of International Importance. Land take or land use/cover change of foraging habitats such as grassland, scrub, bog and forestry may cause secondary effects for this Annex I species and SPA qualifying interest. Loss of foraging habitat at key periods of the breeding cycle can have knock on effects on breeding success of identified pairs nesting nearby, in particular where it occurs within 2km of a nest location.

In relation to the UWF Grid Connection the spatial extent of habitat loss will be limited to roads, berms and other permanent features but also the width of the clear fell corridor at Castlewaller and along the UWF Grid Connection cable route. Temporary land use change for works such as cable trenching will be reinstated immediately following construction and therefore effects from this will be Neutral (equivalent to no effect or effects that are imperceptible), as will the loss of 45m of hedgerow from 9 no. locations. Temporary storage berms, (n=22) are located for along the UGC route; a project design measure is in place to ensure these are immediately re-instated to their previous condition. Permanent berms will be immediately re-seeded with heather. Harvester crossing points will be covered with topsoil and reseeded immediately as will any other temporary land-use change locations. Reinstatement will be overseen by the project Ecologist.

Any impact is negated by the provision of concealed geocell roadways, planted with grass or heather, for all new permanent roads within the SPA. Felled commercial forestry at Castlewaller (1 ha) will be replaced within 1ha of deciduous woodland as part of the UWF Replacement Forestry element.. The felled area at Castlewaller will contain a concealed geocell roadway, which, along with the remainder of the corridor at that location, will be planted with native mature heather and grasses (Irish or Scottish sourced). Planting of geocell with mature plants along with a suitable grass nurse species will take place prior to construction, to avoid any time delay in the provision of habitat at source.

Impact Quality: positive, negative and neutral (varies per project)

Evaluation of the Subject Development Impact–Reduction in or Loss of Suitable Foraging Habitat

Element 3: UWF Replacement Forestry

Impact Magnitude:
 The suitable foraging habitat for Hen Harrier currently within the land folio boundary comprises improved agricultural grassland (3.54Ha); Wet Grassland (0.44Ha) and Scrub (0.01Ha); in total 3.99Ha. This entire area will undergo landuse change to UWF Replacement Forestry (deciduous forestry) to be managed specifically for the use of Hen Harrier, including the incorporation of ‘tried and tested’ management measures which facilitate Hen Harrier foraging and usage.

Significance of the Impact: very significant (positive)

Rationale for Impact Evaluation:

- The demonstrated sensitivity of Hen Harriers to positive management (context), and;
- The extent of lands to be managed for Hen Harrier, and;
- The permanent duration, and;
- The Non-reversibility with lands to remain post decommissioning.

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Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<p><u>Impact Magnitude:</u> Total permanent land take of foraging habitat is confined to improved agricultural grassland (2.47Ha); Wet Grassland (0.27Ha); Wet Grassland/Scrub mosaic (0.04Ha); Mature or closed canopy conifer plantation (2.14Ha), deciduous woodland (0.09Ha) and Scrub (0.11Ha) and totals 5.12Ha (2.44Ha of which is within the SPA). For the avoidance of doubt the calculation of permanent land take is based on all new permanent access roads, permanent berms (including overburden storage berms and notwithstanding seeding will take place immediately) and forestry felling (notwithstanding not all this habitat is suitable). A proportion of the land take above, located within the boundary of the SPA, will be covered with concealed access roads, planted with either native grass species or heather as appropriate to match the surrounding habitat- so as to avoid effects on the SPA itself. This comprises improved agricultural grassland (0.08Ha); Wet Grassland (0.09Ha); and Mature or closed canopy conifer plantation (0.4Ha at Castlewaller) and totals 0.6Ha. Permanent Berms (0.434Ha) within the SPA will be immediately reinstated as will all remaining locations comprising 0.855Ha. The net loss is 5.12Ha-0.6Ha which is 4.52Ha, in total from the study area. As permanent habitat loss/exclusion is avoided within the SPA through this mitigation at source as part of project design, the net permanent loss is (5.12Ha -1.98Ha) which is 3.14Ha, in total from the study area.</p>	
<u>Significance of the Impact:</u> Moderate (negative)	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The very high sensitivity rating of the species (context), and; • The magnitude of effect, on the sensitive aspect Hen Harrier, following Percival <i>et al.</i> is evaluated as 'Low' (1-5% of habitat lost), equivalent to a minor shift away from baseline conditions however with the underlying character and composition remaining similar to pre-development circumstances; • The permanent duration of permanent habitat loss, and ; • The reversibility of effects with the use of concealed access roads at source within the SPA, and the further instatement of foraging habitat. 	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Total permanent land take of foraging habitat is confined to improved agricultural grassland (0.12Ha); Wet Grassland (0.07Ha), upland blanket bog/Conifer mosaic (0.01Ha), Mature or closed canopy conifer plantation (0.28Ha) and scrub (0.004Ha) and totals 0.48Ha, and represent 0.28% of the available foraging habitat within the study area. Note: Within the Related Works, HW7 is the only location where the construction works boundary overlaps the Hen Harrier SPA, comprising 0.027Ha of scrub adjoining an existing yard at this location. All other UWF Related Works lands are located outside the SPA. No land use change will take place at this location, in line with the precautionary principle, to avoid effects on habitats possibly suitable for Hen Harrier.</p>	
<u>Significance of the Impact:</u> Slight (negative)	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The very high sensitivity rating of the species (context), and; • The extent of permanent habitat loss, evaluated as a very slight change from baseline condition, and; • The long term duration of permanent habitat loss, and; • The reversibility of the impact with the replanting and management of lands for the use of Hen Harrier at over the lifetime of the Project Element. 	
Element 4: Upperchurch Windfarm	
<p><u>Impact Magnitude:</u> As per the 2013 RFI the magnitude of foraging habitat loss was calculated as 95Ha (actual loss plus effective loss through displacement effects). For completeness, given that the estimate of total displacement was based on 2017 as the construction year, an upwardly revised total estimate of 98.11Ha has</p>	

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Hen Harrier	<p>been extrapolated from data provided in the RFI (Table 7 of the UWF Ecological Management Plan). This figure corresponds with 2019 as the construction year – however it is still less than the 128Ha of lands to be provided as additional favourable foraging areas under the conditioned Upperchurch Hen Harrier Scheme (evaluated other ‘UWF Other Activities’).</p>
	<p><u>Significance of the Impact:</u> Neutral Residual Impact</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The effective loss of 98.11Ha of habitat constitutes an effect of medium magnitude (5-20% of available habitat lost); • The implementation of the Upperchurch Hen Harrier Scheme, as conditioned; • Very High sensitivity of the species, and; • Long term duration.
	<p>Element 5: UWF Other Activities</p>
	<p><u>Impact Magnitude:</u> Haul Route Activities will not result in loss of foraging habitat. Monitoring activities will not result in a loss of Hen Harrier foraging habitat. Overhead Line Activities will not result in loss of foraging habitat. The consented Upperchurch Hen Harrier scheme will result in 2.2Ha of trees, 1.4km of riparian habitat and 3.82.8km of new hedgerow being enhanced or created during initial activities. In total 128Ha of agricultural lands will be managed for the benefit of Hen Harrier, outside the turbine 250m buffer and the footprint of the development; as per the EMP. The net gain to Hen Harrier is 128Ha-98.11Ha which is 28.9Ha. The magnitude of this gain (an increase of 30% on the effective lands loss plus management of 128Ha) is evaluated as High as it constitutes a major alteration to the baseline features present.</p>
Sensitive Aspect	<p><u>Significance of the Impact:</u> Very significant (positive)</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The demonstrated sensitivity of Hen Harriers to positive management (context), and; • The extent of lands to be managed for Hen Harrier, and; • The long term duration, and; • Low reversibility.
	<p>Cumulative Information: Individual Evaluations of Other Projects or Activities</p>
	<p>Other Project: Consented Castlewaller Windfarm</p>
	<p><u>Impact Magnitude:</u> Effective Habitat Loss of Hen Harrier habitat within 250m of each turbine location, where harriers use second rotation aged 3-9 years-estimated at 47.9Ha.¹⁰ However, it was also proposed to manage 47.9Ha of clear felled woodland for the lifetime of the windfarm for the benefit of Hen Harrier.</p>
Biodiversity	<p><u>Significance of the Impact:</u> Neutral residual effect</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The impact is evaluated as neutral given the effective habitat loss is exactly equivalent to the area of clear felled woodland to be managed for the benefit of Hen Harrier, over the lifetime of the wind farm.
	<p>Other Project: Consented Bunkimalta Windfarm</p>
	<p><u>Impact Magnitude:</u> The Bunkimalta Windfarm SHMP acknowledges that Hen Harriers may show avoidance around 250m of each turbine. A total area of 162.76 hectares must be replaced by mitigation measures. DAHG cites this figure also.</p> <p>As the residual effects presented in the Windfarm EIS were subject to substantive discussion subsequent to decision, we do not cite these; rather we cite the relevant text from the inspectors Report. The comments</p>
	<p>_____</p>
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¹⁰ Castlewaller Woodland Partnership (2007). Response to RFI from North Tipperary County Council prepared by Fehily Timoney and Company

<p>below refer to the loss of foraging habitat within the context of Conservation Objectives for the (Hen Harrier) SPA, as cited in the Inspectors Report for Bunkimalta Wind Farm: Pg. 34 “In summary therefore, I conclude that the relevant matter is that there is a total mitigatory habitat of 164.3 hectares which compares favourably with the 162.76 hectares lost. Subject to the Board being satisfied that the management of the 137.3 hectares of perpetual open canopy forest under the SHMP will provide suitable Hen Harrier habitat then the Board can be satisfied that the development would be in accordance with the conservation objective for the SPA.” and; Pg.41 “Based on the available information, which includes best scientific evidence and which is adequate for the purposes of Appropriate Assessment; I consider that the development would not result in net loss of Hen Harrier habitat. Therefore, I conclude that the Board can be satisfied that the development would not significantly affect the integrity of the SPA having regard to its Conservation Objective”</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Hen Harrier</p>
<p><u>Significance of the Impact:</u> Neutral residual effect</p>	
<p><u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • Based on an evaluation of “no net loss” </p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Sensitive Aspect</p>
<p>Activity: Forestry/Agriculture</p>	
<p><u>Impact Magnitude:</u> Hen Harrier in Ireland makes extensive use of both first and second rotation pre-thicket forest habitat during the breeding period. However, by its successional nature forests inevitably matures and become less suitable (Avery & Leslie, 1990; Madders, 2000; 2003; O’Donoghue, 2004). The following is cited directly from the document titled “Hen Harrier Conservation and the Forestry Sector in Ireland”, published by NPWS in 2015: “Forests less than 15 years old constitute to varying degrees a potential foraging resource for Hen Harriers. In line with the forecasted reduction in the extent of the forest nesting resource, indicative future estimates of the extent of the potential national <i>forest foraging</i> resource within the SPA network shows an acute declining trend over the next 10 years¹¹”(emphasis added). This negative trend is also applicable to the Slieve Felim to Silvermines Mountains SPA. It is likely that some sites within the ‘wider countryside’ areas supporting breeding Hen Harrier that have been afforested will also experience forestry related changes both due to the maturation of existing forest habitat and the conversion of currently useful habitat (e.g. scrub, low intensity managed farmland) to a less stable state. In relation to Agriculture, in the absence of available information on trends it is evaluated as Neutral.</p>	
<p><u>Significance of the Impact:</u> Significant (negative)</p>	
<p><u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • precautionary basis </p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Biodiversity</p>
<p>Other Project: Turf-cutting</p>	
<p><u>Impact Magnitude:</u> Habitats possibly subject to Peat Extraction such as Upland Blanket Bog (335Ha or 1.61% of the SPA) and Cutover Bog (507Ha or 2.42% of the SPA) occur within the SPA. Peat extraction by hand or through mechanical means is ranked as a medium level pressure in respect of Hen Harrier within the SPA¹². Some of these habitats where they overlap the SPA are further protected through the provision of NHA’s wherein further turf cutting of intact areas is unlawful, or SAC’s wherein Conservation Objectives to protect Qualifying Interest bog are set out. In closer proximity to the Development, turf extraction forms part of the current baseline environment at Bleanbeg Bog but is limited to existing banks and further cutting of intact (uncut) areas, in addition to land take from other activities such as infrastructure, material removal etc. is, as already described unlawful¹³</p>	
<p><u>Significance of the Impact:</u> Neutral</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Topic</p>

¹¹ NPWS.2015. Hen Harrier Conservation and the Forestry Sector in Ireland.

¹² <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004165.pdf>

¹³ <http://www.irishstatutebook.ie/eli/2005/si/497/made/en/print>

Hen Harrier	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Restrictions on further turf cutting in intact areas/protected areas, and; • The limited extent of lands subject to turbarry (rights to cut turf) within the Hen Harrier SPA overall (4%), and; • The reversibility of any effect, (in the context of Hen Harrier) with birds expected to continue to utilize re-vegetating cutover bog <i>for foraging</i>.
	<p>Evaluation of Cumulative Impacts – Reduction in or Loss of Suitable Foraging Habitat</p>
Sensitive Aspect	<p>All Elements of the Whole UWF Project</p>
	<p><u>Cumulative Impact Magnitude:</u></p> <p>Both positive and negative quality effects occur with regard to Hen Harrier foraging Habitat loss across the Whole UWF Project. The negative effects of Upperchurch Windfarm, which is evaluated herein within the context of effective displacement based on a revised construction date (as per the Windfarm RFI); is effectively mitigated by the activities consented under the Upperchurch Hen Harrier Scheme, which as intended results in a net gain through design to Hen Harrier both in area and quality of habitat. Remaining negative effects primarily stem from the UWF Grid Connection; however the provision and management of UWF Replacement Forestry specifically for Hen Harrier, outside but adjacent to the SPA also contributes to a net gain overall to Hen Harrier of over 30.26Ha of actively managed foraging habitat.</p>
	<p>Significance of the Cumulative Impact: Significant (positive)</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The demonstrated sensitivity of Hen Harriers to positive management (context), and; • The extent of lands to be managed for Hen Harrier overall, and; • The long term to permanent duration, given that UWF Replacement Forestry will not be decommissioned, • The reversibility of negative effects with the application of the Upperchurch Hen Harrier Scheme and other measures as described.
	<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
Biodiversity	<p><u>Cumulative Impact Magnitude:</u></p> <p>The magnitude of foraging habitat loss resulting from the Whole UWF Project, Castlewaller Wind Farm and Bunkimalta Wind Farm is 312.39Ha. As 344.19Ha of land is additionally subject to management directly for the benefit of Hen Harrier, a net gain of 31.8Ha of foraging habitat will accrue. If Castlewaller WF and Bunkimalta are excluded from consideration, on the assumption that they may not be constructed or the mitigating effects from their respective management plans are merely neutralising effects, then the cumulative effect is in the order of the Whole UWF Project only, which is still a gain in actively managed Hen Harrier habitat of 30.26Ha, with no permanent exclusion of Hen Harrier from lands within the SPA portions of the development. A significant negative effect rating is utilised for predicted reductions in forestry based foraging habitat in the next 10 years, with the effects of peat extraction on foraging habitat evaluated as neutral.</p>
	<p>Significance of the Cumulative Impact: Neutral</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The net gain in terms of lands managed specifically for the use of Hen Harrier, and; • Extent of lands to be managed in total, notwithstanding, • The medium-term duration of a negative trend in respect of reductions in forestry based foraging habitat
Topic	

8.6.4.2 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-52 below.

Table 8-52: Description and Rationale for Excluded Impacts to Hen Harrier

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Planting Stage/Construction Stage				
Land Take	1,2,3,4,5	Land cover	Reduction in Prey Item Species	Evaluated as Excluded: Neutral effects Neutral population level effects on prey item bird species are predicted, either from additive mortality or habitat loss. Neutral effect on the availability of small mammals as a result of habitat loss or additive mortality is expected. Therefore, no secondary effects via a reduction in the availability of prey items as a result of project elements are likely.
Land Take	1,2,3,4,5	Land cover	Reduction in or Loss of Suitable Nesting Habitat	Evaluated as Excluded: No nesting habitat (i.e. suitable bog, pre-thicket forestry) overlaps the construction works areas. All new permanent roads within the SPA will be concealed under a layer of rigid geocells, which will be planted with grass and heather species (Project Design).
Forestry Felling	1,2,3,4,5	Contact	Mortality of Hen Harrier in or at Nest Sites	Evaluated as Excluded as no works will take place within 500m of a nest March - August as part of Project Design.
Land Take	1,2,3,4,5	Land cover	Reduction in or Loss of Winter Roosts	Evaluated as Excluded: No winter roosts overlap works areas no land take is proposed as part of UWF Other Activities.
Land Take	1,2,3,4,5	Contact	Mortality of Winter Roosting Hen Harrier	Evaluated as Excluded as winter roosts are located outside the construction works areas. Measures to avoid disturbance to winter roosting harriers as part of Project Design will also prevent mortality.
Noise and human activity	1,2,3,4,5	Visibility	Disturbance/Displacement of Nesting or Roosting Hen Harrier	Evaluated as Excluded as no works will take place within 500m of an active breeding attempt as part of Project Design; Construction works within 1000m of a winter roost will be limited to the period between one hour after sunrise to one hour before sunset during the months of October to February inclusive, also as part of Project Design.
Growth Stage/Operational Stage				
Landuse Change, Telecom Relay Pole, new permanent access roads	1,2,3,4,5	Land cover, collision	Additive mortality/disturbance	Evaluated as Excluded: No potential for impacts. There will be no increase in accessibility. All new roads will have gates which will be locked on landholder boundaries. No potential for cumulative impacts with Upperchurch Windfarm.

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Source(s) of Impacts		Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Hen Harrier	Sensitive Aspect				<p>Upperchurch Windfarm: As per the 2014 ABP Inspectors Report no significant residual impact to Hen Harrier is expected to occur. There would be no potential for cumulative impacts with other project elements, as follows:</p> <p>UWF Grid Connection: no likely impact with the Mountphilips Substation, all other parts are either underground or at ground level (i.e. new roads).</p> <p>UWF Related Works: no likely impact with the Telecom Relay Pole, due to the immobility of this structure and no precedent in the literature for this structure as a collision risk (akin to telegraph pole).</p> <p>UWF Replacement Forestry: no potential for effects due to the absence of moving structures.</p>
		Noise and human activity	1,2,3,4,5	Air and Visibility	Disturbance/displacement
Decommissioning Stage					
Topic	Noise and human activity	5 (HA1-HA20)	Visibility	Disturbance /displacement	<p>Evaluated as Excluded: UWF Grid Connection – will not be decommissioned. Neutral effect.</p> <p>UWF Replacement Forestry – permanent, will not be felled. Neutral effect.</p>

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				<p>Upperchurch Windfarm and UWF Related Works-decommissioning works will take place from hardcore areas, small number of machines required and brief duration of use (2 to 3 days) at each turbine location.</p> <p>UWF Other Activities: Haul Route Activities: Neutral effect as works involve street furniture removal or activities on public roads with no significant source of noise or intrusion. No requirement for activities associated with the remaining UWF Other Activities.</p>

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8.6.5 Mitigation Measures for Impacts to Hen Harrier

Mitigation measures were incorporated into the design of the UWF Replacement Forestry including the Project Design Measures. **Very Significant Positive** effects are concluded by the topic authors as likely to occur to Hen Harrier as a consequence of the UWF Replacement Forestry, therefore as the effects are positive, no additional mitigation measures are required.

8.6.6 Evaluation of Residual Impacts to Hen Harrier

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for Hen Harrier above (Section 8.6.4) – i.e. **Very Significant Positive** effect.

8.6.7 Application of Best Practice and the EMP for Hen Harrier

The UWF Replacement Forestry will be planted and managed in accordance with the Project Design Measures and in accordance with the Department of Agriculture, Food & the Marine Guidance Documents – *Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards (2015)*, *Environmental Requirements for Afforestation (2016)* and *Management Guidelines for Ireland Native Woodlands (2017)*.

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8.6.8 Summary of Impacts to Hen Harrier

A summary of the Impact to Hen Harrier is presented in Table 8-53.

Table 8-53: Summary of the impacts to Hen Harrier

Impact to Hen Harrier:	Reduction in or Loss of Suitable Foraging Habitat
<i>Evaluation Impact Table</i>	<i>Section 8.6.4.1</i>
Project Life-Cycle Stage	Growth stage
<u>UWF Replacement Forestry</u>	Very Significant (POSITIVE)
Element 1: UWF Grid Connection	Moderate (negative)
Element 2: UWF Related Works	Slight (negative)
Element 4: Upperchurch Windfarm	Neutral residual effect
Element 5: UWF Other Activities	Very significant (positive)
<u>Cumulative Impact:</u>	
All Elements of the Whole UWF Project	Significant (positive)
All Elements of the Whole UWF Project <i>and</i> Other Projects or Activities Bunkimalta Windfarm Castlewaller Windfarm Forestry, Agriculture, Turf-Cutting	Neutral

The greyed out boxes in the summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Hen Harrier
Sensitive Aspect

Biodiversity
Topic

Hen Harrier
Sensitive Aspect

Biodiversity
Topic

8.7 Sensitive Aspect No.6: General Bird Species

This Section provides a description and evaluation of the Sensitive Aspect - General Bird Species.

8.7.1 BASELINE CHARACTERISTICS of General Bird Species

8.7.1.1 STUDY AREA for General Bird Species

The study area for General Bird Species in relation to the UWF Replacement Forestry is described in Table 8-54 and illustrated on [Figure RF 8.7: General Bird Species within the UWF Replacement Forestry Study Area](#) (Volume C3 EIA Figures).

Table 8-54: UWF Replacement Forestry Study Area for General Bird Species

Study Area for General Bird Species	Justification for the Study Area Extents
a 50m area around and incorporating the lands to be afforested	Professional judgement and as per Best Practice (CIEEM, 2016,NRA, 2008, Lusby et al.,2010,SNH 2014)

8.7.1.2 Baseline Context and Character of General Bird Species in the UWF Replacement Forestry Study Area

General Birds

Species recorded on site (during habitat surveys) included Wren, Robin, Meadow Pipit, House Martin, Blackbird, Stonechat, Hooded Crow, Chaffinch, Rook, Magpie and Woodpigeon. The importance and sensitivity of all of the above species are provided in [Section A8-1.2.4.8](#).

General Wintering Birds

Resident species recorded during current studies will also be present during the winter months.

Meadow Pipit

Meadow Pipits are present and were recorded during habitat surveys to inform the current evaluation. Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

Golden Plover

Golden Plover were not recorded from the locations of the UWF Replacement Forestry during any site visits and none were observed during studies to inform the adjacent Upperchurch Windfarm 2013 EIS. Wintering Golden Plover are evaluated as Nationally Important and assigned a sensitivity rating of High.

Red Grouse

Habitat for Red Grouse is not found within the locations of UWF Replacement Forestry.

Merlin

Merlin was not recorded from the locations of the UWF Replacement Forestry during any site visits and none were observed during studies to inform the adjacent Upperchurch Windfarm 2013 EIS. No breeding habitat is present. Merlin are evaluated as of Local Importance (low value) and assigned a sensitivity rating of Negligible

General Bird Species

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Curlew

Curlew was not recorded from the locations of the UWF Replacement Forestry during any site visits and none were observed during studies to inform the adjacent Upperchurch Windfarm EIS. No breeding habitat is present for this species.

Kingfisher

Kingfisher was not recorded during any site visits to inform the current evaluation. Kingfisher was not recorded during studies to inform the adjacent Upperchurch Windfarm EIS. The watercourse which is present within the landholding is not suitable for breeding Kingfisher.

8.7.1.3 Importance of General Bird Species

All wild bird species are protected by legislation under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000. Merlin, Hen Harrier and Golden Plover are listed on Annex I of the EU Birds Directive 2009/147/EC whilst Red Grouse is listed on Annex II. Curlew is now classified on the IUCN Red List as ‘near threatened’.

8.7.1.4 Sensitivity of General Bird Species

General breeding birds are sensitive to habitat loss and disturbance/displacement from noise and/or visual intrusion. Wintering birds are similarly sensitive. Bird species are sensitive to suitable landscaping/reinstatement from which positive effects may accrue.

Golden Plover are sensitive to changes in land cover or land use of suitable foraging or roosting habitat such as improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog, where land cover/use change may cause reductions in foraging success, increased exposure to predation through displacement to less viable feeding areas, and also reduction in survival rates of wintering birds. Wintering Golden Plover are also sensitive to disturbance or displacement effects due to noise, visual intrusion, and anthropogenic sources.

Meadow Pipit are also sensitive to changes in land cover or land use which results in a decrease of suitable nesting habitat (improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog), these changes can effect breeding numbers, foraging success, and increased exposure to predation through displacement to less viable feeding areas, and local population level declines.

Breeding waders such as Curlew are sensitive to habitat loss or fragmentation through afforestation, habitat loss from peat extraction, ground based predation, destruction from agricultural machinery and abiotic variables such as flooding.

8.7.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

In trend analyses on General Breeding Birds undertaken on 53 species within the most recent Countryside Bird Survey report (Crowe *et al.*, 2014) some 20 species showed increasing trends over the 16-year period since 1998, while 17 species remained relatively stable.

The most recently published Atlas (Balmer *et al.*, 2013) has shown that the species with the largest winter range are still the Hooded Crow, Wren, Robin and Blackbird. In Ireland the Atlas found that 74% of species had increased their winter range.

The abundance and diversity of the bird species within the baseline environment is evaluated as following the general trend of species populations throughout Ireland as described in published literature such as cited above. Given this, a scenario in which the subject development does not take place would result in a continuation of current trends relating to general bird species within the study area.

Biodiversity
Topic

8.7.1.6 Receiving Environment (the 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. Identified longer terms trends, such as declines in breeding Curlew is likely to overlap the operational phase, as are trends in respect of general breeding birds and wintering birds, identified in publications such as the 2013 Atlas.

General Bird Species
Sensitive Aspect

Biodiversity
Topic

General Bird Species
Sensitive Aspect

8.7.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.7.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to General Bird Species considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.7.2.2.1](#) below

The evaluation of cumulative impacts to General Bird Species also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects with either the UWF Replacement Forestry or with any of the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of these Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: Bunkimalta Windfarm has been scoped in for evaluation of cumulative effects to General Bird Species.

8.7.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Replacement Forestry Study Area along with the study areas for Other Elements and Other Projects or Activities.

The Cumulative Evaluation Study Area, comprises two different areas - one extent for cumulative evaluation of all of the Elements of the Whole UWF Project and a second extent for the cumulative evaluation of Other Projects or Activities, see Table 8-55.

Table 8-55: Cumulative Evaluation Study Area for General Bird Species

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	50m area around and incorporating the construction works areas, activity locations	Professional judgement and as per Best Practice (CIEEM, 2016,NRA, 2008, Lusby et al.,2010,SNH 2014)
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities: Bunkimalta Windfarm	1km from construction works areas and activity locations.	General birds, due to their naturally smaller home ranges are unlikely to be cumulatively affected outside this distance.

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8.7.2.2.1 Potential for Impacts to General Bird Species

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Project to cause cumulative effects to the Sensitive Aspect General Bird Species. The results of this evaluation are included in Table 8-56.

The location of, and study area boundary associated with, the Other Elements and Other Project which are included for cumulative evaluation is illustrated on [Figure CE 8.7: General Bird Species within the Cumulative Evaluation Study Area](#) (Volume C3 EIAR Figures).

Table 8-56: Results of the Evaluation of the Other Elements and Other Projects or Activities

<u>Other Element of the Whole UWF Project</u>	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects
Other Project or Activities:	
Bunkimalta Windfarm	<u>Yes, included</u> for the evaluation of cumulative effects

8.7.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.7.2.3.1 Element 1: UWF Grid Connection

The receiving environment in the UWF Grid Connection Study Area supports a wide variety of general bird species of open countryside and farmland, in addition to more specialist upland species. Some of these are afforded a higher conservation status due to their scarcity and for example, presence on Annex I of the Habitats Directive. Some species, such as Golden Plover are only present during the winter months within which they disperse widely over suitable habitat, whilst other sedentary species are present throughout the year and retain smaller more localised territories for foraging and breeding.

Detail is provided herein in respect of General Birds (both breeding and winter season) but also specific species evaluated as requiring further consideration. The requirement for further evaluation is based on a sensitivity rating as defined in Table 8-3, derived from survey results and the process of scoping. It infers a known sensitivity to effects from sources such as included within the current development, but is also reflective of the conservation status (locally/nationally/internationally) of the species within the study area overall.

Further detail on all species recorded is included in [Appendix 8-1: Detailed Biodiversity Information and Data](#), (Volume C4 EIAR Appendices), and illustrated on [Figure GC 8.7: General Bird Species within the UWF Grid Connection Study Area](#), maps of Golden Plover observations are also included in [Figure GC 8.7](#) which is part of the EIA Report for the UWF Grid Connection, and is included in [Volume E: Reference Documents](#) with this planning application.

General Breeding Birds

Breeding Bird surveys of the UWF Grid Connection represent a sample of habitats present within the receiving environment across 2 no. breeding seasons one each in 2016 and 2017.

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A species list comprising 58 species was compiled. Many of these species are typically representative of the land use present, and have strong associations with the type of activities present e.g. hill farming in respect of the quality of habitat present. The most abundant species are typical birds of open countryside and hedgerows such as Wren, Rook, Chaffinch, Robin, Barn Swallow, Meadow Pipit and Blackbird. Typical migrant species recorded included Swift, Cuckoo, Barn Swallow, House Martin, and Grasshopper Warbler. All of the above breed and forage in the receiving environment within suitable habitat. In general the receiving environment would be quiet with many species unlikely to undergo significant disturbance other than from day to day farming activities, and occasionally forestry operations.

One 'Red-Listed' species (Meadow Pipit *Anthus pratensis* a species which favours rough pastures and uplands but is currently declining), 14 Amber and 41 Green listed species were recorded. Observations of raptors from transect locations, included single sightings of Sparrowhawk (*Accipiter nisus*) across both years and an observation of Hen Harrier in 2016.

For complete detail of breeding birds across transects and seasons, in addition to conservation importance please see [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.7\)](#). Maps of transect locations are illustrated in [Figure GC 8.7](#).

General Wintering Birds

Wintering bird transects of the UWF Grid Connection undertaken in 2016/17 and again in 2017/18 recorded 34 species of birds within or in close proximity to the construction works area boundary. The species assemblage included 3 Red listed species (Golden Plover, Meadow Pipit and Grey Wagtail), 8 Amber listed (Kestrel, Common Snipe, Robin, Stonechat, and Mistle thrush, Goldcrest, Starling and House Sparrow) and 19 Green listed species. Rook, Robin and Chaffinch were the three commonest species. The importance and sensitivity of all of the above species are provided in [Section A8-1.2.4.8 \(Appendix 8.1\)](#).

Meadow Pipit

Meadow Pipit is a very widespread species in Ireland, found in bogs, uplands and areas of scrub and pasture, with an estimated population of 500,000 to 1, 000, 000 pairs. Birds are ground nesting and typically feed on invertebrates such as crane flies, mayflies and spiders.

Of the general breeding bird species recorded, populations of the red-listed Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

Baseline results suggest that wet heath habitat such as present at Baurnadomeeny along the UWF Grid Connection supports the highest densities.

This species is generally faithful sedentary in the summer but upland birds do move to lowland areas in the winter months.

Golden Plover

Golden Plover breed in heather moors, blanket bogs & acidic grasslands. Their breeding distribution is limited to the uplands of northwest counties in Ireland and they do not breed within the study area. Throughout the winter, Golden Plovers are regularly found in large, densely-packed flocks, and in a variety of habitats, both coastal and inland. Their distribution is widespread in Ireland.

In inland areas, small numbers of birds are often widespread in suitable wintering habitat within a local area but often coalesce to form larger aggregations. Preferred winter habitats are typically low growing crops (winter cereal), ploughed land and grassland where birds feed nocturnally on invertebrates such as earthworms and beetles. The Irish wintering population, comprising mainly birds from Iceland, is estimated at c.100, 000 individuals nationally. Golden Plover was recorded on 2 occasions from winter transects at Knockabansha and Baurnadomeeny. In each instance flock size was low (less than 7 individuals).

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Further, incidental sightings (n=12) of Golden Plover outside the UWF Grid Connection construction works boundary over the wintering period 2016/17 are also described. The average flock size recorded was 29 (range 2-200), with the peak observation of 200 birds in the townland of Fiddane, to the north of the route corridor at Castlewaller, on 14/3/2017. It is clear that birds may utilise suitable habitats in proximity to the route corridor in low numbers (excluding the observation of 200 birds the average flock size observed is 12 birds), with increased aggregations occasionally over higher ground as is characteristic of the species in winter.

Golden Plover, as an Annex I, Red Listed species are assigned a sensitivity rating of High.

Red Grouse

The Red Grouse is a sub-species of Willow Grouse. It is resident in the west and north of Britain and in Ireland. In Ireland, it is a widespread breeding bird but nowhere is it numerous. Found on mountains, moorland and lowland blanket bogs and raised bogs, where it is associated with heather, which it requires for food, shelter and nesting.

Four individual calling male Red Grouse (Red-listed) were present in March 2017 on Bleanbeg Bog, in proximity to the UWF Grid Connection. Locations of Red Grouse observations are included in [Figure GC 8.7](#). The presence of this species has been previously described at Bleanbeg (Bleanbeg Bog NHA Site Synopsis). This species is dependent on heather dominated habitats such as (upland and lowland) blanket bog and raised bog and is unlikely to occur outside of same.

Red Grouse are evaluated as of County Importance and assigned a sensitivity rating of medium.

Merlin

Merlin is the smallest species of falcon. It is a rare breeding bird in Ireland. It nests on the ground on moorland, mountain and blanket bog. Also nests in woodland, isolated trees, and has taken to nesting in forestry plantations adjacent to moorland. More Merlin's are found in the west of the country but they are scattered across the midlands and the Wicklow Mountains also hold good numbers.

Merlin (Amber-listed) surveys to Best Practice in 2017 at Bleanbeg bog, in proximity to the UWF Grid Connection found no evidence to support breeding despite the location being scoped in for breeding status evaluation. Further detail with regard to Merlin surveys is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.7\)](#). There were 2 records of single birds during the winter period 2016/17 from VP surveys of the UWF Grid Connection.

Wintering Merlin records are not indicative of breeding as during the winter month's resident Merlin leave breeding sites and move to low-lying areas, in addition numbers in Ireland are swollen by immigrants. Merlin in the density recorded are evaluated as of Local Importance (low value) and assigned a sensitivity rating of Negligible.

Curlew

Curlews can nest in a range of habitats in Ireland, from wet grasslands such as the River Shannon Callows to marginal hill land. They favour damp pastures grazed lightly by cattle, with a scattering of rush tussocks for nesting in and some wet areas to provide insects for their chicks to feed on. Huge changes in the uplands, such as the destruction of peat bogs, afforestation, more intensive management of farmland and the abandonment of some lands, leading to encroachment by scrub, gorse and dense rushes, have all affected Curlew breeding habitat.

Curlew was recorded at Bleanbeg bog, in proximity to the UWF Grid Connection, in May 2017. On 30/5/17, a male and female were recorded in activity indicating a breeding attempt. The observation location is outside the nearest point of the construction works boundary at a distance of approximately 400m, but

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conservatively within the threshold established in the literature for disturbance related effects (800m) during the breeding season - albeit with regard to higher magnitude source stimuli established for wind farm construction.

Breeding Curlew is evaluated as of National Importance and assigned a sensitivity rating of High.

Kingfisher

Kingfishers breed in tunnels dug in vertical banks along streams and rivers. They are a very sedentary species, and rarely move from their territories. However, some may move to lakes and coasts during extended spells of poor weather. They are widespread in Ireland and found on streams, rivers and canals.

With regard to the UWF Grid Connection watercourses a distance band of 300m upstream and downstream of all watercourse crossing locations including the Newport (Mulkear), Clare and Bilboa Rivers were checked for Kingfisher nest holes. No nest holes or evidence of nesting were identified in the study area. No individuals were observed.

Kingfishers are Amber listed in Ireland. A sensitivity rating of low is applied.

8.7.2.3.2 Element 2: UWF Related Works

All the species recorded the UWF Related Works EIA Report 2017 surveys are typical of the habitats present.

General Breeding Birds

Given the overlap between Upperchurch Windfarm and UWF Related Works locations we refer to the species described within the EIS for Upperchurch Windfarm. As per the EIS 2013, surveys of breeding birds to inform the baseline evaluation of Upperchurch Windfarm recorded 37 species in total across 'summer transects' and vantage point surveys. All the species recorded are typical of the habitats present. Species recorded include Skylark, Kestrel, Peregrine Falcon, Stonechat and Crossbill. Additional species recorded on Upperchurch Windfarm, were Raven, Peregrine Falcon (Annex I), Sand Martin, Crossbill and Reed Bunting. Of these it is considered that Peregrine and Sand Martin do not nest within the study area as there is no suitable nesting habitat present. Many of the remaining species are typically representative of the land use present, and have strong associations with the type of activities present e.g. hill farming in respect of the quality of habitat present.

All of the above breed and forage in the receiving environment within suitable habitat. In general the receiving environment would be quiet with many species unlikely to undergo significant disturbance other than from day to day farming activities, and occasionally forestry operations.

General Wintering Birds

Studies for the 2013 EIS on Upperchurch Windfarm (which overlaps the locations of UWF Related Works) recorded a typical assemblage of wintering species (n=24). Of these one Red listed (Meadow pipit), 7 Amber (Skylark, Robin, Hen Harrier, Kestrel, Starling, Mistle thrush, Goldcrest and Linnet) and 15 Green listed species were present. In the interest of clarity, we note that the BOCCI status presented herein is the more current Cummins and Colhoun (2013) evaluation, published subsequent to Upperchurch Windfarm EIS.

Meadow Pipit

This is a very widespread species in Ireland, found in bogs, uplands and areas of scrub and pasture, with an estimated population of 500,000 to 1, 000, 000 pairs. Birds are ground nesting and typically feed on invertebrates such as crane flies, mayflies and spiders. This species is generally faithful sedentary in the summer but upland birds do move to lowland areas in the winter months. Meadow Pipit is present within the study area for UWF Related Works in suitable habitat (rough grassland and bog and mosaics of same).

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Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

Golden Plover

Golden Plover were not recorded from the locations of the UWF Related Works, during any site visits and none were observed during studies to inform Upperchurch Windfarm 2013 EIS. Wintering Golden Plover are evaluated as Nationally Important and assigned a sensitivity rating of High.

Red Grouse

Optimal habitat for Red Grouse is not found within the locations of the UWF Related Works. No Red Grouse were recorded in studies to inform Upperchurch Windfarm. Although Upland Blanket Bog is present within the 50m habitat survey buffer it is sub-optimal for the species, and no evidence was recorded during e.g. habitat walkovers. Red Grouse are evaluated as of County Importance and assigned a sensitivity rating of medium.

Merlin

Merlin was not observed during studies to inform Upperchurch Windfarm 2013 EIS. None were recorded during site visits to inform the current evaluation. Merlin in the density recorded are evaluated as of Local Importance (low value) and assigned a sensitivity rating of Negligible.

Curlew

Curlew was not recorded from the locations of the UWF Related Works during any site visits and none were observed during studies to inform the (overlapping) Upperchurch Windfarm EIS. Breeding Curlew is evaluated as of National Importance and assigned a sensitivity rating of High.

Kingfisher

Kingfisher was not recorded during studies to inform Upperchurch Windfarm EIS. None were recorded in surveys to inform the current appraisal, including watercourse evaluations. Kingfishers are Amber listed in Ireland. A sensitivity rating of low is applied.

8.7.2.3.3 Element 4: Upperchurch Windfarm

All the species recorded during 2012 surveys for the Upperchurch Windfarm EIS are typical of the habitats present.

General Breeding Birds

As per the EIS 2013, surveys of breeding birds to inform the baseline evaluation of Upperchurch Windfarm recorded 37 species in total across ‘summer transects’ and vantage point surveys . All the species recorded are typical of the habitats present. Species recorded include Skylark, Kestrel, Peregrine Falcon, Stonechat and Crossbill. Additional species recorded on Upperchurch Windfarm, to that recorded at UWF Grid Connection locations, were Raven, Peregrine Falcon (Annex I), Sand Martin, Crossbill and Reed Bunting. Of these is it considered that Peregrine and Sand Martin do not nest on site as there is no suitable nesting habitat present at Upperchurch Windfarm.

General Wintering Birds

Studies on Upperchurch Windfarm (2013) recorded a typical assemblage of wintering species (n=24). Of these one Red listed (Meadow pipit), 7 Amber (Skylark, Robin, Hen Harrier, Kestrel, Starling, Mistle thrush, Goldcrest and Linnet) and 15 Green listed species were present. In the interest of clarity we note that the

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BOCCI status presented herein is the more current Cummins and Colhoun (2013) evaluation, published subsequent to the Upperchurch Windfarm EIS.

Meadow Pipit

Meadow Pipit is present in suitable habitat. Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

Golden Plover

Golden Plover were not observed during studies on Upperchurch Windfarm. Wintering Golden Plover are evaluated as Nationally Important and assigned a sensitivity rating of High.

Red Grouse

No Red Grouse were recorded in studies on Upperchurch Windfarm.

Merlin

Merlin was not observed during studies on Upperchurch Windfarm.

Curlew

No Curlew was observed during studies to inform the Upperchurch Windfarm EIS.

Kingfisher

Kingfisher was not recorded during studies to inform the Upperchurch Windfarm EIS.

8.7.2.3.4 Element 5: UWF Other Activities

Haul Route Activity Locations

General bird species of Hedgerows are present. Resident Bird species described in respect of breeding are likely to be present during the winter months also. Meadow Pipit may be present in suitable fields adjacent to activity locations however habitats such as roadside verges do not comprise breeding habitat. Meadow Pipit present have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation. Golden Plover were not recorded from the locations of the Activity locations during any site visits. The locations do not comprise suitable habitat for this species. Habitat for Red Grouse is not found at the locations of UWF Other Activities. Merlin may occasionally perch in roadside trees during the winter months, however the locations of activities do not comprise breeding or foraging habitat for this species.

Overhead Line Activity Locations

Bird species present during a site walkover (January 2018) to inform the current evaluation are described in **Appendix 8-1 Section A8-1.2.4.7**. Twenty three species were recorded, including 6 Amber listed species (Goldcrest, Stonechat, Starling, Common Snipe, Robin and House Sparrow).

8.7.2.3.5 Other Projects or Activities

Bunkimalta Windfarm: Thirty three species were recorded from breeding bird surveys of the Bunkimalta Windfarm site in 2009. Peregrine, a further Annex I species, has a traditional territory on Keeper Hill and occasional flight paths over the Bunkimalta site were recorded. Red grouse, a Red Data Book species, occurs above the western boundary of the Bunkimalta site on Keeper Hill and on the bog at Knockane.

Some of the other bird species which occur within the study area and in the areas that adjoin the development, such as kestrel, skylark and grasshopper warbler, are Amber listed species (i.e. of Medium conservation concern).

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8.7.3 PROJECT DESIGN MEASURES for General Bird Species

There are no UWF Replacement Forestry Project Design Measures specific to General Bird Species.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Related Works and UWF Other Activities and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4: EIA Appendices](#).

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8.7.4 EVALUATION OF IMPACTS to General Bird Species

In this Section, the likely direct and indirect effects of the UWF Grid Connection are identified and evaluated. Then the likely cumulative effects of the UWF Grid Connection together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - General Bird Species.

As a result of the exercise, some impacts were included and some were excluded.

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Table 8-57: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Golden Plover: Habitat Loss (construction stage)	Habitat Loss – Merlin, Red Grouse, Eurasian Curlew, (construction stage)
Golden Plover: Disturbance/Displacement (construction stage)	Disturbance / Displacement: General Birds, Kingfisher, Red Grouse, Merlin, Meadow Pipit, Eurasian Curlew, (construction stage)
Meadow Pipit: Habitat Loss (construction stage)	Physical injury or destruction of nests/chicks, (construction stage)
General Birds: Habitat Enhancement (construction stage)	Disturbance / Displacement, (operational stage)
	Disturbance / Displacement, (decommissioning stage)

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.7.4.1 to 8.7.4.4.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.7.4.5.

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8.7.4.1 Impact Evaluation Table: Golden Plover - Habitat Loss

Impact Description	
Project Life Cycle Stage:	Planting/Growth Stages
<p><u>Impact Source:</u> afforestation</p> <p><u>Cumulative Impact Source:</u> Construction Works; Excavation; Movement of Soils and Machinery</p> <p><u>Impact Pathway:</u> Land Take</p> <p><u>Impact Description:</u> As an Annex I species Golden Plover is a High Sensitivity receptor. Land use change of suitable foraging or roosting habitat such as improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog, may cause reductions in foraging success, increased exposure to predation through displacement to less viable feeding areas, and also reduction in survival rates of wintering birds. No breeding Golden Plover will be affected as all works are outside the Irish breeding range. In addition numbers of birds recorded and therefore potentially affected are low within the context of the Irish wintering population.</p> <p>In relation to UWF Grid Connection and UWF Related Works, temporary land use change for works such as cable trenching will be reinstated immediately following construction and therefore effects will be Neutral.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation of the Subject Development Impact – Golden Plover: Habitat Loss	
Element 3: UWF Replacement Forestry	
<p><u>Impact Magnitude:</u> Permanent land use change of 3.98Ha of suitable foraging or roosting grassland habitat to deciduous woodland will occur. This represents 37% of the available habitats within the UWF Replacement Forestry study area (10.7Ha).</p>	
<p>Significance of the Impact: Slight</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of suitable habitat to be affected (3.98Ha or 37% of that available within the study area); • The permanent duration, and; • Low reversibility with land use change likely. 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<p><u>Impact Magnitude:</u> Permanent land use change will comprise 2.77Ha of suitable foraging or roosting habitat, in the form of grassland or grassland mosaic. The scale of habitat loss represents 1.4% of available, suitable Golden Plover habitat (198Ha comprising grassland/grassland mosaics/upland blanket bog and cutaway bog) within the study area boundary.</p>	
<p><u>Significance of the Impact:</u> Slight</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The high sensitivity rating of the species, based on conservation status, and; • The extent of habitat loss (1.4% of available suitable habitat) is low (i.e. within 1-5% of available habitat) and represents a minor shift away from baseline conditions; • The permanent duration, and; • Low reversibility 	
Element 2: UWF Related Works	

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General Bird Species	Impact Magnitude: Permanent land use change will comprise 0.2Ha of suitable foraging or roosting habitat for wintering Golden Plover as improved agricultural grassland (0.12ha) and wet grassland (0.07ha). The scale of habitat loss represents 0.16% of available suitable Golden Plover habitat (120Ha – comprising improved agricultural grassland, grassland mosaics, upland blanket bog and cutaway bog) within the study area boundary.
	Significance of the Impact: Not Significant
	Rationale for Impact Evaluation: <ul style="list-style-type: none"> • The extent of habitat loss (0.2Ha), is negligible(i.e. <1% of available habitat) and represents a very slight change from baseline conditions; • The availability of suitable foraging and roosting habitat (at minimum 119.8Ha) in the greater area, notwithstanding; • The long term duration, and; • Low reversibility with permanent land use change likely.
	Element 4: Upperchurch Windfarm
	Impact Magnitude: None
	Significance of the Impact: Neutral impact
	Rationale for Impact Evaluation: <ul style="list-style-type: none"> • No Golden Plover were recorded during winter bird studies of the Upperchurch Windfarm.
	Element 5: UWF Other Activities
	Impact Magnitude: Negligible
	Significance of the Impact: Neutral impact
Rationale for Impact Evaluation: <ul style="list-style-type: none"> • No suitable habitat is present for roosting or foraging Golden Plover, and • Golden Plover are not known to utilize roadside verges/roundabouts for foraging or roosting, and; • Golden Plover were not recorded within the locations for the Upperchurch Hen Harrier Scheme, in studies for the Upperchurch Windfarm; • Monitoring does not include land take or land use changes. 	
Cumulative Information: Individual Evaluations of Other Projects or Activities	
Other Project: Consented Bunkimalta Windfarm	
Impact Magnitude: None	
Significance of the Impact: Neutral effect	
Rationale for Impact Evaluation: <ul style="list-style-type: none"> • No Golden Plover Recorded in Baseline Studies to inform EIS. 	
Evaluation of Cumulative Impacts – Golden Plover: Habitat Loss	
All Elements of the Whole UWF Project	
Cumulative Impact Magnitude: Instances of landuse use change in respect of suitable foraging or roosting habitat will occur from works associated with the UWF Grid Connection (2.77Ha), UWF Related Works (0.2Ha), and UWF Replacement Forestry (3.99Ha).	
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Significance of the Cumulative Impact: Slight	
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The high sensitivity rating of the species, counterbalanced with; • The low numbers of birds recorded, within the context of the Irish wintering population (c.100, 000). • The extent of habitat loss overall, and; • The permanent duration, and; • Low reversibility 	
All Elements of the Whole UWF Project with Other Projects or Activities	
<u>Cumulative Impact Magnitude:</u> None	
Significance of the Cumulative Impact: No Cumulative Impact	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Neutral effects caused by Bunkimalta Windfarm. 	

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Sensitive Aspect

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8.7.4.2 Impact Evaluation Table: Golden Plover - Disturbance/Displacement

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Impact Description	
Project Life Cycle Stage:	Planting stage
<u>Impact Source:</u> during planting Noise and Visual and Intrusion	
<u>Cumulative Impact Source:</u> During Construction Noise and Visual and Intrusion	
<u>Impact Pathway:</u> Air	
<u>Impact Description:</u> As an Annex I species Golden Plover is a High Sensitivity receptor. Disturbance to/displacement of wintering Golden Plover due to noise, visual intrusion, anthropogenic sources may occur during the period October to March when the highest proportion of birds are present within the receiving environment.	
As works will only be conducted during daylight hours as part of Project Design, disturbance to birds foraging at night (when most foraging takes place) is avoided. Displacement during daylight hours, if of sufficient duration and from high value foraging areas may result in effective habitat loss with consequent effects on feeding success, winter survival and breeding capacity; dependant on numbers of birds affected and availability of alternative habitat. No breeding Golden Plover will be directly affected as all works are outside the Irish breeding range.	
Sources of disturbance are likely; however the degree of avoidance/response may also vary from individual to individual and as flock size varies may be limited in spatial extent. The duration of disturbance events are assumed to be brief given the linear nature of most of the works – however as birds may range over wide areas there is the potential for sequential effects i.e. from multiple concurrent sources. In this instance birds displaced from one location may experience a second disturbance stimulus from e.g. another work crew on another Element work location.	
<u>Impact Quality:</u> Negative	

Evaluation of the Subject Development Impact –Golden Plover: Disturbance/Displacement

Element 3: UWF Replacement Forestry
<u>Impact Magnitude:</u> None
Significance of the Impact: Neutral effect
<u>Rationale for Impact Evaluation:</u>
<ul style="list-style-type: none"> All planting will be done by hand and will not contrast to baseline agricultural activities.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection
<u>Impact Magnitude:</u>
Populations of wintering Golden Plover may experience disturbance related events, if feeding/roosting during daylight hours within locations comprising grassland, grassland mosaics or bog habitats. Sequential effects may occur along the UWF Grid Connection should multiple sources of disturbance occur simultaneously in grassland, grassland mosaics or bog habitats.
<u>Significance of the Impact:</u> Not Significant
<u>Rationale for Impact Evaluation:</u>
<ul style="list-style-type: none"> The low numbers of birds recorded (avg. flock size 12 birds, excluding the one instance of a flock of 200 recorded in 2017), within the context of the Irish wintering population (c.100, 000), and;

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<ul style="list-style-type: none"> • Activities such as cable trenching will not contrast significantly from baseline activities such as farming related works, and; • The duration of individual disturbance events will be brief, and; • Reversible once works finish, with birds expected to return, and; • Any response is not expected to be permanent, based on studies of the species with regard to the construction of wind farms (Pearce-Higgins et al., study, published in 2012) and therefore unlikely to alter long term wintering trends; 	General Bird Species
<p>Element 2: UWF Related Works</p>	
<p><u>Impact Magnitude:</u> 120ha of suitable habitat for wintering Golden Plover occurs within the study area for UWF Related Works. However no birds have been recorded utilising these locations in studies described herein. The magnitude of any disturbance is therefore negligible.</p>	Sensitive Aspect
<p><u>Significance of the Impact:</u> Not Significant</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No birds were recorded in baseline studies for the Upperchurch Windfarm, which overlaps the works locations for UWF Related Works, therefore; • The probability of disturbance is significantly reduced (to an evaluation as low), notwithstanding suitable habitat is present. 	
<p>Element 4: Upperchurch Windfarm</p>	
<p><u>Impact Magnitude:</u> None</p>	Sensitive Aspect
<p><u>Significance of the Impact:</u> Neutral effect</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No Golden Plover were recorded in studies to inform the EIS for the <u>Upperchurch Windfarm</u> 	
<p>Element 5: UWF Other Activities</p>	
<p><u>Impact Magnitude:</u> None</p>	
<p><u>Impact Evaluation:</u> Neutral effect</p>	Biodiversity
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The Haul Route Activity locations do not include suitable habitat to attract Golden Plover, and; • Activities will not contrast from baseline activities already present, such as farming related works and road maintenance. • Overhead Line Activities will be similar to existing maintenance which is undertaken; will occur during daylight hours and will not result in any contrast from the existing environment. 	
<p>Cumulative Information: Individual Evaluations of Other Projects or Activities</p>	
<p>Other Project: Consented Bunkimalta Windfarm</p>	
<p><u>Impact Magnitude:</u> None</p>	
<p><u>Significance of the Impact:</u> Neutral effect</p>	Topic
<p><u>Rationale for Impact Evaluation:</u> No Golden Plover Recorded in Baseline Studies to inform EIS.</p>	

General Bird Species	Evaluation of Cumulative Impacts – Golden Plover: Disturbance/Displacement
	All Elements of the Whole UWF Project
Sensitive Aspect	<p><u>Cumulative Impact Magnitude:</u> There is no potential for likely cumulative whole project effects, as Golden Plover were only recorded within the UWF Grid Connection Study Area. Therefore the whole project effect is in the order of the UWF Grid Connection, evaluated above.</p>
	<p>Significance of the Cumulative Impact: Not Significant</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The low numbers of birds recorded , within the context of the Irish wintering population (c.100, 000), and; • Activities such as cable trenching will not contrast significantly from baseline activities such as farming related works, even if multiple instances occur simultaneously, and; • The duration of individual disturbance events (including sequential) will be brief, limited to daylight hours and; • Reversible once works finish, with birds expected to return, and; • Any response is not expected to be permanent, based on studies of the species with regard to the construction of wind farms (Pearce-Higgins et al., study, published in 2012) and therefore unlikely to alter long term wintering trends;
	All Elements of the Whole UWF Project with Other Projects or Activities
	<u>Cumulative Impact Magnitude:</u> None
	Significance of the Cumulative Impact: No Cumulative Impact
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Neutral effects caused by Bunkimalta Windfarm.

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8.7.4.3 Impact Evaluation Table: Meadow Pipit – Habitat Loss

Impact Description	
Project Life Cycle Stage:	Planting/Growth Stages
<p><u>Impact Source:</u> Afforestation</p> <p><u>Cumulative Impact Source:</u> Construction Works; Excavation; Movement of Soils and Machinery</p> <p><u>Impact Pathway:</u> Land Cover</p> <p><u>Impact Description:</u> As a red listed species Meadow Pipit is assigned a medium sensitivity rating. Land use change of suitable nesting habitat (improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog), where planting and construction works areas overlap may cause reductions in breeding numbers, foraging success, increased exposure to predation through displacement to less viable feeding areas, and local population level declines. Temporary land use change for works such as cable trenching will be reinstated immediately following construction and therefore effects will be Neutral.</p> <p>Any impact is negated by the provision of concealed geocell roadways, planted with grass or heather, for all permanent roads within the SPA. Felled commercial forestry at Castlewaller (total area 1 ha) will be replaced by a concealed geocell roadway, which, along with the remainder of the corridor at that location, will be planted with heather (Irish or Scottish) – which will in turn benefit Meadow Pipit through the provision of nesting and foraging habitat.</p> <p>Meadow Pipit will also benefit from enhancement measures for Hen Harrier as part of the Upperchurch Hen Harrier scheme (UWF Other Activities), wherein the management prescription has been specifically designed to benefit species such as Meadow Pipit, which are an important prey item for Hen Harrier.</p> <p><u>Impact Quality:</u> Negative and positive</p>	
Evaluation of the Subject Development Impact – Meadow Pipit: Habitat Loss	
Element 3: UWF Replacement Forestry	
<p><u>Impact Magnitude:</u> Construction Works will include permanent land use change of 3.98Ha of suitable breeding habitat (improved agricultural grassland (3.54ha) and wet grassland (0.44ha)) for Meadow Pipit. The scale of habitat loss represents 37% of available habitats (10.68Ha) within the UWF Replacement Forestry study area but is offset by the retention of suitable Meadow Pipit habitat within woodland rides to be established for foraging Hen Harrier.</p>	
Significance of the Impact: Slight	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The majority of land use change is from improved agricultural grassland, which is sub-optimal for Meadow Pipit, and; • Offset by the retention of rides (i.e. Meadow Pipit habitat) within the deciduous woodland to be planted, notwithstanding; • The extent of habitat subject to change, evaluated as high (20-80% of habitat lost), which; • Comprises a major alteration to the baseline conditions; • The permanent duration, and; • Low reversibility with land use change likely 	

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General Bird Species	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
	Element 1: UWF Grid Connection	
	<p><u>Impact Magnitude:</u> Construction works will result in land use change of 2.77Ha of suitable breeding habitat for Meadow Pipit in the form of grassland and grassland mosaic. The total land use change comprises 1.38% of available habitat within the Study area boundary (201Ha – comprising improved agricultural grassland, wet grassland, grassland mosaics, and heath).</p>	
	<p><u>Significance of the Impact:</u> Slight</p>	
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The extent of suitable habitat to be affected (2.77Ha), evaluated as low (i.e. 1-5% of available habitat), which ; • Comprises a minor shift away from baseline conditions, notwithstanding; • The permanent duration , and; • Low reversibility. 	
	Element 2: UWF Related Works	
	<p><u>Impact Magnitude:</u> Construction Works will include land take of 0.2Ha of suitable breeding habitat for Meadow Pipit in the form of grassland and grassland mosaic. The scale of habitat loss is 0.15% of available habitat within the Study area boundary (123Ha – where suitable habitats for Meadow Pipit include grassland, grassland mosaics, dry heath, upland blanket bog and cutaway bog).</p>	
	<p><u>Significance of the Impact:</u> Not Significant</p>	
Biodiversity	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The extent of suitable habitat to be affected (0.2Ha), evaluated as negligible (<1% of available habitat lost), which ; • Comprises a minor shift away from baseline conditions, notwithstanding; • The long-term duration (15-60 years), and; • Low reversibility with permanent land use change likely 	
	Element 4: Upperchurch Windfarm	
	<p><u>Impact Magnitude:</u> Construction Works will include land use change of 7.81Ha of suitable breeding habitat for Meadow Pipit in the form of grassland, grassland mosaic, and bog habitat. The scale of land use change is 2.39% of available habitat within the Study area boundary (128Ha).</p>	
	<p><u>Significance of the Impact:</u> Slight</p>	
Topic	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The extent of habitat to be lost, is low (i.e. 1-5% of available habitat),which; • Comprises a minor shift away from baseline conditions, notwithstanding; • The long-term duration (15-60 years), and; • Low reversibility with permanent land use change likely 	

Element 5: UWF Other Activities	
<u>Impact Magnitude:</u>	The sensitive management of 128Ha of lands for Hen Harrier as part of the Upperchurch Hen Harrier Scheme will also increase the suitable habitat present for Meadow Pipit. No habitat loss of suitable breeding habitat is associated with other locations such as Haul Route Activities and Overhead Line Activities.
<u>Significance of the Impact:</u>	Moderate (positive)
<u>Rationale for Impact Evaluation:</u>	<ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The extent of lands to be sympathetically managed, evaluated as high (i.e. 20-80% of the 128Ha included in the Upperchurch Hen Harrier Scheme of habitat present), which; • Comprises a major alteration to baseline features, and • The long term duration, over the lifetime of the project, and; • Low reversibility.
Cumulative Information: Individual Evaluations of Other Projects or Activities	
Other Project: Consented Bunkimalta Windfarm	
<u>Impact Magnitude:</u>	During the construction period, the clearance of habitats will affect a range of passerine species that nest and feed within the forests. The significance of this impact can be minimised by clearance taking place outside of the main nesting season. All species which currently occur on site are expected to retain a presence within the site after the construction period (as similar habitats will still occur). Further, there may be beneficial effects for some species as recent research by Pearce-Higgins <i>et al.</i> , (2012) suggests potential positive effects of wind farm construction on skylarks, meadow pipits and stonechats. Such effects may result from vegetation disturbance during construction creating greater openness in the sward structure, known to benefit these species. It is noted that the Species and Habitat Management Plan will also be of value for a range of small birds for both nesting and foraging purposes ¹⁴ .
<u>Significance of the Impact:</u>	No significant effects
<u>Rationale for Impact Evaluation:</u>	Inspectors report ¹⁵ : "I conclude that the development would not give rise to significant residual ecological impacts."
Evaluation of Cumulative Impacts – Meadow Pipit: Habitat Loss	
All Elements of the Whole UWF Project	
<u>Cumulative Impact Magnitude:</u>	Instances of land use change in respect of suitable breeding habitat will occur from works associated with the UWF Grid Connection (2.77Ha), UWF Related Works (0.2Ha), UWF Replacement Forestry (3.99Ha) and the Upperchurch Windfarm (7.81Ha). Land Use change within the UWF Grid Connection (where it overlaps the SPA) is offset by the instatement of concealed access roads, and outside the SPA - the Upperchurch Hen Harrier Scheme (UWF Other Activities) measures will also enhance Meadow Pipit habitat.
Significance of the Cumulative Impact: Slight	
<u>Rationale for Cumulative Impact Evaluation:</u>	<ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and;

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¹⁴ ESB Wind Development Ltd. and Coillte (2013) Bunkimalta Wind Energy Project Environmental Impact Statement

¹⁵ An Bord Pleanala (2013) Inspectors Report for Bunkimalta Wind Energy Project PL.22.241924.

General Bird Species	<ul style="list-style-type: none"> • The extent of land use change overall (14.77Ha), evaluated as low (1-5% of habitat lost) represents 2.24% of total suitable habitat present within the study areas (660Ha), comprising; • A minor shift away from baseline conditions, which; • Is ameliorated by the management of lands (128ha) as part of the Upperchurch Hen Harrier Scheme, over; • A long-term duration (15-60 years), and with; • Low reversibility with land use change permanent/ management already consented
Sensitive Aspect	<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
	<p><u>Cumulative Impact Magnitude:</u> Instances of land use change in respect of suitable breeding habitat will occur from works associated with both the Upperchurch Whole UWF Project and Bunkimalta Windfarm. As effects from the Upperchurch Whole UWF Project are only expected to be slight; and ameliorated by enhancement measures and management proposed in respect of Hen Harrier; it is consequently considered that the likelihood of synergistic effects on Meadow Pipit is low and consequently the resultant magnitude of cumulative effects is low. Sequential effects are unlikely to occur given the small home range of breeding Meadow Pipit; and widespread availability of alternative habitat surrounding both developments.</p>
	<p>Significance of the Cumulative Impact: Slight</p>
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The medium sensitivity of the species, based on conservation status, and; • The extent of land use change overall comprises; • A minor shift away from baseline conditions, which; • Is offset by the management of lands as part of the Upperchurch Hen Harrier Scheme and Bunkimalta Habitat and Species Management Plan, over; • A long-term duration (15-60 years), and with; • Low reversibility with land use change permanent/ management already consented.

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8.7.4.4 Impact Evaluation Table: General Birds - Habitat Enhancement

Impact Description	
Project Life Cycle Stage:	Growth Stage
<p><u>Impact Source:</u> Planting of Deciduous Trees</p> <p><u>Cumulative Impact Source:</u> Reinstatement, Replanting, enhancement planting, maintenance of rush swards,</p> <p><u>Impact Pathway:</u> Land use Change</p> <p><u>Impact Description:</u> The planting of equivalent deciduous forestry for lower ecological value conifer plantation, as UWF Replacement Forestry, in addition to the incorporation into UWF Grid Connection Project design of the planting of concealed access roads within the SPA with heather/grasses mix on geocell, the planting of the clear fell area in Castlewaller with native Irish or Scottish heather species, plus the use of locally sourced native hedgerow and tree species in all landscaping and reinstatement will constitute a land use change to higher value habitat for general birds. In addition the management measures as part of the Upperchurch Hen Harrier Scheme such as the maintenance of rush swards, enhancement and planting of hedgerows and riparian habitat, and promotion of semi-natural habitat will increase habitat quality for ground nesting birds such as Meadow Pipit and Skylark, and general birds of open countryside – this will have secondary positive effects not only on Hen Harrier but additionally other raptor species which may be present such as Kestrel. It is likely that the above will result in a net gain to overall bird diversity - with the duration being permanent in the case of the UWF Grid Connection and UWF Replacement Forestry, and long term in the case of the UWF Related Works, Upperchurch Hen Harrier Scheme and Upperchurch Windfarm.</p> <p><u>Impact Quality:</u> Positive</p>	
Evaluation of the Subject Development Impact – General Birds: Habitat Enhancement	
Element 3: UWF Replacement Forestry	
<p><u>Impact Magnitude:</u> In total, 6Ha of mixed species, native woodland will be created, which will comprise tall trees and understory shrubs, along with wide ride lines, and a mix of tall grasses and scrub land cover maintained during the growth stage. The existing riparian habitat will be enhanced through the planting of Hazel, alder and willow species, and protected through the placement of fencing.</p>	
<p>Significance of the Impact: Slight (positive)</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The benefit to bird diversity, and; • The contrast with emerging trends in respect of land management, and; • The permanent duration, and; • The low reversibility with proposed enhancement already incorporated into project design. 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<p><u>Impact Magnitude:</u> Felled commercial forestry at Castlewaller (1 Ha) will contain a concealed geogrid roadway, which, along with the remainder of the corridor at that location, will be planted with heather (Irish or Scottish). Hedgerow crossing locations will be enhanced with equivalent numbers of native trees as part of Project Design. At Mountphilips, 700m of new hedgerow will be planted alongside the new access road between Site Entrance No. 1 and the new Mountphilips Substation.</p>	
<p><u>Significance of the Impact:</u> Slight (positive)</p>	

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Rationale for Impact Evaluation:

- The benefit to bird diversity, in particular within the SPA (a very high sensitivity receptor), and;
- The contrast with emerging trends in respect of land management and existing land cover, and;
- The permanent duration, and;
- The low reversibility with proposed enhancement already incorporated into project design

Element 2: UWF Related Works

Impact Magnitude:

Equivalent lengths of native hedgerow and native trees will be replanted in lieu of hedgerow removal. In addition, c.370m of new hedgerow will be planted alongside the Realigned Windfarm Road RWR2.

Significance of the Impact: Imperceptible (positive)

Rationale for Impact Evaluation:

- The benefit to bird diversity, and;
- Long term duration, and;
- The low reversibility with proposed enhancement already incorporated into project design.

Element 4: Upperchurch Windfarm

Impact Magnitude:

The planting of 360m of new hedgerow using native species, and the enhancement of existing hedgerows with native species will constitute a land use change to a higher value habitat for general birds.

Significance of the Impact: Imperceptible (positive)

Rationale for Impact Evaluation:

- The benefit to bird diversity, and;
- The low reversibility with proposed enhancement already incorporated into project design.

Element 5: UWF Other Activities

Impact Magnitude:

The Upperchurch Hen Harrier scheme will result in 2.2Ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow being enhanced or created during initial activities. In total 128Ha of agricultural lands will be managed.

The measures to be incorporated such as planting of scrub along riparian corridors, management of rush coverage, reductions in stocking levels, limiting of drainage, fertilizing, burning or hedgerow removal will constitute a land use change to a higher value habitat for general birds.

Significance of the Impact: Significant (positive)

Rationale for Impact Evaluation:

- The benefit to bird diversity, and;
- The contrast with emerging trends in respect of land management, and;
- The duration proposed for management, and;
- The low reversibility with proposed enhancement already consented

Cumulative Information: Individual Evaluations of Other Projects or Activities

Other Project: Consented Bunkimalta Windfarm

Impact Magnitude:

A species and Habitat management plan is planned. This comprises both restoration of bog and heath habitats (41.2 ha) and sensitive management of second rotation forests (137.3 ha). Restoration is expected to increase

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the area of open peatland. There is a high probability that these measures will result in positive Biodiversity effects on general birds.

Significance of the Impact: Slight positive

Rationale for Impact Evaluation:

- It is considered that positive ecological impacts will be derived by the restoration of areas of bog/heath and sensitive management of selected woodland plots¹⁶.

Evaluation of Cumulative Impacts – General Birds: Habitat Enhancement

All Elements of the Whole UWF Project

Cumulative Impact Magnitude:

Instances of enhancement, and management of habitat specifically for the benefit of birds will occur as part of the UWF Grid Connection, UWF Related Works, UWF Replacement Forestry (by design), and Upperchurch Windfarm. Cumulative positive effects may accrue due to the proximity of the UWF Replacement Forestry to the Upperchurch Hen Harrier Scheme.

Significance of the Cumulative Impact: Slight (positive)

Rationale for Cumulative Impact Evaluation:

- The benefit to bird diversity, and;
- The contrast with emerging trends in respect of land management and land cover, and;
- The duration which is long term to permanent, and;
- The low reversibility.

All Elements of the Whole UWF Project with Other Projects or Activities

Cumulative Impact Magnitude:

Instances of enhancement and management of habitat specifically for the benefit of birds will occur as part of the Upperchurch Windfarm Project. Habitat improvement and management measures for Bunkimalta Wind farm are also expected to result in positive Biodiversity benefits to General Birds. This may benefit species which use both sites e.g. wintering species (such as Fieldfare/Redwing etc.) in instances where birds are affected sequentially (through the availability of higher quality habitat) as they forage and move through the landscape. The in-combination effects may also provide more robust source populations of species such as Meadow Pipit, which may increase the overall population at a local or greater level.

Significance of the Cumulative Impact: Slight (positive)

Rationale for Cumulative Impact Evaluation:

- The scale of habitat management, in particular as part of the Upperchurch Windfarm Project and;
- Long term to Permanent duration, with;
- The low reversibility of measures to be implemented

¹⁶ ESB Wind Development Ltd. and Coillte (2013) Bunkimalta Wind Energy Project Environmental Impact Statement prepared by ESBI.

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General Bird Species

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8.7.4.5 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-58 below.

Table 8-58: Description and Rationale for Excluded Impacts to General Bird Species

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Planting Stage/Construction Stage				
Land take	1,2,3,4,5	Land cover	Habitat Loss (Merlin, Red Grouse)	Merlin: Evaluated as Excluded - Neutral habitat loss within the context of wintering Merlin.
	1,2,3,4,5			Red Grouse: Evaluated as Excluded - No Habitat Loss at Bleanbeg in relation to Red Grouse (Element 1). No habitat loss from Other Elements (2, 3, 4, 5) including Overhead Line Activities as part of 'UWF Other Activities.
	1,2,3,4,5		Habitat Loss (Eurasian Curlew)	Eurasian Curlew Evaluated as Excluded - A single breeding attempt was recorded in baseline studies, which was located outside the construction area boundaries associated with the UWF Grid Connection. No further evidence of Curlew was noted therefore it is considered that no currently used breeding habitat will be subject to land use change as a result of the Whole UWF Project. No habitat loss from Other Elements including Overhead Line Activities as part of 'UWF Other Activities.
Noise and human activity	1,2,3,4,5	Visibility	Disturbance/ Displacement (General Birds, Kingfisher, Red Grouse, Merlin, Meadow Pipit, Eurasian Curlew)	General Birds: Evaluated as Excluded for remaining species with sensitivity rating of medium and lower.
	1,2,3,4,5	Air and Visibility		Kingfisher; Evaluated as Excluded - Neutral effects as no nest locations were identified within the zone of effect i.e. proximal to River Crossings on the Newport (Mulkear), Clare and Bilboa Rivers (Element 1). No nests were identified within the zone of effect at watercourse crossing locations associated with UWF Related Works/Upperchurch Windfarm. Best Practice measures are provided to ensure Neutral effects. No watercourse crossing works associated with either UWF Replacement Forestry or UWF Other Activities.
	1,2,3,4,5	Visibility		Red Grouse: Evaluated as Excluded - Brief-temporary duration of works at Bleanbeg, combined with habituation to activities such as peat extraction ensures Neutral effects (Element 1). No habitat loss from Other Elements including Overhead Line Activities as part of 'UWF Other Activities.
	1,2,3,4,5			Merlin: Evaluated as Excluded - Low numbers of wintering birds will not be measurably affected by the scale of visual intrusion or disturbance. This

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				includes Overhead Line Activities as part of 'UWF Other Activities.
	1,2,3,4,5			Meadow Pipit: Evaluated as Excluded - Most passerine (perching) species and general lowland 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 <i>et al.</i> 2012 ¹⁷) and operation (Pearce-Higgins <i>et al.</i> 2009 ¹⁸) have found little evidence of significant disturbance effects on passerine species.
	1,2,3,4,5			Eurasian Curlew: Evaluated as Excluded - Neutral effect as Project Design measures will avoid works within 800m of a confirmed breeding attempt. No Eurasian Curlew recorded within the study areas for Elements 2,3,4,5.
Movement of soils and machinery	1,2,3,4,5	Direct Contact	Physical injury/destruction of nests or chicks – General Birds	Evaluated as Excluded - Hedgerow trimming and felling will occur outside the bird nesting season. Effects on ground nesting birds including Meadow Pipit from works such as cable trenching will be overseen by Project Ecologist and therefore effects will be Neutral.
Hedgerow trimming Forestry Felling	1,2,3,4,5	Direct Contact	Physical injury/destruction of nests or chicks – General Birds	Scoped out; all trimming /felling will occur outside the bird nesting season.
Growth Stage/Operational Stage				
Maintenance Noise/ Visual intrusion	1,2,3,4,5	Air and Visibility	Disturbance/displacement – (Golden Plover, Eurasian Curlew, Red Grouse, Merlin, Meadow Pipit)	Golden Plover: Evaluated as Excluded - Neutral disturbance/displacement effects are expected due to maintenance activities because; in relation to UWF Grid Connection (1), Maintenance visits will be conducted annually, by 1-2 people travelling in light vehicles in to joint bays, In relation to Other Elements, all maintenance works will be carried out from hardcore surfaces (2, 3, 4), from public road (5), or on foot (3,5).
				Eurasian Curlew: Evaluated as Excluded; Neutral effects predicted
				Red Grouse: Evaluated as Excluded; Neutral effects predicted
				Merlin: Evaluated as Excluded; Neutral effects predicted
	1,2,3,4,5			Meadow Pipit: Evaluated as Excluded; Neutral effects predicted.

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¹⁷ Greater Impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site 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

¹⁸ 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.)

Source(s) of Impacts		Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)	
						Decommissioning Stage
General Bird Species	Sensitive Aspect	Noise and human activity	1,2,3,4,5	Disturbance/ Displacement (Golden Plover, Eurasian Curlew, Red Grouse, Merlin)	Visibility	Golden Plover: Evaluated as Excluded - No significant decommissioning activities for elements 1, 2, 3 and 5. No Golden Plover were recorded in studies for Upperchurch Windfarm (Element 4).
						Eurasian Curlew: Evaluated as Excluded as no decommissioning relative to nesting location (Element 1)
						Red Grouse: Evaluated as Excluded as no decommissioning will take place at Bleanbeg (Element 1)
						Merlin: Evaluated as Excluded - decommissioning is not likely to affect low numbers of wintering Merlin measurably.
			1,2,3,4,5	Disturbance/Displacement Mortality of ground nesting birds – Meadow Pipit		Meadow Pipit: Evaluated as Excluded as there are no decommissioning activities associated with either the UWF Grid Connection or UWF Replacement Forestry, and no significant decommissioning activities associated with the UWF Related Works or UWF Other Activities. In relation to Upperchurch Windfarm (Element 4), Activities will only take place at existing hard stand locations within Upperchurch Windfarm, will be temporary in duration, reversible, and occur primarily in habitats of low value for Meadow Pipit. Studies on the impacts of wind farms during both construction (Pearce-Higgins <i>et al.</i> 2012) and operation (Pearce-Higgins <i>et al.</i> 2009) have found little evidence of significant disturbance effects on passerine species. This is also applicable to decommissioning.

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8.7.5 Mitigation Measures for Impacts to General Bird Species

Mitigation measures were incorporated into the UWF Replacement Forestry project design. No additional mitigation measures are required as **no significant adverse impacts** are concluded by the topic authors as likely to occur to General Bird Species as a consequence of the UWF Replacement Forestry.

8.7.6 Evaluation of Residual Impacts to General Bird Species

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for General Bird Species above (Section 8.7.4) – i.e. **no significant adverse impacts**.

8.7.7 Application of Best Practice and the EMP for General Bird Species

Best Practice Measures (BPM), although not part of the Project Design for the UWF Replacement Forestry, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **General Bird Species**, by the authors of this topic chapter, using industry best practice:

RF-BPM-01	Monitoring of non-native invasive plant species
RF-BPM-02	Management of general non-native invasive species

These Best Practice Measures are included in full at the end of this topic chapter, and also included as **Appendix 5.1: UWF Replacement Forestry Best Practice Measures** in **Volume C4: EIAR Appendices**.

8.7.7.1 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan is included as **Appendix 5.2: Invasive Species Management Plan**.

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8.7.8 Summary of Impacts to General Bird Species

A summary of the Impact to General Bird Species is presented in Table 8-59.

Table 8-59: Summary of the impacts to General Bird Species

Impact to General Bird Species:	Golden Plover: Habitat Loss	Golden Plover: Disturbance /Displacement	Meadow Pipit: Habitat Loss	General Birds: Habitat Enhancement
<i>Evaluation Impact Table</i>	<i>Section 8.7.4.1</i>	<i>Section 8.7.4.2</i>	<i>Section 8.7.4.3</i>	<i>Section 8.7.4.4</i>
Project Life-Cycle Stage	Planting/Growth	Planting	Planting/Growth	Growth
<u>UWF Replacement Forestry</u>	Slight	Neutral	Slight	Slight (positive)
Element 1: UWF Grid Connection	Slight	Not Significant	Slight	Slight (positive)
Element 2: UWF Related Works	Not Significant	Not Significant	Not Significant	Imperceptible (positive)
Element 4: Upperchurch Windfarm	Neutral	Neutral	Slight	Imperceptible (positive)
Element 5: UWF Other Activities	Neutral	Neutral	Moderate (positive)	Significant positive
<u>Cumulative Impact:</u>				
All Elements of the Whole UWF Project	Slight	Not Significant	Slight	Slight (positive)
All Elements of the Whole UWF Project <i>cumulatively with</i> Other Projects or Activities Bunkimalta Windfarm	No Cumulative Impact	No Cumulative Impact	Slight	Slight (positive)

The greyed out boxes in the summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to present the totality of the project.

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8.8 Sensitive Aspect No.7: Bats

This Section provides a description and evaluation of the Sensitive Aspect - Bats.

8.8.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

8.8.1.1 Baseline Characteristics of Bats in relation to UWF Replacement Forestry.

The potential for Bats was surveyed within and adjoining the UWF Replacement Forestry lands as illustrated on **Figure RF 8.8: Bats within the UWF Replacement Forestry Study Area** (Volume C3 EIAR Figures).

During surveys, no bat roosts were recorded at the UWF Replacement Forestry lands, one low suitability roost was recorded within 150m of the existing entrance to the afforestation lands.

8.8.1.2 Evaluation of UWF Replacement Forestry

It is evaluated that the UWF Replacement Forestry has **no potential to cause impacts to Bats**, for the following reasons:

- There is no potential for destruction or disturbance of bat roosts in trees, as there is no requirement to fell or prune trees for the UWF Replacement Forestry, therefore there is no source of impact;
- No potential for severance of commuting routes or feeding area, as there is no requirement to remove any hedgerows or other linear features for the UWF Replacement Forestry. Woodland edge habitat will be created for foraging bats, as the UWF Replacement Forestry matures;
- No potential for disturbance effects due to lighting, as lighting will not be required for the UWF Replacement Forestry,
- No potential for disturbance or displacement effects due to noise or vibration as no significant sources of noise and no sources of vibration will be present onsite during planting or management activities
- No potential for mortality of bats due to collision due to the absence of moving structures,
- No potential for effects due to harvesting, as the UWF Replacement Forestry will be a permanent woodland and will not be harvested.

8.8.1.3 Cumulative Evaluation for the Other Elements *(grey background)*

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

UWF Replacement Forestry has no potential to cause impacts to Bats by itself, and therefore cannot have a cumulative effect. However, the Other Elements must be considered because the UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in **Section 8.8.2 to Section 8.8.4** and included in the summary table in **Section 8.8.8** in order to show the totality of the project.

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8.8.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

8.8.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Bats considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.8.2.2.1](#) below.

The evaluation of cumulative impacts to Bats also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Bats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effect to Bats.

8.8.2.2 Cumulative Evaluation Study Area

The study area for the evaluation of cumulative effects is described on Table 8-60.

Table 8-60: Cumulative Evaluation Study Area for Bats

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	<ul style="list-style-type: none"> Buildings within 150m of Element construction works areas or activity locations Mature trees within 50m of Element construction works areas or activity locations; Hedgerow severance locations Bridges within construction works locations or along concrete/aggregate haulage routes for Elements of the Whole UWF Project. 	Professional Judgement and as per Best Practice: Bat Surveys for Professional Ecologists: Good Practice Guidelines, Collins, (2016), and The Conservation of Bats in Bridges Project – A Report on the survey and conservation of bat roosts in bridges in Cumbria, Billington and Norman (1997).
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities		

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8.8.2.2.1 Potential for Impacts to Bats

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Bats. The results of this evaluation are included in Table 8-61.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on **Figure CE 8.8: Bats within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-61: Evaluation of the Other Elements of the Whole UWF Project

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects

8.8.2.3 Cumulative Information: Baseline Characteristics – Context & Character

Bats are common and widespread throughout Ireland, and occupy a wide variety of habitats. In a regional context, the following is noted in the (Draft) North Tipperary Biodiversity Plan 2007: “Many bat species forage in woodland and over water, and the combination of both habitats within North Tipperary makes the area valuable for bat species. Built structures, such as bridges, that occur close to water are of particular value as roosts. Six of Ireland’s bat species are known to occur in North Tipperary common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Leisler’s bat *Nyctalus leisleri*, Natterer’s bat *Myotis nattereri* (records from www.batconservationireland.org), Brown long-eared bat *Plecotus auritus* and Daubenton’s bat *Myotis daubentonii* (pers comm. S. Jones, S. Geraghty¹⁹)”. In addition, the author has recorded Nathusius’ pipistrelle *Pipistrellus nathusii* and whiskered bat *Myotis mystacinus* in the north Tipperary. Ireland’s only other regularly-occurring bat species – the lesser horseshoe bat *Rhinolophus hipposideros* – can occasionally be found on the Limerick – Tipperary border, but in general the county is just outside the range of this species.

8.8.2.3.1 Element 1: UWF Grid Connection

The UWF Grid Connection will be located in the Slievefelim to Silvermine Mountains upland area in County Tipperary. The landscape present is predominantly forestry and improved agricultural landscapes, interspersed with hedgerows and low-density houses and farm buildings. Mature trees are also present within hedgerows and along public roads.

Online national landscape suitability maps for Irish bat species (Lundy *et al.*, 2010) were reviewed and indicate that the suitability index for the ‘all bats combined’ layer varies across the length of the UWF Grid Connection. Areas of high suitability are found in the environs of Mountphilips at the western end of the UWF Grid Connection, moderate suitability and low suitability in the centre, and moderate suitability at the

¹⁹ As cited in the ‘draft North Tipperary Biodiversity Plan 2007’

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western end. Overall, the landscape suitability follows a consistent west to east pattern of decreasing suitability for all species, which roughly corresponds with the changes in altitude.

When considered at the level of individual bat species, the UWF Grid Connection Study Area has high suitability for common pipistrelles; moderate suitability for soprano pipistrelles, Leisler’s bat, whiskered bat and natterer’s bat, low suitability for Daubenton’s and brown long-eared bats, and negligible suitability for Nathusius’ pipistrelles and lesser horseshoe bats.

Further information on context such as known roosts identified from desktop review is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.2.1\)](#).

Survey Results

Preliminary ecological appraisals were carried out for 119 buildings within the study area, and presence / absence surveys and/or roost characterisation surveys were carried out in 2016 and 2017 for features of high or moderate roost suitability that were considered to be at risk of direct or indirect effects.

Bat roosts were identified in 14 buildings, including 8 maternity roosts, 7 non-breeding summer roosts, 4 transitional / mating roosts and 4 hibernation roosts (some buildings had more than one roost). Four buildings were considered to be of County Importance and six to be of Local Importance. These are further described per project element below.

Mature trees within 50m of the construction works area were inspected from ground level, and 26 were considered to have low suitability for bats (e.g. small crevices that could be used by individual roosting bats), while 2 were considered to have moderate suitability (e.g. multiple or larger crevices that could support multiple roosting bats). However, these numbers only refer to the potential suitability of these trees for bats, and we note that **no evidence of roosting bats was observed** (e.g. bat droppings) in any of these trees. All other mature trees within 50m of the construction area boundaries were inspected and evaluated as having negligible roost suitability. 17 of the low-suitability trees and none of the moderate-suitability trees were within the construction works area boundary.

A number of bridges were inspected along the route of the UWF Grid Connection and material (concrete and stone) haulage routes along local roads; bridges on national or regional roads were scoped out of the assessment, as they are maintained on a regular basis by Transport Infrastructure Ireland, and would not need to be upgraded or strengthened in order to allow the passage of construction vehicles. Within the study area 1 bridge had high suitability, 1 had moderate suitability and 5 bridges had low suitability for bat roosts. However, these numbers only refer to the potential suitability of these for bats, and we note that **no evidence of roosting bats was observed** in any of these bridges.

Bat activity surveys using automated detectors were carried out at twenty-seven locations (including compound locations, and additional treeline/hedgerows with high suitability for bats) within the UWF Grid Connection Study Area. . A full list of bat activity survey results is provided in [Section A8-1.2.4.5 of Appendix 8-1: Detailed Biodiversity Information and Data](#) (Volume C4 EIAR Appendices).

Roosts

Fourteen bat roosts in total were identified, of which 12 were in dwelling houses, one was in an outbuilding/shed and one in a ruined church. None of the roosts were located within the construction area boundary. Four roosts are of County Importance, with the closest 5m from the construction works area. 6 roosts are of local importance, with the closest 5m from the construction works area. Further detail is provided below in Table 8-62.

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Table 8-62: Bat Roosts Identified within UWF Grid Connection Study Area

<u>Code</u>	<u>Type</u>	<u>Evidence of bats</u>	<u>Importance Evaluation</u>	<u>Proximity to the UWF Grid Connection</u>
BR1	Ruined church	Maternity, mating and hibernation roost: 5 - 10 natterer's bats	County	20m
BR2	Dwelling house	Maternity roost: 30 - 40 common pipistrelles	Local	120m
BR3	Dwelling house	Day roost / satellite roost: 1 soprano pipistrelle	Negligible	350m
BR4	Dwelling house	Hibernation roost: >100 brown long-eared bats, 1 natterer's bat. Summer day roost: 2 brown long-eared bats, 1 natterer's bat.	County	160m
BR5	Dwelling house	Summer non-breeding roost and mating / transition roost: 3 - 4 common pipistrelles. Hibernation roost: 6 common pipistrelles, 2 brown long-eared bats	County	50m
BR6	Dwelling house	Former transitional roost: >200 pipistrelles. Access points have now been sealed.	Negligible (inactive)	140m
BR7	Dwelling house	Maternity roost: 40 - 50 common pipistrelles	Local	5m
BR8	Dwelling house	Maternity roost: 10 - 20 common pipistrelles	Local	200m
BR9	Dwelling house	Day roost / satellite roost: 1 common pipistrelle	Negligible	50m
BR10	Dwelling house	Maternity roost: 40 - 50 common pipistrelles	Local	400m
BR11	Shed	Day roost / satellite roost: 1 Myotis sp.	Negligible	430m
BR12	Dwelling house	Maternity roost: 40 - 50 common pipistrelles	Local	5m
BR13	Dwelling house	Maternity roost: 30 - 40 common pipistrelles Possible day roost / satellite roost: 1 Myotis sp.	Local	5m
BR16*	Dwelling house and farm buildings	Maternity roost: 4 - 5 natterers bats. Transitional / mating roosts: 5 - 10 natterers bats, 20 common pipistrelles, 3 brown long-eared bats. Summer non-breeding / day roost: 2 common pipistrelles, 1 Leisler's bat. Hibernation roost: natterer's bats, common pipistrelles, Leisler's bat.	County	5m

* It should be noted that roost R16 is also within the zone of influence of the UWF Related Works and Upperchurch Windfarm, and is discussed therefore under each within the relevant sections of this report. However, it should be noted, that although the potential impacts on this roost are considered for three separate elements of the project, this does not represent three separate roosts.

Activity

Activity levels (from 27 sampling locations) were relatively high, with an average of one bat pass every two minutes throughout the survey period (a Bat Activity Index of 29.3). The most frequently-recorded species were common pipistrelles, followed by soprano pipistrelles, *Myotis* spp. Leisler's bat, Nathusius' pipistrelle and brown long-eared bat, in order of abundance. Lesser-horseshoe bats were not recorded. 5 habitat features were considered to be of County Importance as commuting routes / feeding areas and 18 to be of Local Importance.

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Table 8-63: Bat Activity Sampling Results

<u>Sampling Location</u>	<u>Habitat</u>	<u>Month</u>	<u>Characterisation of activity</u>	<u>Importance Evaluation</u>
SD1	Mature treeline	Jun	Frequent CP, occasional SP	Local
		Sept	Frequent CP, occasional SP & MY	
SD2	Hedgerow	Aug	Frequent CP	Local
		Sept	Occasional CP	
SD3	Hedgerow	Jun	Negligible	Local
		Sept	Frequent SP, occasional CP	
SD4	Hedgerow	Jun	Frequent CP, occasional SP	Local
		Sept	Occasional CP	
SD5	Hedgerow	Jun	Occasional CP	Negligible
		Sept	Occasional CP	
SD6	Farmyard	Jun	Occasional CP	Local
		Sept	Frequent CP & SP	
SD7	Mature woodland	Aug	Frequent CP, occasional L	Local
		Sept	Frequent CP & SP, occasional MY	
SD8	Ruined church	Jun	Occasional CP & MY	Local
		Sept	Occasional CP	
SD9	Hedgerow	Jun	Negligible	Negligible
		Sept	Negligible	
SD10	Mature woodland	Aug	Frequent CP, occasional SP	Local
		Sept	Negligible	
SD11	Hedgerow	Jun	Frequent CP & SP	County
		Sept	Near-constant SP, frequent CP, occasional MY	
SD12	Hedgerow	Jun	Frequent CP & MY	County
		Sept	Frequent CP, occasional MY	
SD13	Road within conifer plantation	Jun	Near-constant CP	County
		Sept	Frequent CP, occasional SP & MY	
SD14	Road within conifer plantation	Aug	Frequent CP, occasional SP	Local
		Sept	Occasional CP	
SD15	Road within conifer plantation	Jun	Occasional CP & MY	Local
		Sept	Negligible	
SD16	Treeline	Aug	Occasional CP, SP & MY	Local
		Sept	Frequent SP, occasional CP	
SD17	Farmyard	Jun	Frequent CP	Local
		Sept	Frequent CP, occasional SP & MY	
SD18	Road within conifer plantation	Jun	Frequent CP	Local
		Sept	Frequent CP	
SD19	Hedgerow	Sept	Negligible	Negligible
		Sept	Negligible	
SD20	Roadside hedgerow	Aug	Frequent CP & MY, occasional SP	County
		Sept	Frequent CP	
SD21	Road within conifer plantation	Jun	Frequent CP, occasional L & SP	Local
		Sept	Occasional CP	
SD22	Road within conifer plantation	Aug	Occasional CP	Local
		Sept	Frequent CP & SP	
SD23	Hedgerow	Aug	Frequent CP & SP	Local

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<u>Sampling Location</u>	<u>Habitat</u>	<u>Month</u>	<u>Characterisation of activity</u>	<u>Importance Evaluation</u>
		Sept	Frequent CP, occasional SP	
SD24	Open ground	Jun	Occasional CP & L	Local
		Sept	Occasional CP	
SD25	Hedgerow	Jun	Occasional CP	Local
		Sept	Occasional CP, SP & MY	
SD26**	Farmyard	Jun	Near-constant CP	County
		Sept	Occasional CP	
SD27**	Edge of conifer plantation	Jun	Occasional CP	Negligible
		Sept	Negligible	

** It should be noted that sampling locations SD26 and SD27 are also within the zone of influence of the UWF Related Works, and are discussed in relation to same within the relevant section of this report.

Maps showing the preliminary ecological appraisals of in respect of bats buildings, trees and bridges are provided in **Figure GC 8.8: Bats within the UWF Grid Connection Study Area**. **Figure GC 8.8** is part of the EIA Report for the UWF Grid Connection, and is included in **Volume E: Reference Documents** with this planning application

8.8.2.3.2 Element 2: UWF Related Works

The UWF Related Works will be located in the Slievefelim to Silvermine Mountains upland area in County Tipperary. The landscape present is predominantly improved agricultural/forestry landscape, interspersed with hedgerows and low-density houses and farm buildings. Mature trees are also present within hedgerows and along public roads.

Online national landscape suitability maps for Irish bat species (Lundy *et al.*, 2010) were reviewed and indicate that the suitability index for the ‘all bats combined’ layer is moderate within the environs of UWF Related Works.

When considered at the level of individual bat species, the UWF Related Works Study Area has high suitability for common pipistrelles; moderate suitability for soprano pipistrelles, Leisler’s bat, Whiskered Bat and natterer’s bat, low suitability for Daubenton’s and brown long-eared bats, and negligible suitability for Nathusius’ pipistrelles and lesser horseshoe bats.

Further information on context such as known roosts identified from desktop review is included in **Appendix 8-1: Detailed Biodiversity Information and Data (Section A8-1.2.2.1)**.

Survey Results – UWF Related Works:

Roosts

Preliminary ecological appraisals were carried out for 35 buildings within the study area, and presence / absence surveys and/or roost characterisation surveys were carried out in 2016 and 2017 for features of high or moderate roost suitability that were considered to be at risk of direct or indirect effects.

Four bat roosts were identified, all of which were located in dwelling houses and farm buildings. None of the roosts were located within the construction area boundaries. Two roosts are of County Importance, with the closest 5m from the UWF Related Works construction works area. One roost is of Local importance, located 130m from the construction works area. We note that two of the roosts identified are also discussed within the context of the UWF Grid Connection and Upperchurch Windfarm.

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Table 8-64: Identified Bat Roosts in the UWF Related Works study area

<u>Code</u>	<u>Type</u>	<u>Evidence of bats</u>	<u>Valuation</u>	<u>Proximity to UWF Related Works</u>
BR14*	Dwelling house	Day roost / satellite roost: 1 common pipistrelle	Negligible	15m
BR15	Dwelling house and traditional farm buildings	Maternity roost: 50 - 60 common pipistrelles Maternity roost: 5 soprano pipistrelles.	Local	130m
BR16*	Dwelling house and traditional farm buildings	Maternity roost: 4 - 5 natterers bats. Transitional / mating roosts: 5 - 10 natterers bats, 20 common pipistrelles, 3 brown long-eared bats. Summer non-breeding / day roost: 2 common pipistrelles, 1 Leisler's bat. Hibernation roost: natterer's bats, common pipistrelles, Leisler's bat.	County	10m
BR17	Dwelling house	Maternity roost: 2 – 3 natterers bats	County	5m

* It should be noted that roosts R14 and R16 are also within the zone of influence of the UWF Grid Connection and Upperchurch Windfarm, and are discussed in relevant sections of this report. However, although the potential impacts are considered for multiple elements of the project, they refer only to two individual roosts.

Activity

Activity levels (from two sampling locations within the study area) were relatively high, with an average of one bat pass every three minutes throughout the survey period (a Bat Activity Index of 20.8). The only species recorded in significant numbers was common pipistrelles; all other species had negligible activity. Lesser-horseshoe bats were not recorded. One habitat feature was considered to be of County Importance as a commuting route / feeding area.

Table 8-65: Bat Activity Sampling Results in the UWF Related Works study area

<u>Site</u>	<u>Habitat</u>	<u>Month</u>	<u>Characterisation of activity</u>	<u>Ecological value</u>
SD26	Farmyard	Jun	Near-constant CP	County
		Sept	Occasional CP	
SD27	Edge of conifer plantation	Jun	Occasional CP	Negligible
		Sept	Negligible	

** It should be noted that SD26 and SD27 are also within the zone of influence of the UWF Grid Connection, and are also discussed under same in the relevant section of this report.

Maps showing the preliminary ecological appraisals of in respect of bats buildings, trees and bridges are provided in **Figure RW 8.8: Bats within the UWF Related Works Study Area**. **Figure RW 8.8** is part of the EIA Report for the UWF Related Works, and is included in **Volume E: Reference Documents** with this planning application

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8.8.2.3.3 Element 4: Upperchurch Windfarm

Preliminary ecological appraisals were carried out for 7 buildings within the study area, and presence / absence surveys and/or roost characterisation surveys were carried out in 2016 and 2017 for features of high or moderate roost suitability that were considered to be at risk of direct or indirect effects.

One bat roost of County Importance is located within farm buildings at Site Compound No.2, which is associated with the Upperchurch Windfarm, and therefore overlaps the construction works area directly. A further day roost/satellite roost of negligible importance is also present 15m from the construction works area within another part of the Upperchurch Windfarm.

Table 8-66: Identified Bat Roosts in the Upperchurch Windfarm study area

<u>Code</u>	<u>Type</u>	<u>Evidence of bats</u>	<u>Valuation</u>	<u>Proximity to Upperchurch Windfarm</u>
BR14	Dwelling house	Day roost / satellite roost: 1 common pipistrelle	Negligible	15m
BR16	Dwelling house and traditional farm buildings	Maternity roost: 4 - 5 natterers' bats. Transitional / mating roosts: 5 - 10 natterers bats, 20 common pipistrelles, 3 brown long-eared bats. Summer non-breeding / day roost: 2 common pipistrelles, 1 Leisler's bat. Hibernation roost: natterer's bats, common pipistrelles, Leisler's bat.	County	0m

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Activity

Activity surveys for the Upperchurch Windfarm were carried out by Malachy Walsh & Partners in 2012 and 2013, and the results were presented in the wind farm EIS. Some excerpts from the bat report are provided below:

“The results of bats surveys indicate that up to seven species of bat are utilising habitats within the study area or are commuting through the site to more suitable habitat in the greater area.

Throughout the site common pipistrelles and soprano pipistrelles were recorded on the edge of woodland, along access tracks, hedgerows, treelines, over areas of scrub, semi-natural grassland and improved agricultural grassland. Common pipistrelle was the most common species recorded during surveys in 2012 and 2013.”

8.8.2.3.4 Element 5: UWF Other Activities

Activity Survey: Due to the absence of possible sources of hedgerow severance in respect of UWF Other Activities (only minimal trimming of outer branches is planned) activity surveys to inform an appraisal of likely effects were not required

Roosts: No bat roosts were present. Trees at hedgerow trimming locations as part of Haul Route activities are not suitable for roosting bats. No trimming is required for Overhead Line Activities

8.8.2.3.5 Other Projects or Activities

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.8.2.1.

8.8.2.4 Cumulative Information: Baseline Characteristics - Importance of Bats

All bat species, as listed in the Fifth Schedule to the Wildlife Act 1976 (as amended in 2000), and their resting places are legally protected in Ireland. The Wildlife Act, 1976, is the principal national legislation providing for the protection of wildlife and the control of some activities, which may adversely affect wildlife. For the purpose of the current evaluation, importance levels are as described under Context, above in respect of both roosts and locations of activity.

All bats are listed on Annex IV of the EU Habitats Directive 92/43/EEC which was transposed into national law through the European Communities (Natural Habitats) Regulations 1997 (S.I. 94/97) as amended in 1998 (S.I. No. 233/1998), 2005 (S.I. No. 378/2005) and 2011 (SI No. 477/2011). This legislation further protects bats both inside and outside of the Natura 2000 site network. Furthermore, lesser horseshoe bat is listed on Annex II of the EU Habitats Directive 92/43/EEC which requires Special Areas of Conservation (SACs) to be designated within the Natura 2000 site network to ensure the maintenance of their conservation status.

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The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention, 1982) ensures that governments take into account the conservation needs of species during the formulation of planning and development policies. It also seeks the protection of endangered species and in relation to bats, it stipulates that all bat species and their habitats are conserved.

8.8.2.5 Cumulative Information: Baseline Characteristics - Sensitivity of 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). During the day, bats roost in man-made structures (typically houses, farm buildings and bridges), mature trees and caves. 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). They are most sensitive to effects during their maternity and hibernation periods, which are from May to August and November to March, respectively.

After sunset, bats ‘commute’ fly from their roosts to a suitable feeding area (referred to as ‘commuting’ behaviour), and spend most of the night foraging for insect prey. They typically favour linear habitat features (e.g. hedgerows and forest edges) for commuting and foraging, and usually avoid brightly-lit areas (Lundy *et al.*, 2011). They may travel several kilometres from their roost, and may use different feeding areas on different nights.

8.8.2.6 Cumulative Information: Baseline Characteristics - Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

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 2013), all Irish bat species are considered to be of favourable conservation status, although the status of Nathusius’ pipistrelle is listed as unknown, because there is some uncertainty about their range and breeding status. Most bat species are listed as ‘least concern’ on the all-Ireland red list of mammals (Marnell *et al.*, 2009), including the Nathusius’ pipistrelle. Leisler’s bat is listed as ‘near-threatened’ because Ireland supports an internationally-important population, but the overall population status of this species is known to stable or increasing.

The abundance of Irish bats is monitored by Bat Conservation Ireland (Roche *et al.*, 2012) using annual public surveys such as the ‘Car-Based Monitoring Scheme’, the ‘All-Ireland Daubenton’s Bat Waterways Survey’, and roost monitoring assessments for brown long-eared bats and lesser horseshoe bats. In combination, these projects monitor all Irish species with the exception of Natterer’s bat and whiskered bat. **To date the populations of all monitored species appear to be stable or increasing.**

If the subject development does not proceed, the site is expected to remain in the baseline condition and to be used by bat species on an occasional to regular basis. Based on the national trends of these species, the abundance of bats in the surrounding landscape is expected to remain stable, or to increase at a slow rate.

8.8.2.7 Cumulative Information: Baseline Characteristics - Receiving Environment (the Baseline + Trends)

As the conservation status of all Irish bat species is considered to be stable, it is expected that the baseline levels of bat activity recorded in 2016 / 2017 will not change significantly by the time of construction or operation and decommissioning.

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8.8.3 CUMULATIVE INFORMATION: Project Design Measures for Bats

Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Related Works and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4 and 5.5](#), in [Volume C4: EIA Appendices](#).

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8.8.4 CUMULATIVE INFORMATION: Evaluation Of Impacts to Bats

It was evaluated, in Section 8.8.1, that **UWF Replacement Forestry has no potential to cause impacts to Bats.**

This Section evaluates the likely cumulative effects of the Other Elements of the Whole UWF Project and the evaluation is based on the residual effects of the Other Elements of the Whole UWF Project.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Bats.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-67: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Destruction or disturbance of bat roosts in trees, (construction stage)	<i>Mortality through roost destruction of roosts in forestry, in bridges or in hedgerows, (construction stage)</i>
Severance of commuting routes or feeding areas, (construction stage)	<i>Destruction/Disturbance of Bat Roosts in Buildings, (construction stage)</i>
Disturbance or Displacement due to lighting, (construction stage)	<i>Disturbance or Displacement of Bat Roosts due to Noise and Vibration, (construction stage)</i>
	<i>Inadvertent mortality through roost destruction due to hedgerow trimming activities (operational stage)</i>
	<i>Avoidance due to increased EMF (operational stage)</i>
	<i>Disturbance or Displacement due to lighting (operational stage)</i>
	<i>Disturbance or Displacement due to Noise and Vibration (operational stage)</i>
	<i>Mortality of bats due to collision or barotrauma (operational stage)</i>
	<i>Inadvertent mortality through roost destruction, (decommissioning stage)</i>
	<i>Disturbance or Displacement due to lighting, (decommissioning stage)</i>
	<i>Indirect Disturbance from Noise and Vibration, (decommissioning stage)</i>

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The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.8.4.1 to 8.8.4.3.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, Section 8.8.4.4.

8.8.4.1 Impact Evaluation Table: Destruction or disturbance of bat roosts in trees

Evaluation of UWF Replacement Forestry Excluded: As there is no requirement to trim or fell trees, there is no potential for UWF Replacement Forestry to cause destruction or disturbance effects to Bats by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: <i>(for Other Elements only)</i>	Construction stage
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Cumulative Impact Source: Tree felling, Removal of mature trees, trimming and pruning of mature trees and hedgerows
Impact Pathway: Landcover

Impact Description: Crevices and cavities in mature trees can provide roosting opportunities for bats, with some species (e.g. Leisler’s bat) thought to favour roosting sites in trees. Recent research has demonstrated that the use of roosts in trees can be highly transitory, with frequent roost switching between nights and across the season, although some large cavities can be used as maternity or hibernation roosts for longer periods of time. Almost all records to date have been from broadleaf trees (particularly oaks), with only a very small number from specimen conifers, and none from conifer plantations²⁰.

Any damage or disturbance to trees with crevices or cavities can have direct or indirect impacts on any bats that may be roosting within them. Felling can cause death or injury to bats, or the associated disturbance can cause them to emerge during daylight, thus exposing them to diurnal predators. Similarly, construction work within the root zone of trees can cause the death of trees, causing them to fall at a later date. The spatial extent of impacts is limited to the tree in question (including its root zone and overhanging branches).

Trimming of hedgerows and low-hanging branches of trees will be required along some roads in order to facilitate the passage of construction vehicles. Almost all of these locations are on public roads and already subject to the standard maintenance regime for public roads, and it is expected that all such hedgerows / trees would have been trimmed in the past. Therefore, there is a negligible risk that bats could roost in any of these branches, so this element of the project will not have any direct impacts on potential tree roosts. All works will occur within daylight hours as part of Project Design.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

17 No. trees with bat roost suitability are located either within or partially within the UWF Grid Connection construction works area boundary. All of these trees were evaluated as having low suitability for roosting bats, i.e. small crevices that could be used on a transitory basis by individual roosting bats. No trees of moderate or high suitability were recorded within the construction works area. The trees were surveyed in either 2016 or 2017, and no evidence of roosting bats was observed, so it is considered that there is a low likelihood (e.g. <5%) that bats would be roosting within them at the time of construction. It is likely that some or all of these trees will be directly or indirectly affected during construction works, although decisions to fell these trees will be made at the construction stage. Even if the trees are not felled, it will be necessary to trim or prune some of

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²⁰ Andrews H & Gardener M 2016. Bat Tree Habitat Key – Database Report 2016. AEcol, Bridgwater

Bats	<p>the lower branches to facilitate access, and root disturbance could occur during excavation works. In recognition of the potential risk of impacts on any bats that may be roosting in these trees at the time of works, a series of best-practice measures have been incorporated into the design of the development, including pre-felling inspections, felling procedures, and the installation of bat boxes. This will ensure that any impacts on any bats present in the trees would be imperceptible.</p> <p>There is no potential for sequential effects to bats, as the extent of any instance of roost disturbance/destruction is limited to those Bats which may be present in individual trees.</p>
	<p><u>Significance of the Impact:</u> Imperceptible</p>
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Only 17 of the trees located within the zone of effect, and all were considered to have low suitability for roosting bats, and; • Considering their low suitability for roosting bats, the likelihood that bats would occupy any of these trees at the time of felling is considered to be low (<5%); • There was no evidence that bats were roosting in any of these trees during inspections in 2016 / 2017; • Best practice measures have been incorporated into the project design, including pre-felling inspections, sensitive felling procedures, and the installation of bat boxes.
	<p>Element 2: UWF Related Works</p>
	<p><u>Impact Magnitude:</u> There are no trees with bat roosting suitability within the study area.</p>
	<p><u>Significance of the Impact:</u> None</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • no change in baseline conditions
	<p>Element 4: Upperchurch Windfarm</p>
	<p><u>Impact Magnitude:</u> No potential tree roosts were identified in the EIS for the Upperchurch Windfarm and it was noted that the conifer plantations within the site offer “<i>very poor roosting habitat</i>”.</p> <p>In the RFI reporting it was noted that “<i>large mature treelines in the greater area offer potential roosting sites for bats particularly along the roads in Shevry and Gleninchaveigh</i>”. However, only a small number of trees will be felled along these roads, and none were considered to have suitability for bats. Therefore, this element of the project will not have any direct impact on potential tree roosts.</p>
	<p><u>Significance of the Impact:</u> Neutral effect</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • None of the trees within the footprint of the development are suitable for roosting bats, so there will be no change to the baseline conditions
	<p>Element 5: UWF Other Activities</p>
	<p><u>Impact Magnitude:</u> There is no requirement to fell trees. Trimming of hedgerows and low-hanging branches of trees will occur as part of Haul Route Other Activities. Haul Route Activity locations are on public roads and already subject to the standard maintenance regime for public roads, and it is expected that all such hedgerows / trees would have been trimmed in the past. Therefore, there is a negligible risk that bats could roost in any of these branches. No tree or hedgerow trimming is required for Overhead Line Activities. Significant planting of new trees will occur as part of the Upperchurch Hen Harrier Scheme (totalling 2.8km).</p>
	<p><u>Significance of the Impact:</u> Neutral effect.</p>
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<p><u>Rationale for Impact Evaluation:</u> None of the trees within the footprint of the development are suitable for roosting bats, so there will be no change to the baseline conditions</p> <ul style="list-style-type: none"> • Trimming associated with Haul Route Activity locations will not contrast with any baseline activities, and; • Tree planting in respect of the Upperchurch Hen Harrier Scheme will increase availability of trees for Bats.
<p>Evaluation of Cumulative Impacts – Destruction or disturbance of bat roosts in trees</p>
<p>All Elements of the Whole UWF Project</p>
<p><u>Cumulative Impact Magnitude:</u> There is no potential for the UWF Related Works to cumulatively effect bats, as Neutral effects are likely to occur to Bats as a result of the development of the UWF Related Works. At a wider population level, Neutral cumulative effects are likely as the UWF Grid Connection is the only Element which will cause effects - where instances of tree felling has the potential to affect Bat Roosts, whereas the remaining elements do not include trees suitable for roosting bats, and trimming activities on public roads as part of UWF Other Activities will have Neutral effect on bat roosts. There is no potential for cumulative sequential effects; as the extent of any instance of roost disturbance/destruction is limited to those Bats which may be present in individual trees.</p>
<p>Significance of the Cumulative Impact: No Cumulative Impact</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Effects are limited to the UWF Grid Connection.

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Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

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8.8.4.2 Impact Evaluation Table: Severance of commuting routes or feeding areas

Evaluation of UWF Replacement Forestry Excluded: As there is no requirement to remove hedgerows, there is no potential for UWF Replacement Forestry to cause severance effects to Bats by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: <i>(for Other Elements only)</i>	Construction stage/early operational stage
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Cumulative Impact Source: Site clearance
Impact Pathway: Land cover

Impact Description: Bats forage and commute along hedgerows, treelines and other linear habitat features. Both temporary and permanent clearance of short sections of habitats such as Hedgerows will be required to facilitate some construction works, particularly along the routes of new access roads or underground trenching locations. The removal of this habitat would not kill or injure any bats, but it may disrupt their behaviour, reducing the value of regular feeding areas and forcing bats to use alternate commuting routes. In many cases bats will be able to adapt to an altered route, as many bat species (e.g. pipistrelles) readily cross gaps of 5 - 10m. However, the disruption of key feeding areas or commuting routes may have a significant effect. For example, alteration of the key commuting routes to and from bat roosts can potentially cause bats to permanently abandon the roost.

Bat protection measures have been incorporated into the project design in order to minimise the effects of habitat severance on bats. This includes the installation of bat crossing structures at severed hedgerows proximal to areas of high Bat activity or roost locations, the replanting of severed hedgerows with semi-mature (i.e. at least ten years growth) shrubs/trees on a like-for-like basis, and limits on lighting. This will substantially reduce the risk of impacts on bats in these areas. The bat crossings will be inspected annually during the operational stage, maintained if necessary and removed once vegetation has re-established to the level of the adjacent hedgerow/field boundary. Further to this, at each crossing location, enhancement via the planting of locally sourced native species of trees at either side of the crossing location will be undertaken. This will ensure that a like for like scenario develops where for every shrub/tree removed another is planted, ensuring no net loss of vegetation, and a rapid re-establishment to original height.

Re-instated hedgerows will be planted with semi-mature (locally sourced, native) trees, thus reducing the time required for re-establishment to original vegetation height. Therefore, the effects of vegetation removal would only persist in the short term (approx. 1 – 7 years), and after this period, the hedgerows would return to the baseline condition. It is also noted that other elements of the project will include substantial Hedgerow planting, resulting in a net increase in the coverage of this habitat within the study area.

Impact Quality: Negative and Positive

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

5m sections of hedgerow will be permanently removed at 9 locations, all of which are evaluated as of local importance to bats. Temporary bat crossing structures will be installed at severed hedgerows proximal to areas of either high Bat activity or roost locations (refer to Figure GC 8.8: Bats within the UWF Grid Connection Study Area), in order to avoid effects from the severance of these features during works.

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In addition, approximately 585m of field boundary (primarily hedgerow and earthen banks) will be temporarily removed at other locations along the route of the UWF Grid Connection. Most of these locations were considered to be of relatively low importance for feeding / commuting bats due to their lack of vegetation (e.g. earth banks), small size and / or lack of continuity(). This includes permanent removal of roadside field boundary at 2 entrances (E1, E15) to facilitate lines of sight, although the roadside boundaries will be replanted with hedgerows behind the sightlines. Temporary removal of 2m to 5m wide sections of field boundary will also occur along the construction works area boundary to facilitate cable trenching works.

The new gaps, which will be 5m in width in most locations, will be used for between 1 week and 6 months. When construction is complete, all temporarily removed hedgerows or field boundaries will be reinstated with semi-mature vegetation, thus reducing effects.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- Only a small extent of hedgerow will be permanently lost, and;
- 700m of additional hedgerow planting will more than compensate for its loss; and
- All temporarily-removed field boundaries will be reinstated to at least their former (or better) condition in the medium term, as outlined in Chapter 5 Description of the Development and;
- The severance of most commuting routes / feeding areas will be medium term in duration, reversible and offset by the planting of new hedgerows using semi-mature trees / shrubs;
- There will be a lag time in the re-establishment of the vegetation, but the continuity of important bat commuting routes will be maintained using specially-designed bat crossing structures;
- This will ensure that bats can continue to use these features during the re-establishment period.

Element 2: UWF Related Works

Impact Magnitude:

10m sections of field boundary will be permanently removed at two locations along Realigned Windfarm Road RWR2. However, as these areas are un-vegetated, they are not considered to be of importance for commuting or foraging bats.

145m of linear vegetation features (primarily hedgerows) will be removed temporarily (c.1 week to 1 month) at 15 locations along works locations for the Internal Windfarm Cabling and for Haul Route Works (HW7 and HW10). Temporary bat crossing structures will be installed at severed hedgerows proximal to areas of either high Bat activity or roost locations, in order to avoid effects from the severance of these features during works. When complete, all temporarily removed hedgerows or field boundaries will be reinstated with semi-mature vegetation.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- Only a small extent of hedgerow will be permanently lost.
 - 370m of additional hedgerow planting will more than compensate for its loss; and
 - All temporarily-removed field boundaries will be reinstated to at least their former (or better) condition in the medium term, as outlined in Chapter 5 Description of the Development;
 - The severance of most commuting routes / feeding areas will be medium term in duration, reversible and offset by the planting of new hedgerows;
 - There will be a lag time in the re-establishment of the vegetation, but the continuity of linear features near bat roosts will be maintained using specially-designed bat crossing structures;
- This will ensure that bats can continue to use these features during the re-establishment period.

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Bats	Element 4: Upperchurch Windfarm
	<p><u>Impact Magnitude:</u> Approximately 360m of good quality hedgerows will be removed as part of the construction of the Upperchurch Windfarm. There shall be a loss of potential foraging habitat within the site. However, this loss of habitat is not considered to be significant given the availability of extensive foraging habitat outside the site. In the Ecological Management Plan for the development it is noted that “approximately 360m of new hedgerow will be planted to mitigate this loss of habitat.”</p>
	<p><u>Significance of the Impact:</u> Not significant</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of permanent loss is mitigated by the planting of the same extent of replacement habitat; and • Relatively little bat activity was recorded along hedgerow habitats.
	Element 5: UWF Other Activities
	<p><u>Impact Magnitude:</u> This element of the project will not involve the severance of any hedgerows or similar features. As part of Upperchurch Hen Harrier Scheme up to 2.8km of hedgerow is to be planted, constituting a significant offset of Upperchurch Windfarm hedgerow removal in terms of the effects of severance</p>
	<p><u>Significance of the Impact:</u> Neutral Impact</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No hedgerows or other similar features will be severed, so there will be no change to the baseline conditions, and; • 2.8 km of new hedgerow planting will improve bat foraging habitat in the short to medium term.
	Evaluation of Cumulative Impacts – Severance of commuting routes or feeding areas
	All Elements of the Whole UWF Project
<p><u>Cumulative Impact Magnitude:</u> Some short sections of hedgerow comprising 65m in total will be permanently removed for the UWF Grid Connection element of the Whole UWF Project. Approximately 710m of field boundary will be temporarily removed during construction for periods of up to six months. 20m of hedgerow removal will overlap (4 No.) for both the UWF Grid Connection and the UWF Related Works. Bat crossing structures will be installed at locations proximal to identified bat roosts or areas of high foraging activity, which will ensure that linear connectivity is maintained during this period. When construction is completed, all of these hedgerows will be reinstated to at least their former (or better) condition using semi-mature plants. The provision of these structures will avoid sequential effects on foraging bats in instances where hedgerow severance locations occur within the zone of effect of multiple project elements. In addition, several elements of the Project will involve hedgerow planting, as follows: the Upperchurch Hen Harrier Scheme will incorporate 2.8 km of new hedgerows, and additional hedgerows will be planted as part of the UWF Grid Connection (700m of new hedgerow), UWF Related Works (370m of new hedgerow) and Upperchurch Windfarm (360m as mitigation for loss of suitable hedgerows).</p>	
<p>Significance of the Cumulative Impact: Not Significant</p>	
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Only a small extent of hedgerow will be permanently lost. Additional hedgerow planting will more than mitigate for its loss; • All temporarily-removed field boundaries will be reinstated to at least their former (or better) condition in the medium term, as outlined in Chapter 5 Description of the Development; 	
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- The severance of most commuting routes / feeding areas will be short term in duration, reversible and offset by the planting of semi-mature trees and shrubs on a like-for-like basis; and
- The continuity of important bat commuting routes will be maintained using specially-designed bat crossing structures;

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

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8.8.4.3 Impact Evaluation Table: Disturbance or Displacement due to Lighting

Evaluation of UWF Replacement Forestry Excluded: As there will be no requirement for lighting, there is no potential for UWF Replacement Forestry to cause destruction or disturbance effects to Bats by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage:
(for Other Elements only) Construction stage

Cumulative Impact Source: Artificial lighting
Impact Pathway: Visibility

Impact Description: Bats are nocturnal animals, and typically avoid any source of natural or artificial light. Lighting in the vicinity of bat roosts can cause roost abandonment, reduction in numbers of individuals, and reductions in juvenile growth rates. In addition, lighting near hedgerows and other semi-natural habitats can form barriers to the movement of commuting bats, and displace bats from feeding areas.

All construction work will take place during daylight hours as part of Project Design, so it will not be necessary to use artificial lighting at construction works areas. However, lighting will be required at temporary construction compounds for security reasons. A series of bat protection measures have been incorporated into the Project Design in order to minimise the effects of lighting on bats. This will include the fitting of cowls (specifications in line with Best Practice) to all lights in order to minimise light spill, and the use of motion and time sensors to minimise the amount of time the lights are operational. Lights will not be left on overnight.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

3 No. Temporary compounds will be used for up to one year, and each location will be fitted with lights. The spatial extent of any disturbance or displacement effects will be small, due to the use of cowls: it would be directed towards the key areas required for security, and may illuminate an area of 10 - 20m from the light source. Lights will not be directed towards any bat roosts or key commuting routes / feeding areas. As lighting will be fitted with motion and time sensors, all lighting will be of momentary duration, typically only for approx. one minute for each time that the sensor is triggered.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The use of cowling will prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition.
- Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration.

Element 2: UWF Related Works

Impact Magnitude: No additional compounds required for the UWF Related Works. The already consented Site Compound No.1 at the Upperchurch Windfarm site will be used by construction personnel working on the UWF Related Works.

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<u>Significance of the Impact:</u> Imperceptible	<p style="text-align: center;">Bats</p> <p style="text-align: center;">Sensitive Aspect</p>	
<u>Rationale for Impact Evaluation:</u>		
<ul style="list-style-type: none"> • The use of cowling will prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition. • Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration 		
Element 4: Upperchurch Windfarm		
<u>Impact Magnitude:</u>		
All lighting within compounds will be cowed towards the centre of the compound.		
<u>Significance of the Impact:</u> Imperceptible		
<u>Rationale for Impact Evaluation:</u>		
<ul style="list-style-type: none"> • The use of cowling will prevent light spillage so there will be no change to their baseline condition. • Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration. 		
Element 5: UWF Other Activities		
<u>Impact Magnitude:</u>	<p style="text-align: center;">Biodiversity</p> <p style="text-align: center;">Topic</p>	
No artificial lighting is proposed for this element of the project.		
<u>Significance of the Impact:</u> Neutral impact		
<u>Rationale for Impact Evaluation:</u>		
<ul style="list-style-type: none"> • No artificial lighting will be required, so there will be no change to the baseline conditions 		
Evaluation of Cumulative Impacts – Disturbance or Displacement due to Lighting		
All Elements of the Whole UWF Project		
<u>Cumulative Impact Magnitude:</u>		
As noted above, some restrictions on lighting have been incorporated into the Project design in order to minimise the effects on bats. This will include the fitting of cowls to all lights in order to minimise light spill, and the use of motion and time sensors to minimise the amount of time the lights are operational. Lights will not be left on overnight. In addition, lighting may only be required for a maximum of one year in any location, and the spatial extent is expected to be of no more than 20m from the light source. Although there are some bat roosts and key commuting routes / feeding areas in the vicinity of the UWF Related Works, consented Upperchurch Windfarm and the UWF Grid Connection, the proposed project design measures will prevent the illumination of any such features, and will ensure that lights will only be active on a temporary basis. This will also prevent any sequential effects on roosting or foraging bats from multiple aspects of the Whole Project.		
Significance of the Cumulative Impact: Imperceptible		
<u>Rationale for Cumulative Impact Evaluation:</u>		
<ul style="list-style-type: none"> • The use of cowling will prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition. • Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration 		

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

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8.8.4.4 Cumulative Information: Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-68 below.

Table 8-68: Description and Rationale for Excluded Impacts to Bats

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Forestry Felling	1,2, 4, 5	Landcover	Mortality through roost destruction	In relation to 1, 2, 4: No likely effect, as homogenous conifer plantations have extremely limited potential or suitability for roosting bats. In relation to UWF Other Activities: No likely effect due to the absence of possible sources of hedgerow severance in respect of <u>UWF Other Activities</u> , no bat roosts were present and the trees at hedgerow trimming locations as part of Haul Route Activities are not suitable for roosting bats. No trimming is required for Overhead Line Activities.
Construction Works	1,2, 4,5	Bridge Upgrade Works	Mortality through roost destruction	No potential for effects, as no works are required to upgrade the integrity of structures along haulage routes. These bridges are already used by large vehicles on a regular basis, so the passage of construction vehicles would not represent a change from the baseline condition
Hedgerow Trimming	1,2, 4,5	Landcover	Inadvertent mortality through roost destruction	No potential for effects, as trimming involves only the removal of outer edges of branches which are unsuitable for Bats
Land use Change	1,2, 4,5	Renovation/alteration of Buildings	Destruction/Disturbance of Bat Roosts in Buildings	Neutral effect, as: an unoccupied dwelling house and associated outbuildings (Roost #16) will be used as a site office for the Upperchurch Windfarm. The use of the site office for welfare facilities will be very similar to its original use as a dwelling house. There will be no renovations of the exterior or interior of the building. No permanent or fixed lighting will be installed around the exterior of the property, and shutters or blinds will be used to prevent light spill from windows on the northern side which faces towards identified roosts. The outbuildings will not be used for storage. Given the above, there is a low probability that the change of use would have direct impacts on any bat roosts, and the magnitude and spatial extent of impacts is considered to be negligible, because: (i) there will be no destruction or disturbance of any of the bat roosts in these structures; and (ii) there will be no new artificial lighting near any roost exit / entry points; therefore, there will be Neutral effects on the bat roost. There will be no renovations or alterations of any other buildings.

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<u>Source(s) of Impacts</u>	<u>Project Element</u>	<u>Pathway</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
Noise and Vibration	1,2,4,5	Air	Disturbance or Displacement of Bat Roosts due to Noise and Vibration	Neutral Effect: Bats are not thought to be particularly sensitive to noise and / or vibration; this pathway for impacts is not discussed in any British or Irish guidelines. As there will be no construction works at night, there is no risk of noise or vibration impacts on foraging or commuting bats. Although there are some bat roosts within 10m of the Project, construction works will only be in close proximity to these roosts for no more than a half a day at any location. It is predicted that construction-related vibration will be approx. 0.5 to 1 mm/s within a zone of influence of approx. 5m. This would be barely perceptible to any human residents of properties, and therefore is also considered barely perceptible to any bats occupying a roost. Therefore, the magnitude of impacts reaching any bat roosts will be imperceptible.
Operational Stage				
Hedgerow Trimming	1,2, 4,5	Landcover	Inadvertent mortality through roost destruction	No potential for effects, as trimming of hedgerows involves only the removal of outer edges of branches which are unsuitable for Bats
EMF	1,2, 4	Air	Avoidance due to increased EMF	No likely effects, as literature supports no precedent for this as a viable impact.
Artificial Lighting	1, 4	Visibility	Disturbance or Displacement due to lighting	Neutral impact, as the only locations with operational lighting (substations, wind turbines) will incorporate bat-sensitive lighting (cowled, motion sensor and timer controlled) as part of the project design.
Noise and Vibration	1,2, 4,5	Air	Disturbance or Displacement due to noise/vibration	Neutral impact, as there will be no significant noise or vibration during the operational phase.
Above ground structures	1,2,4	Physical contact	Mortality of bats due to collision or barotrauma	No likely effect and no potential for cumulative impacts with Upperchurch Windfarm. Upperchurch Windfarm: As per the 2014 ABP Inspectors Report no significant impact to bats is expected to occur. There would be no potential for cumulative impacts with other project elements, as follows: UWF Grid Connection: no likely impact with the Mountphilips Substation, all other parts are either underground or at ground level (i.e. new roads), UWF Related Works: no likely impact with the Telecom Relay Pole, due to the immobility of this structure.
Decommissioning Stage				
Hedgerow Trimming	1,2, 4,5	Landcover	Inadvertent mortality	No potential for effects as the UWF Grid Connection will not be decommissioned.

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<u>Source(s) of Impacts</u>	<u>Project Element</u>	<u>Pathway</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
			through roost destruction	In relation to the UWF Related Works or Upperchurch Windfarm trimming activities, if they occur, will only involve the removal of outer edges of branches which are unsuitable for bats. UWF Other Activities, if they occur, will only involve the removal of outer edges of branches which are unsuitable for bats.
Artificial Lighting	1,2, 4	Air	Disturbance or Displacement due to lighting	No potential for effects, the UWF Grid Connection will not be decommissioned. In relation to the UWF Related Works or Upperchurch Windfarm, no potential for effects as there will be no requirement for lighting during decommissioning works
Noise and Vibration	1,2, 4	Air	Indirect Disturbance from Noise and Vibration	No potential for effects, the UWF Grid Connection will not be decommissioned. In relation to the UWF Related Works or Upperchurch Windfarm, no likely effects due to the small scale of decommissioning works or activities, with all work taking place from roads and turbine hardstands, so no potential to generate significant noise or vibration.

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8.8.5 UWF Replacement Forestry: Mitigation Measures for Impacts to Bats

Mitigation measures were incorporated into the project design. No additional mitigation measures are required as the topic authors conclude that **there is no potential for impacts** to occur to Bats as a consequence of the UWF Replacement Forestry.

8.8.6 UWF Replacement Forestry: Evaluation of Residual Impacts to Bats

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in the Evaluation of UWF Replacement Forestry (Section 8.8.1), i.e. **no potential for impacts**.

8.8.7 UWF Replacement Forestry: Application of Best Practice and the EMP for Bats

No UWF Replacement Forestry Best Practice Measures have been developed specifically for Bats.

The UWF Replacement Forestry will be planted and managed in accordance with the Department of Agriculture, Food & the Marine Guidance Documents – *Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards (2015)*, *Environmental Requirements for Afforestation (2016)* and *Management Guidelines for Ireland Native Woodlands (2017)*.

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8.8.8 Summary of Impacts to Bats

No impacts to Bats are concluded by the topic authors as likely to occur as a consequence of the development of UWF Replacement Forestry.

Table 8-69: Summary of the impacts to Bats

Impact to Bats:	Destruction or disturbance of bat roosts in trees	Severance of commuting routes or feeding areas	Disturbance or Displacement due to Lighting
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Section 8.8.4.1</i>	<i>Section 8.8.4.2</i>	<i>Section 8.8.4.3</i>
Project Life-Cycle Stage (for Other Elements only)	Construction	Construction/early Operation	Construction
<u>UWF Replacement Forestry</u>	No Potential for Impacts Evaluated as Excluded - see Section 8.8.1		
Element 1: UWF Grid Connection	Imperceptible	Imperceptible	Imperceptible
Element 2: UWF Related Works	Neutral	Imperceptible	Imperceptible
Element 4: Upperchurch Windfarm	Neutral	Not Significant	Imperceptible
Element 5: UWF Other Activities	Neutral	Neutral	Neutral
<u>Cumulative Impact:</u>			
All Other Elements of the Whole UWF Project	No Cumulative Impact	Not Significant	Imperceptible

The greyed out boxes in the summary table below relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

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8.9 Sensitive Aspect No.8: Non-Volant Mammals

This Section provides a description and evaluation of the Sensitive Aspect - Non-Volant Mammals.

8.9.1 BASELINE CHARACTERISTICS of Non-Volant Mammals

8.9.1.1 STUDY AREA for Non-Volant Mammals

The study area for Non-Volant Mammals in relation to the UWF Replacement Forestry is described in Table 8-70 and illustrated on **Figure RF 8.9: Non-Volant Mammals within the UWF Replacement Forestry Study Area** (Volume C3 EIAR Figures).

Table 8-70: UWF Replacement Forestry Study Area for Non-Volant Mammals

Study Area for Non-Volant Mammals	Justification for the Study Area Extents
Otter: Watercourse crossing location plus 300m in either direction Badger and Other Mammals: afforestation lands plus 50m	Professional Judgement and as pertinent: Otters: Best Practice guidelines published by the Highways Agency (1999) Badgers: Best Practice guidelines published by the NRA (2005) Other mammal species professional judgement and as per Best Practice (CIEEM, 2016).

8.9.1.2 Baseline Context and Character of Non-Volant Mammals in the UWF Replacement Forestry Study Area

The principal habitats within the context of Non-Volant (non-flying) Mammals include open grassland, bogs, moors, heath and marsh which provides foraging habitat, and coniferous forestry, mixed woodland, hedgerows, and scrub, which provide shelter and provide locations for breeding and resting.

Survey Results

Badger: No Badger setts were recorded within the UWF Replacement Forestry study area. A single print was recorded at ITM 594687 661526 within the study area, along a muddy farm track.

Otter: No Otter evidence was recorded within the UWF Replacement Forestry study area.

Other Species: Fallow Deer (found mainly in mature deciduous or mixed woodlands close to open grassland) are present throughout the receiving environment for the Whole UWF Project including UWF Replacement Forestry. Pine Marten was not recorded from the study area. Red Fox (found in a wide range of habitats) is present and was recorded within the study area. Irish Hare (found in bog, moor, heath and marsh in addition to mixed farmland, pastoral farmland and more marginal habitats) was not recorded.

8.9.1.3 Importance of Non-Volant Mammals

All native mammals are protected by legislation under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000.

Otter is listed on Annex II and Annex IV of the EU Habitats Directive. This Annex II listing requires Member States to designate Special Areas of Conservation (SACs) for the protection of the species. Otter is therefore listed as a qualifying interest of the Lower River Shannon SAC and, hence, is evaluated as of International Importance.

The Eurasian Badger has been given legal protection under the Wildlife Act and is listed in Appendix III of the Bern convention as a species in need of protection. Badger is evaluated as of National Importance.

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Pine Marten is listed on Annex V of the EU Habitats Directive and is afforded legal protection under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000. Annex V species are those whose taking from the wild is restricted by European law. Pine Marten are evaluated as of County Importance.

Irish Hare is evaluated as of National Importance. Red Squirrel is evaluated as of County Importance. Fallow Deer are evaluated as of Local Importance (Higher Value). Populations present of Red Fox, Rabbit and Wood Mouse are evaluated as of Local Importance (Lower Value).

The Greater White-toothed Shrew is an Amber-listed invasive species rated as ‘medium risk’ however their impact on conservation goals remains uncertain due to lack of data (Kelly *et al.*, 2017). As an invasive species no importance evaluation is assigned to this species. As a high impact invasive species American Mink is similarly not assigned an importance evaluation.

8.9.1.4 Sensitivity of Non-Volant Mammals

All mammals are sensitive to the direct effects from disturbance/displacement from breeding and foraging ranges as a result of noise and visual intrusion. Some species show variable or flexible responses such as Otter where research from English Nature (Chanin, 2013) suggests indicate that Otters will rest under roads, in industrial buildings, close to quarries, and at other sites close to high levels of human activity. Mammals are also sensitive to habitat loss and additive mortality from inadvertent contact with operating machinery or vehicles. The National Parks & Wildlife Service’s Threat Response Plan for the Otter (NPWS, 2009²¹), a review of and response to the pressures and threats to otters in Ireland, categorized three principal risks implicated in Otter declines across Europe: i) habitat destruction and degradation; ii) water pollution; and, iii) accidental death and/or persecution..

8.9.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

Available trends on general Irish mammals are limited however the most recent ‘red list’ (Marnell *et al.*, 2009) has judged most of Ireland’s terrestrial mammal species to be of ‘least concern’. Otter and Red Squirrel are considered near threatened.

Article 17 reporting suggests there appears to have been a genuine improvement in the status of Otter in Ireland with future prospects evaluated as ‘favourable’ (NPWS, 2013). The Badger population is currently stable in Ireland, estimated in Northern Ireland as 33,500 (Reid *et al.*, 2008) and in the Republic of Ireland as 84,000 (Sleeman *et al.*, 2009). The Pine Marten population is thought to be increasing, and is estimated at 3-10,000 mature individuals (O’Mahony *et al.*, 2007). Future prospects are evaluated as ‘favourable’ (NPWS, 2013).

Trends in respect of Greater White Toothed Shrew suggest the species is expanding its range by an average of 5.5 km/year (McDevitt *et al.*, 2014). American Mink distribution in Ireland is also expected to continue to increase (Roy *et al.*, 2009).

A scenario in which this proposed project does not take place would result in a continuation of current trends relating to Non-Volant Mammal species within the study area. Populations of mammals would be expected to remain as described above, i.e. favorable in the case of Otter, stable in the case of Badger etc.

8.9.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to Non-Volant Mammal species, 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.

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²¹ https://www.npws.ie/sites/default/files/publications/pdf/2009_Otter_TRP.pdf

8.9.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

The evaluation of cumulative impacts to Non-Volant Mammals considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.9.2.2.1](#) below.

The evaluation of cumulative impacts to Non-Volant Mammals also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Non-Volant Mammals with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to Non-Volant Mammals.

8.9.2.1 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Replacement Forestry Study Area along with the study areas for Other Elements which are described in Table 8-71.

Table 8-71: Cumulative Evaluation Study Area for Non-Volant Mammals

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Otter: Watercourse crossing locations plus 300m in either direction Badger and Other : construction works area, activity locations plus 50m in all directions	Professional Judgement and as pertinent: Otters: Best Practice guidelines published by the Highways Agency (1999) Badgers: Best Practice guidelines published by the NRA (2005) Other mammal species professional judgement and as per Best Practice (CIEEM, 2016).
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities:		
	Not Relevant – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects.	

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8.9.2.1.1 Potential for Impacts to Non-Volant Mammals

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Non-Volant Mammals. The results of this evaluation are included in Table 8-72.

The location of, and study area boundary associated with the Other Elements, which are included for cumulative evaluation, is illustrated on **Figure CE 8.9: Non-Volant Mammals within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-72: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	Included for the evaluation of cumulative effects
Element 2: UWF Related Works	Included for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	Included for the evaluation of cumulative effects
Element 5: UWF Other Activities	Included for the evaluation of cumulative effects

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8.9.2.2 Cumulative Information: Baseline Characteristics – Context & Character

8.9.2.2.1 Element 1: UWF Grid Connection

Baseline surveys of the UWF Grid Connection recorded Badger (*Meles meles*), Otter (*Lutra lutra*), Fallow Deer (*Dama dama*), Red Fox (*Vulpes Vulpes*), Irish Hare (*Lepus timidus hibernicus*), Rabbit (*Oryctolagus cuniculus*), Pine Marten (*Martes Martes*), American Mink (*Neovison vison*), Squirrel (*Sciurus spp.*), Wood Mouse (*Apodemus sylvatica*) and Greater White-toothed Shrew (*Crocidura russula*) using the study area.

The most frequently identified species was Badger, with field evidence in the form of tracks or prints, latrines and snuffle holes (evidence of feeding). Deer, presumably Fallow Deer, were the next most frequently recorded, followed by Red Fox.

No protected sites in respect of mammals exist within the study area.

Survey Results

Badger

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. Badger densities are lower in upland and mountainous areas, areas of bog, and marginal pasturelands along the Atlantic fringe. Several setts will be present within a badger group’s territory but the focus of the badger group is known as the ‘main’ sett. The main sett is situated roughly central within the group territory and is usually occupied throughout the year and used as the principal breeding sett. Annex setts or outlier setts are smaller and may only be used intermittently or seasonally. An active main sett is characterised by considerable signs of activity, such as copious bedding, nearby latrine (defecation) sites, and well-used paths. Studies in several Irish counties have shown that territory size can vary from as little as 15ha to almost 300ha, with a mean of about 80ha.

In respect of the UWF Grid Connection, seven Badger setts were identified at varying distance of 28m to 290m from the construction area boundaries. Only a single (main) sett is within 50m of construction works,

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with the remainder at 60m (main), 64m (annex), 130m (annex- confirmed as active), 240m (annex), 237m (annex) and 290m (annex) as described. Setts are located in forestry (n=2), Riparian woodland (n=2), and hedgerows (n=3).

Overall, a total of 83 locations of Badger evidence in the form of tracks, prints and latrines were identified. The highest densities of recorded evidence were in closer proximity to setts and broadly correlate to within 500m. No animals were observed however this is typical in respect of a nocturnal species.

Further detail on Badger survey results, including the distribution of recorded evidence, is included in [Section A8-1.2.4.9 of Appendix 8-1: Detailed Biodiversity Information and Data](#) (Volume C4 EIA Appendices).

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 may have to range more than 20km to find sufficient food. Territorial marking typically occurs by means of sprainting or anal secretions. These marks are left mostly at features such as bridge footings, boulders, grass tussocks and stream confluences. Within their territories an individual otter may utilise a number of resting sites within its territory; these can be hidden refuges above ground (couches), or under-ground chambers (holts). Holts tend to be natural crevices, associated with the roots of trees growing along river and lake banks. These natural recesses provide the otter with a holt that has multiple entrances from which the otter can escape if disturbed. Couches occur frequently in dense vegetation and may be associated with frequently used runs and slides into the water. The rearing of cubs occurs within ‘natal holts’, which are not marked by spraint. Although capable of breeding at any time of the year, a peak in breeding occurs during the summer and early autumn.

Otters that live in rivers and lakes tend to be completely nocturnal, described as being crepuscular – activity peaks at dusk and dawn. Otters are principally piscivorous (fish eating), relying predominantly on salmonids (salmon and trout), but also eel and small fish species such as stickleback. However, otters are not limited to fish and feed opportunistically on a range of prey when available: frogs are frequently eaten by otters, and the remains of invertebrates (crayfish), birds and small mammals have also been found in spraints.

There were seven records of Otter within the UWF Grid Connection study area, consisting of paths, slides, tracks and spraints. Evidence was distributed across the Reardnogy Beg River (a tributary of the Clare River, n=3), the Bilboa River (n=2), the Mulkear River (n=1) and the Munnia Stream (a tributary of the Newport River, n=1). Evidence suggestive of either Otter or Mink was recorded at one of the described locations on the Reardnogy Beg and is assumed to be Otter on a precautionary basis. No active breeding or resting sites (Holts or Couches) were identified. No animals were observed however this is typical in respect of a species where most activity takes place at night. The location of otter records within the study area are presented on [Figure GC 8.9: Non-Volant Mammals within the UWF Grid Connection Study Area](#). [Figure GC 8.9](#) is part of the EIA Report for the UWF Grid Connection, and is included in [Volume E: Reference Documents](#) with this planning application.

Further detail on Otter survey results, including all recorded evidence, is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.9\)](#).

Other species

Fallow Deer (found mainly in mature deciduous or mixed woodlands close to open grassland) are present throughout the receiving environment and evidence was recorded along the UWF Grid Connection corridor. There were four records of Pine Marten evidence noted and this species is assumed to occur in suitable habitat (coniferous or mixed forestry and scrub). Red Fox (found in a wide range of habitats) and Irish Hare (found in bog, moor, heath and marsh in addition to mixed farmland, pastoral farmland and more marginal

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habitats) are present throughout the UWF Grid Connection Study Area. Presumed evidence of Red Squirrel (mainly found in coniferous or mixed woodland) was observed at 2 no. locations along the UWF Grid Connection corridor. There was no evidence of Irish Stoat in any surveys to inform this appraisal.

The location of recorded evidence of Fallow Deer, Pine Martin, Red Squirrel, Irish Hare and Field Mouse, is included in [Appendix 8-1: Detailed Biodiversity Information and Data \(Section A8-1.2.4.9\)](#).

The carcass of the invasive species, Greater White-toothed Shrew (*Crocidura russula*) was recovered within the 50m study area of the UWF Grid Connection next to a Fox scat. American Mink is also present within the study area (Mink scat recorded at least 2 locations).

8.9.2.2.2 Element 2: UWF Related Works

Survey Results

Badger: No Badger setts were recorded within the UWF Related Works study area.

Otter: No Otter evidence was recorded within the UWF Related Works study area.

Other species

Fallow Deer (found mainly in mature deciduous or mixed woodlands close to open grassland) are present throughout the receiving environment for the Whole UWF Project and are expected to occur in habitats adjacent to UWF Related Works. As Pine Marten evidence was noted from other elements of the Whole UWF Project this species is assumed to occur in suitable habitat (coniferous or mixed forestry and scrub) where it occurs. Red Fox (found in a wide range of habitats) and Irish Hare (found in bog, moor, heath and marsh in addition to mixed farmland, pastoral farmland and more marginal habitats) are present.

8.9.2.2.3 Element 4: Upperchurch Windfarm

Survey Results

Badger: As per the 2013 RFI, within the Upperchurch Windfarm a disused single entrance sett has been described approximately 250m southwest of T7 and a single disused entrance badger sett was recorded along a field boundary 150m west of T4. Evidence of Badger foraging was recorded in prior surveys for the 2013 RFI.

Otter: As per the 2013 EIS, no Otter was recorded during surveys at the Upperchurch Windfarm site.

Other Species: Fallow Deer (found mainly in mature deciduous or mixed woodlands close to open grassland) evidence was recorded previously within the Upperchurch Windfarm (as per the 2013 RFI). There were no records of pine marten (*Martes martes*), hedgehog (*Erinaceus europaeus*) and Irish stoat (*Mustela erminea subsp. hibernica*) during surveying. The habitats within the study area offer potential habitat for the species. Irish Hare does occur and was observed during RFI studies. Red Fox and Pygmy shrew were recorded as present

8.9.2.2.4 Element 5: UWF Other Activities

Haul Route Activity Locations:

No mammal evidence was recorded. This is as expected given the locations of activities generally occur in immediate proximity to or overlap public roads.

Overhead Line Activity Locations:

Incidental records of mammal signs and individuals were made during surveys (January 2018) within the overhead line activities study area, findings of note are summarised below.

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An old Otter Holt was recorded within the bank of a drainage ditch in the townland of Killonan. An otter pathway located 80 metres west of AM 3 was recorded between the Groody River and an adjoining stream, also in the townland of Killonan.

No active Badger setts were recorded within close proximity to the poles. An old badger sett was recorded within the hedgerow 180 metres north east AM 78, in the Mountphilips townland.

Additional mammals noted included Fox, Fallow Deer, and Rabbit. Mammal pathways were recorded frequently within hedgerows and through treelines. These could be used by a number of mammal species.

8.9.2.2.5 Other Projects or Activities:

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.9.2.1.

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8.9.3 PROJECT DESIGN MEASURES for Non-Volant Mammals

At the conception of the UWF Replacement Forestry, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-73 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Non-Volant Mammals**.

Table 8-73: UWF Replacement Forestry Project Design Measures relevant to Non-Volant Mammals

PD ID	Project Design Environmental Protection Measure (PD)
RF-PD 01	All planting and maintenance activities will be carried out during daylight hours
RF-PD 05	A water setback from the watercourse which flows through the site will be established during planting works. The setback will be 10m from the edge of the watercourse. No planting or other works will be carried out in this 10m wide buffer area. Native woodland will be planted beyond this distance in accordance with Silvicultural Standards for Native Woodland Establishment GP9 & GP10 (Department of Agriculture, Food and the Marine, 2015).
RF-PD 07	The lands will be protected from livestock by the perimeter fence.
RF-PD 08	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
RF-PD 09	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
RF-PD 10	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken <u>while cubs are present in the holt</u> and NPWS will be notified immediately
RF-PD 11	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
RF-PD 12	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as ‘out of bounds’. Fencing will be in accordance with Clause 303 of the NRA’s Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.
RF-PD 13	Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary of identified badger setts to determine the current status of known badger setts (i.e. active or inactive) and to determine if any new setts have been established in the intervening period following initial pre-planning surveys and the commencement of construction activity. These confirmatory badger surveys will be undertaken no more than 12 months in advance of proposed construction activities, during the period November and April when vegetation cover is reduced. NWPS will be notified immediately if the sett previously identified is confirmed as active

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	or if a further active sett is located within 50 meters of the footprint of the development. If sett exclusion is required, this will be undertaken by an experienced ecologist under the necessary license and following best practice guidance (NRA, 2005).
RF-PD 14	No construction works will be carried within 50m of an active sett during the main breeding season (December 1 st to June 30 th).
RF-PD 15	Construction activity in the environs of a known active badger sett outside of the breeding period will follow NRA (2005) guidelines, i.e. no heavy machinery will be used within 30m of badger setts (unless carried out under license); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Related Works and UWF Other Activities and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4: EIAR Appendices](#).

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8.9.4 EVALUATION OF IMPACTS to Non-Volant Mammals

In this Section, the likely direct and indirect effects of the UWF Replacement Forestry are identified and evaluated. Then the likely cumulative effects of the UWF Replacement Forestry together with the Other Elements of the Whole UWF Project are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Non-Volant Mammals.

As a result of the exercise, some impacts were included and some were excluded.

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Table 8-74: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
Badger: Habitat Loss (construction stage)	Otter – Loss of Habitat, (construction stage)
Badger: Disturbance/Displacement (construction stage)	Secondary Mortality of Otter, (construction stage)
Otter: Disturbance/Displacement (construction stage)	Secondary Mortality of Badger, (construction stage)
Irish Hare, Pine Marten, Red Squirrel and -Fallow Deer: Habitat Loss (construction stage)	Secondary Mortality of Pine Marten, Red Squirrel, Fallow Deer, Irish Hare, (construction stage)
Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance/Displacement (construction stage)	Introduction or spread of invasive species- White Toothed Shrew, (construction stage)
	Introduction or spread of invasive species- White Toothed Shrew, (operational stage)
	Disturbance/Displacement of General Non-Volant Mammals, (operational stage)
	Secondary Mortality of General Non-Volant Mammals, (operational stage)
	Introduction or spread of invasive species- White Toothed Shrew, (operational stage)
	Disturbance/Displacement of General Non-Volant Mammals, (operational stage)
	Secondary Mortality of General Non-Volant Mammals, (operational stage)

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The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.9.4.1 to 8.9.4.5.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.9.4.6.

8.9.4.1 Impact Evaluation Table: Badger - Habitat Loss

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Impact Description

Project Life Cycle Stage:	Planting Stage/Growth Stage
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Impact Source: afforestation

Cumulative Impact Source: Excavations, construction of new access roads, compounds and hardstanding areas

Impact Pathway: Land cover

Impact Description: Badger is evaluated as a High Sensitivity receptor. Afforestation and construction works will cause a permanent loss of some suitable foraging or breeding habitat in the form of grassland, woodland and/or hedgerows under the footprint of permanent structures such as new access roads, compounds, and hardstanding areas. Habitat loss is avoided by the use of concealed geocell roadways (UWF Grid Connection), replanted with grass or heather, within the SPA. Some temporary loss will occur during construction works; and as reinstatement will occur immediately following the completion of construction works in an area – effects will be Neutral.

Loss of suitable foraging habitat, may affect body condition, survival rate and/or breeding capacity dependant on the percentage of loss within a groups territory (>25% is considered as significant²²) and the availability of other food resources. Badgers will benefit positively from varying degrees of hedgerow enhancement, the creation of new hedgerows and also the management of lands as part of the Upperchurch Hen Harrier Scheme.

Impact Quality: positive, negative,

Evaluation of the Subject Development Impact – Badger: Habitat Loss

Element 3: UWF Replacement Forestry

Impact Magnitude: 4Ha of suitable foraging habitat for Badger in the form of improved agricultural grassland will undergo a permanent land use change to a mixed species, native woodland, which will comprise tall trees and understory shrubs, along with wide ride lines, and a mix of tall grasses and scrub land cover maintained during the growth stage. The existing riparian habitat will be enhanced through the planting of Hazel, alder and willow species, and protected through the placement of fencing. The area to be created represents 5% of an average territory size (80Ha).

Significance of the Impact: Slight (Positive)

Rationale for Impact Evaluation:

- No setts were identified within the study area for UWF Replacement Forestry, but prints indicating a foraging range were noted, and;
- The extent of habitat change which is;
- A positive contrast with baseline conditions;
- With permanent duration, and;
- Low reversibility.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude: There will be a total permanent land use change within 500m of all 7 identified Badger Setts of 0.17Ha comprising Improved agricultural grassland (0.14Ha), Wet Grassland (0.01Ha), Hedgerows (.003Ha)

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²² NRA. *Guidelines for the treatment of Badgers prior to the construction of National Road Schemes*. <http://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Badgers-prior-to-the-Construction-of-a-National-Road-Scheme.pdf>

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and Treelines (.0003Ha), (based on an average 80Ha territory per sett). This represents 0.05% of available habitat (340Ha in total).

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The extent of land use change, within the context (less than 1%) of an average territory size of 80Ha, and;
- No significant contrast with baseline conditions is expected, notwithstanding;
- The duration of permanent land use change, and;
- Low reversibility

Element 2: UWF Related Works

Impact Magnitude: 0.5Ha of suitable foraging habitat as Spoil and Bare Ground, recolonising bare ground, improved agricultural grassland, wet grassland, Conifer plantation and Scrub will be permanently lost. 170m of hedgerow will also be lost, comprising primarily earthen banks.

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- The extent of land use change, within the context (less than 1%) of an average territory size of 80Ha, and;
- No active Badger setts were recorded in baseline studies of the UWF Related Works locations, and;
- No contrast with baseline conditions is expected.

Element 4: Upperchurch Windfarm

Impact Magnitude:

As per the 2013 EIS: Some permanent, irreversible loss of foraging habitat within the improved agricultural grassland in the south-eastern section of the proposed site where a badger trail and droppings were observed.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

• "Arising from my assessment above and based on the information available therefore I Conclude that the development will not give rise to Significant adverse effects on the environment and that ongoing impacts are limited in terms of scale and significance and can be remediated."

Element 5: UWF Other Activities

Impact Magnitude: No permanent land take of Badger foraging or breeding habitat.

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- Badgers are not likely to forage extensively or rely on roadside habitats, and;
- No permanent land use change will occur, and;
- The brief duration of any temporary effects, with;
- No significant contrast with baseline conditions expected, and;
- The reversibility of temporary habitat loss with reinstatement of roadside verges following delivery and;
- Positive effects will accrue from land management as part of the Upperchurch Hen Harrier Scheme, and;
- Overhead Line Activities will not require land take of suitable Badger habitat nor contrast with the existing environment.

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Evaluation of Cumulative Impacts – Badger: Habitat Loss	
All Elements of the Whole UWF Project	
<p><u>Cumulative Impact Magnitude:</u> Instances of foraging and or breeding habitat loss will occur across the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm; however as setts have only be identified proximal to the UWF Grid Connection study area, in combination effects are limited to this element.</p> <p>Other temporary loss will occur, and UWF Replacement Forestry will result in a permanent land cover change, to habitat also suitable for Badger resulting in a slight positive change to higher quality breeding and foraging habitat. Management activities as part of the Upperchurch Hen Harrier scheme, whilst targeted at Hen Harrier will also benefit and possibly attract Badgers to the area.</p>	
Significance of the Cumulative Impact: Not Significant	
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> ● The extent of total land use change within identified territories, and; ● No significant contrast with baseline conditions is expected, and; ● The long-term duration of permanent land use change, with; ● Low reversibility, is; ● Offset by management activities as described 	

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

8.9.4.2 Impact Evaluation Table: Badger - Disturbance/Displacement

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Impact Description	
Project Life Cycle Stage:	Planting Stage
<u>Impact Source:</u> Noise and Visual Intrusion	
<u>Cumulative Impact Source:</u> Construction Noise and Visual Intrusion	
<u>Impact Pathway:</u> Air and visibility	
<p><u>Impact Description:</u> Badgers are high sensitivity receptors. Disturbance to or Displacement of Badgers may occur where planting works and construction works are in close proximity to occupied Badger Setts. Serious disturbance may cause an avoidance response and result in the mortality of cubs, which are typically underground during the months of January through to February prior to emergence in April.</p> <p>Works will be undertaken during daylight hours only as part of Project Design, which significantly reduces effects. No construction works will take place within 50m of an active badger sett in the main breeding season (December to June inclusive), as part of Project Design.</p>	
<u>Impact Quality:</u> Negative	

Evaluation of the Subject Development Impact – Badger: Disturbance/Displacement

Element 3: UWF Replacement Forestry
<u>Impact Magnitude:</u> No impact
Significance of the Impact: No potential for impacts
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No setts were identified within the study area, and • All planting will be done by hand, undertaken during daylight hours, and; • Of temporary duration; • No contrast to baseline conditions is expected.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection
<p><u>Impact Magnitude:</u></p> <p>Of the 7 setts identified, one main sett is located 31m from the Construction area boundary. Disturbance is possible at this location, from both cable trenching and excavation, and passing traffic along a temporary access road. Remaining setts will remain undisturbed due to distance from works. Additional Badger setts present within the vicinity are outside the zone of effect for disturbance (range 130m-240m) and therefore sequential effects will not occur i.e. multiple instances of repeated disturbance on the same individuals. The magnitudes of any effects are evaluated as high.</p>
<u>Significance of the Impact:</u> Moderate
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The proximity of a main sett to a source of disturbance i.e. cable trenching and passing traffic, and; • No construction works will take place within 50m of an active badger sett in the main breeding season (December to June inclusive) as part of project design. • Duration will be short term with relevant sections likely to be completed over a period of weeks, and; • Completed during daylight hours.

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Element 2: UWF Related Works	Non-Volant Mammals	
<u>Impact Magnitude:</u> None		
<u>Significance of the Impact:</u> No potential for impact		
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • No active Badger setts were identified in baseline studies of UWF Related Works. 		
Element 4: Upperchurch Windfarm		
<u>Impact Magnitude:</u> 'Some noise and anthropogenic disturbance during the construction phase of the development'.	Sensitive Aspect	
<u>Significance of the Impact:</u> not significant		
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • Duration temporary. • Impact from disturbance is expected to be mostly reversible post construction. • As per the UWF EIS 2013 - it is probable that a negative impact to badger will not be significant'. 		
Element 5: UWF Other Activities		
<u>Impact Magnitude:</u> Negligible		
<u>Significance of the Impact:</u> Neutral effect.	Topic	
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • No Badger setts were identified at Haul Route Activity locations or within 50m of same. • Overhead Line Activities at any one location will be brief-momentary in duration, conducted during daylight hours only, with no excavations and the use only of light vehicles. • Activities pertaining to the Upperchurch Hen Harrier Scheme management prescriptions will be similar to existing agricultural activities. 		
Evaluation of Cumulative Impacts – Badger: Disturbance/Displacement		
All Elements of the Whole UWF Project		
<u>Cumulative Impact Magnitude:</u> The UWF Related Works or UWF Replacement Forestry will not contribute to cumulative effects as Neutral effects are expected from both of these projects. Cumulative effects of the Other Elements of the Whole UWF Project relate to the UWF Grid Connection and the consented Upperchurch Windfarm, which are expected to have Moderate and Not Significant effects, respectively.		
Significance of the Cumulative Impact: Moderate		
<u>Rationale for Cumulative Impact Evaluation:</u> <ul style="list-style-type: none"> • The proximity of an active badger main sett and badger records in the study areas; • Project design measures to avoid/reduce effects on Badger, with • Duration will be short term with relevant sections likely to be completed over a period of weeks at locations in proximity to setts along the UWF Grid Connection, and; • Works completed during daylight hours only. 		

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

8.9.4.3 Impact Evaluation Table: Otter - Disturbance/Displacement

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Impact Description

Project Life Cycle Stage: Planting Stage

Impact Source: Noise and Visual Intrusion

Cumulative Impact Source: Construction Noise and Visual Intrusion

Impact Pathway: Air and visibility

Impact Description: Otter are rated as a very high sensitivity receptor (based on International importance ratings) and do not tolerate disturbance at or near holts (breeding dens) that are in active use (breeding may occur at any time of the year, but most likely during the period). As no active holts were located within 150m (upstream or downstream) of the watercourse within the afforestation lands or UWF Related Works/UWF Grid Connection works locations (i.e. watercourse crossings) then effects are reduced to disturbance/displacement of foraging or resting animals, primarily within aquatic habitats but also within adjacent riparian corridors. This could include the disturbance of animals at resting places (couches).

These effects are reduced by an adherence to completing works during daylight hours only as part of Project Design. However watercourses are present which form part of or are hydrologically connected to European Sites (cSAC's) which include Otter as a Qualifying Interest. Significant effects on Otter from displacement resulting from noise or visual intrusion may therefore affect in turn the integrity of these designated site(s).

Impact Quality: Negative

Evaluation of the Subject Development Impact – Otter: Disturbance/Displacement

Element 3: UWF Replacement Forestry

Impact Magnitude: Negligible

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- No active holts or resting places were recorded in baseline studies, and;
- All planting will be done by hand, and;
- Undertaken during daylight hours, and
- Of temporary duration;
- No significant contrast to baseline conditions is expected.
- Any effect will be reversible, given the low magnitude of source disturbance.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

5 No. watercourse crossings have been identified as potential sources of disturbance to Otter. A number of sensitive locations, specifically where recorded Otter evidence occurs close to drilling operations at the Newport (Mulkear) (W10) and Bilboa Rivers (57), cable trenching works at W7 (the Munnia, a tributary of the Newport). In addition, trenching works within 2 existing structures, and the movement of construction traffic over these existing structures along the Reardnogy Beg (at Watercourse Crossings W43, W44) where otter evidence was identified. The magnitude of source disturbance/stimulus from drilling operations is considered the greater effect in terms of types of watercourse crossings. Although considered unlikely (due to the phased approach being undertaken as part of Project Design for Class 1 and 2 watercourses) the potential exists for sequential effects should animals be displaced and consequently encounter a second source stimulus on a Class 3 or 4 watercourse.

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<p><u>Significance of the Impact:</u> Slight (residual impact – see UWF Grid Connection EIA Report)</p>	Non-Volant Mammals
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The implementation of Additional Mitigation Measure AMM-01:Disturbance to or displacement of Otter – see UWF Grid Connection EIA Report • The very high sensitivity <u>rating</u> of the species, and; • Recorded Otter evidence in close proximity to the identified crossings, notwithstanding; • Works will take place during daylight hours, and; • The brief-temporary duration of disturbance events, with • Project design measures to avoid/reduce effects also in place , however; • Effects may not be reversible. 	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Negligible</p>	Sensitive Aspect
<p><u>Significance of the Impact:</u> Neutral effect</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No active holts were identified overlapping the construction area boundaries or within 150m, and; • Works will take place during daylight hours only, and; • Be of brief-temporary duration. 	
Element 4: Upperchurch Windfarm	
<p><u>Impact Magnitude:</u> None</p>	Sensitive Aspect
<p><u>Significance of the Impact:</u> Neutral effects</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No Otter were recorded and hence disturbance effects were not scoped in for evaluation. 	
Element 5: UWF Other Activities	
<p><u>Impact Magnitude:</u> Negligible</p>	Sensitive Aspect
<p><u>Significance of the Impact:</u> Neutral effect</p>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No otter holts or resting places were recorded at Haul Route Activity locations, and; • Locations of Overhead Line Activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours; • The offsetting effects of long term management activities for the Hen Harrier scheme which will promote and enhance existing Otter habitat – including the enhancement of riparian corridors. • The low reversibility of the above described management. 	
Evaluation of Cumulative Impacts – Otter: Disturbance/Displacement	
All Elements of the Whole UWF Project	
<p><u>Cumulative Impact Magnitude:</u> There is no likelihood for additive cumulative effects to individual Otters from both the UWF Grid Connection and UWF Related Works or the Upperchurch Windfarm due to the separation distance between the 5 No. UWF Grid Connection watercourse crossing points and the UWF Related Works/UWF crossing points.</p>	

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<p>There is no potential for cumulative additive effects to Otters from both the UWF Related Works and the Upperchurch Windfarm due to the absence of Otter recorded at the watercourses within these sites. There is no potential for cumulative effects of the UWF Replacement Forestry with the Other Elements due to the Neutral effect of UWF Replacement Forestry.</p> <p>The in combination effect of the whole project, where considered in its entirety is in the order of Project Element 1 i.e. the Grid Connection.</p>
<p>Significance of the Cumulative Impact: Slight</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Notwithstanding the separation distances between the 5 no. watercourse crossing locations along the UWF Grid Connection and the watercourse crossing locations associated with the UWF Related Works and Other Elements, and • The absence of Otter records at the UWF Related Works, UWF Replacement Forestry and UWF study areas, and • Works will take place during daylight hours, and; • Be brief-temporary in duration; • The high sensitivity of the species .and context of crossing locations as part of Project Element 1 utilizing drilling within an SAC with Otter as a Qualifying Interest, with; • Recorded evidence of Otter in close proximity, and • Potential (albeit unlikely) for sequential effects

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.9.4.4 Impact Evaluation Table: Irish Hare, Pine Marten, Red Squirrel and Fallow Deer - Habitat Loss

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Impact Description	
Project Life Cycle Stage:	Afforestation
<p><u>Impact Source:</u> afforestation</p> <p><u>Cumulative Impact Source:</u> groundworks and vegetation clearance, new access roads and hardstanding areas</p> <p><u>Impact Pathway:</u> Land cover</p> <p><u>Impact Description:</u> Populations of Pine Marten and Red Squirrel are evaluated as of County Importance. Populations of Irish Hare are evaluated as of National Importance. Populations of Fallow Deer are evaluated as of Local Importance (Higher Value).</p> <p><u>UWF Replacement Forestry:</u> Afforestation will result in the permanent land use change/creation of some suitable foraging or breeding habitat - deciduous and mixed forestry/woodland/Scrub in respect of Pine Marten, Red Squirrel and Fallow Deer and open fields and grassland in respect of Irish Hare. The management of deciduous woodland as UWF Replacement Forestry (permanent) will have secondary positive effects for mammals species through the provision of enhanced shelter and foraging habitat.</p> <p><u>UWF Related Works/UWF Grid Connection:</u> Construction Works will involve groundworks and vegetation clearance which will result in the temporary and/or permanent land use change of some suitable foraging or breeding habitat - deciduous and mixed forestry/woodland/Scrub in respect of Pine Marten, Red Squirrel and Fallow Deer and open fields, grassland and upland heath and bog in respect of Irish Hare. Temporary land use change will be reinstated immediately resulting in Neutral effects. Permanent effects will be avoided by the use of concealed, geocell roads within the SPA as part of Project Design, the instatement of heather (which will also provide shelter for Hare and Deer and foraging opportunities for Pine Marten) in lieu of 1Ha of clear felled forestry at Castlewaller, the creation of new hedgerows as part of the UWF Grid Connection and UWF Related Works, and management activities as part of the Upperchurch Hen Harrier Scheme which will have secondary positive effects for mammals species through the provision of enhanced shelter and foraging habitat.</p> <p><u>Impact Quality:</u> Negative and positive</p>	
Evaluation of the Subject Development Impact – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Habitat Loss	
Element 3: UWF Replacement Forestry	
<p><u>Impact Magnitude:</u> Construction Works will include land take of some suitable foraging habitat for Irish Hare and Fallow Deer. The loss of foraging habitat is offset by the provision of further breeding and foraging habitat through replanting of deciduous woodland.</p>	
Significance of the Impact: Not significant	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of land use change is primarily improved agricultural grassland, and; • A slight positive contrast with baseline conditions is expected from management, • Which is of Permanent Duration and ; • Not reversible. 	

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Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Permanent land use change of 2.04Ha (1%) of available suitable foraging or breeding Pine Marten, Red Squirrel and Fallow Deer habitat (184.6Ha).
Permanent land use change of 2.77ha (1.4%) of available suitable foraging or breeding Irish Hare habitat (198Ha).

Significance of the Impact: Not Significant for Pine Marten, Red Squirrel and Fallow Deer, and Slight for Irish Hare

Rationale for Impact Evaluation:

- The extent of permanent land use change, evaluated as low (1-5%), within the context of available habitat, and;
- Comprises a minor shift from baseline conditions; notwithstanding
- Reinstatement measures will provide suitable habitat;
- The permanent duration , and
- Low reversibility.

Element 2: UWF Related Works

Impact Magnitude:

Permanent land use change of 0.28Ha (<1%) of available suitable foraging or breeding Pine Marten, Red Squirrel and Fallow Deer habitat (48Ha).
Permanent land use change of 0.19ha (<1%) of available suitable foraging or breeding Irish Hare habitat (123Ha).

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The extent of permanent land use change, evaluated as Negligible (1-5%), within the context of available habitat, and;
- Comprises a very slight change from baseline conditions; notwithstanding;
- The long term duration, and
- Low reversibility;

Element 4: Upperchurch Windfarm

Impact Magnitude:

Pine Marten: There shall be loss of potential suitable habitat, due to the loss of conifer plantation. This negative effect is irreversible.

Irish Hare: Some loss of habitat within the footprint of the Upperchurch Windfarm.

Red Squirrel: Not recorded, therefore Neutral effect.

Fallow Deer: There is a high probability (>50% likelihood) that the Construction Works will include land take of some suitable habitat for Fallow Deer. The scale of habitat loss is evaluated as negligible in the context of available habitat.

Significance of the Impact: Not significant

Rationale for Impact Evaluation:

- No Pine Marten were recorded during studies to inform the baseline EIS, and;
- The scale of Pine Martin habitat loss (4.35Ha) is evaluated as negligible in the context of available forestry habitat.
- Fallow Deer were recorded in low numbers (n=5) during studies to inform the EIS RFI, and;
- The scale of habitat loss (4.35Ha) is evaluated as negligible in the context of available forestry habitat

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Element 5: UWF Other Activities	Non-Volant Mammals Sensitive Aspect
<u>Impact Magnitude:</u> Negligible	
<u>Significance of the Impact:</u> Neutral effects	
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • The absence of habitat loss, and; • The brief duration of any effects, and; • No significant contrast with baseline conditions is expected, and; • The reversibility of temporary habitat loss with reinstatement of roadside verges following delivery and; • The offsetting effects of management activities for the Hen Harrier scheme which will promote and enhance existing mammalian habitat, with; • Neutral effects likely from Overhead Line Activities as described due to the brief duration of same, and an adherence to working during daylight hours. 	
Evaluation of Cumulative Impacts – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Habitat Loss	
All Elements of the Whole UWF Project	
<u>Cumulative Impact Magnitude:</u> Instances of land use change of suitable habitat for Irish Hare, Pine Marten, Red Squirrel and Fallow Deer will occur in the context of the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm. Sequential effects may occur from multiple sources of land take occurring simultaneously at different locations. Effects will be offset by the management of lands such as UWF Replacement Forestry and the Upperchurch Hen Harrier Scheme.	
<u>Significance of the Cumulative Impact:</u> Not Significant for Pine Marten, Red Squirrel and Fallow Deer, and Slight for Irish Hare	
<u>Rationale for Cumulative Impact Evaluation:</u> <ul style="list-style-type: none"> • The extent of habitat loss overall (1-5%); • Will limit effects as animals will have ample habitat to move into in respect of any permanent land use change, even in the instance of sequential land use change, and; • No significant contrast with baseline conditions is therefore expected, and; • The offsetting effects of management activities for the Upperchurch Hen Harrier scheme and UWF Replacement Forestry will promote and enhance existing mammalian habitat. 	

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.9.4.5 Impact Evaluation Table: Irish Hare, Pine Marten, Red Squirrel and Fallow Deer - Disturbance /Displacement

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Impact Description

Project Life Cycle Stage: Planting Stage

Impact Source: Noise and Visual Intrusion

Cumulative Impact Source: Construction Noise and Visual Intrusion

Impact Pathway: Air and visibility

Impact Description: Populations of Pine Marten and Red Squirrel are evaluated as of County Importance. Populations of Irish Hare are evaluated as of National Importance. Populations of Fallow Deer are evaluated as of Local Importance (Higher Value).

Disturbance or displacement effects from visual intrusion and other anthropogenic sources may have secondary effects from stress, on breeding success, foraging capacity and in a worst-case result in effective habitat loss through displacement. Responses will vary dependant on species (some have increased sensitivity inherently or at varying times of the year such as during the reproductive cycle) and existing habituation (e.g. to farming activities). Effective habitat loss is offset by the high availability of suitable habitat for all species under consideration. An adherence to working during daylight hours only also greatly reduces the likelihood of effects, with most animals expected to undergo brief-temporary effects before returning to previously occupied habitats. The probability of disturbance from visual intrusion and anthropogenic sources is evaluated as medium (5-50% likelihood) given the distribution of fauna recorded, availability of suitable habitat and existence of source stimuli from e.g. farming activities across much of the project elements under consideration.

The potential for sequential effects through multiple sources of stimulus operating concurrently does exist with multiple work crews in operation at the same time. In this instance initially displaced animals may subsequently encounter a second stimulus, leading to additive disturbance.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance /Displacement

Element 3: UWF Replacement Forestry

Impact Magnitude: Negligible

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- All planting will be done by hand, and;
- All planting will be undertaken during daylight hours, therefore;
- No significant contrast to baseline conditions is expected.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Populations of the above species in the immediate vicinity of the work locations such as cable trenching, traffic movements, cable laying etc. will experience a temporary source of disturbance/displacement. All are expected to return with no permanent displacement considered likely. Sequential effects may occur should animals encounter multiple sources of source stimulus. Overall populations are not expected to be affected.

Significance of the Impact: Moderate

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<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The temporary duration of the main stimulus associated with trenching and ducting expected to last 20-24 weeks overall, and; • Works will take place during daylight hours only, and; • The expected contrast with baseline conditions from the introduction of visual and other anthropogenic sources.
<p>Element 2: UWF Related Works</p>
<p><u>Impact Magnitude:</u></p> <p>Populations of the above species in the immediate vicinity of the work locations such as cable trenching, traffic movements, cable laying, road widening, Haul Route Works, re-alignment of wind farm roads etc. will experience a temporary source of disturbance/displacement. The spatial extent of any disturbance/displacement will be limited to the immediate vicinity of the construction area boundaries. Sequential effects may occur should animals encounter multiple sources of source stimulus. Overall populations are not expected to be affected.</p>
<p><u>Significance of the Impact:</u> Moderate</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The temporary duration of works, and; • Works will take place during daylight hours only, and; • The expected contrast with baseline conditions from the introduction of visual and other anthropogenic sources.
<p>Element 4: Upperchurch Windfarm</p>
<p><u>Impact Magnitude:</u></p> <p>Some noise and anthropogenic disturbance during the construction phase of the development. Duration temporary. Impact from disturbance is expected to be mostly reversible post construction.</p>
<p><u>Significance of the Impact:</u> Not Significant</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The species of terrestrial mammal including badger within the study area are not consider likely to be impacted by Upperchurch Windfarm apart from the increase in noise and activity during construction phase which would be deemed a localized and temporary impact with species expected to return soon after construction.
<p>Element 5: UWF Other Activities</p>
<p><u>Impact Magnitude:</u></p> <p>Populations of the above species in the immediate vicinity of the activities such as Hedgerow trimming, Overhead Line Activities will experience a temporary source of disturbance/displacement. All are expected to return with no permanent displacement considered likely. Sequential effects may occur should animals encounter multiple sources of source stimulus. Overall populations are not expected to be affected.</p>
<p><u>Significance of the Impact:</u> Moderate</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The temporary duration of works, and; • Works will take place during daylight hours only, and; • The expected contrast with baseline conditions from the introduction of visual and other anthropogenic sources. • The offsetting effects of management activities for the Hen Harrier scheme which will promote and enhance existing mammalian habitat.

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Non-Volant Mammals	Evaluation of Cumulative Impacts – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance /Displacement
	<p>All Elements of the Whole UWF Project</p> <p><u>Cumulative Impact Magnitude:</u> Instances of disturbance may occur across all elements, cumulative impacts may occur where various Elements are located in close proximity to each other The scale/magnitude of any disturbance response is evaluated as medium. The spatial extent of any disturbance/displacement will be limited to the immediate vicinity of the construction area boundaries. Sequential effects are unlikely given the alternative habitat available.</p> <p>Significance of the Cumulative Impact: Moderate</p>
Sensitive Aspect	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The temporary duration of works, and; • Works will take place during daylight hours only, and; • The expected contrast with baseline conditions from the introduction of visual and other anthropogenic sources. • The offsetting effects of management activities for the Upperchurch Hen Harrier Scheme which will promote and enhance existing mammalian habitat.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.9.4.6 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-75 below.

Table 8-75: Description and Rationale for Excluded Impacts to Non-Volant Mammals

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Planting Stage/Construction Stage				
Land take	1,2,3,4, 5	Land cover	Otter: Loss of habitat	Evaluated as Excluded: There will be no permanent loss of aquatic habitat (Elements 1,2,4). Any loss of riparian habitat will be negligible, resulting in no contrast to baseline conditions and Neutral effects on Otter. No loss of aquatic habitat in relation to Elements 3, 5.
Operating Machinery	1,2,3,4	Direct Contact	Otter: Secondary Mortality	Evaluated as Excluded: No holts of resting places are located within the works areas associated with Elements 1,2,3,4). Sources of mortality are therefore restricted to accidental collision with vehicles, which is avoided through works only occurring in daylight hours. Neutral effects.
Operating Machinery	1,2,4	Direct Contact	Badger: Secondary Mortality	Evaluated as Excluded: No setts are located within the construction works areas. Sources of mortality are therefore restricted to accidental collision with vehicles, with effects avoided through an adherence to only working during daylight hours. Neutral effects.
Operating Machinery	1,2,4,5	Direct Contact	Pine Marten, Red Squirrel, Fallow Deer, Irish Hare: Secondary Mortality	Evaluated as Excluded: Works will only be conducted during daylight hours. Potential Secondary mortality is limited to vehicular collision and as such effects are considered unlikely.
Delivery of Materials	1,2,3,4,5	Landscaping	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew	Evaluated as Excluded: The Irish population of this invasive species is considered as Established/ Widespread and expanding. Range estimated at 7,600km ² in 2013, with a rate of expansion of 0.5-14.1km/yr depending on landscape characteristics (McDevitt <i>et al.</i> , 2014 ²³). It is considered that the low number of deliveries of organic materials such as marker posts or hedging (a likely source of transportation or introduction) will have Neutral additive effects, within the context of background trends (a species already established and increasing rapidly).

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²³ McDevitt, A.D., Montgomery, W.I., Tosh, D.G., Lusby, J., Reid, N., White, T.A., McDevitt, C.D., O'Halloran, J., Searle, J.B. and Yearsley, J.M., (2014). Invading and expanding: range dynamics and ecological consequences of the greater white-toothed shrew (*Crocidura russula*) invasion in Ireland. PLoS One. 2014 Jun 23; 9(6):e100403. doi: 10.1371/journal.pone.0100403. eCollection 2014

Sensitive Aspect		Non-Volant Mammals		Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
		Growth Stage/Operational Stage						
		Delivery of Materials	1,2,3,4,5	Land-scaping	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew	Evaluated as Excluded: No significant deliveries of materials are required for any Element of the Whole UWF Project.		
		Noise and human activity	1,2,3,4,5	Air and Visibility	General Non-Volant Mammals: Disturbance/Displacement to all non-volant mammals	Evaluated as Excluded: Levels of operational maintenance will have Neutral disturbance effects to mammals.		
		Operating Machinery	1,2,3,4,5	Direct Contact	General Non-Volant Mammals: Secondary Mortality	Evaluated as Excluded: Frequency of vehicular usage too low for measurable effect – any effects will be Neutral.		
Decommissioning Stage								
		Delivery of Materials	1,2,3,4,5	Landscaping	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew	Evaluated as Excluded: In relation to Element 1, 3, no potential for effects as no decommissioning will take place. In relation to Element 2,4,5 – no significant deliveries of materials are required.		
		Noise and Human Activity	1,2,3,4,5	Air and Visibility	General Non-Volant Mammals: Disturbance/Displacement to all non-volant mammals	Evaluated as Excluded: In relation to Element 1, 3, no potential for effects as no decommissioning will take place. In relation to Element 2,4,5 – Daylight hours of works, habituation, and limited frequency of disturbance reduces disturbance/displacement to 'Neutral'		
		Operating Machinery	1,2,3,4,5	Direct Contact	General Non-Volant Mammals: Secondary Mortality	Evaluated as Excluded: In relation to Element 1, 3, no potential for effects as no decommissioning will take place. In relation to Element 2,4,5 – Reduced vehicular movement, limited to established roads only reduces effect to 'Neutral effect'. Mammals will have become habituated to existing roads. Frequency of growth stage vehicular usage reduces effect for Element 3 to Neutral.		
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8.9.5 Mitigation Measures for Impacts to Non-Volant Mammals

Mitigation measures were incorporated into the UWF Replacement Forestry project design including the Project Design Measures. No additional mitigation measures are required as **no significant adverse impacts** are concluded by the topic authors as likely to occur to Non-Volant Mammals as a consequence of the UWF Replacement Forestry.

8.9.6 Evaluation of Residual Impacts to Non-Volant Mammals

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impacts are the same as the Impacts set out in Impact Evaluation Table sections for Non-Volant Mammals above (Section 8.9.4) – i.e. **no significant adverse impacts**.

8.9.7 Application of Best Practice and the EMP for Non-Volant Mammals

Best Practice Measures (BPM), although not part of the Project Design for the UWF Replacement Forestry, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of Non-Volant Mammals, by the authors of this topic chapter, using industry best practice:

RF-BPM-01	Monitoring of non-native invasive plant species
RF-BPM-02	Management of general non-native invasive species

These Best Practice Measures are included in full at the end of this topic chapter, and also included as **Appendix 5.1: UWF Replacement Forestry Best Practice Measures** in **Volume C4: EIAR Appendices**.

8.9.7.1 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan is included as **Appendix 5.2: Invasive Species Management Plan**.

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8.9.8 Summary of Impacts to Non-Volant Mammals

A summary of the Impact to Non-Volant Mammals is presented in Table 8-76.

Table 8-76: Summary of the impacts to Non-Volant Mammals

Impact to Non-Volant Mammals:	Badger: Habitat Loss	Badger: Disturbance /Displacement	Otter: Disturbance /Displacement	Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Habitat Loss	Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance /Displacement
<i>Evaluation Impact Table</i>	<i>Section 8.9.4.1</i>	<i>Section 8.9.4.2</i>	<i>Section 8.9.4.3</i>	<i>Section 8.9.4.4</i>	<i>Section 8.9.4.5</i>
Project Life-Cycle Stage	Planting Stage	Planting Stage	Planting Stage	Planting Stage	Planting Stage
<u>UWF Replacement Forestry</u>	Slight (positive)	No potential for Impact	Neutral	Not Significant	Neutral
Element 1: UWF Grid Connection	Not Significant	Moderate	Slight	Ranges from Not Significant to Slight	Moderate
Element 2: UWF Related Works	Neutral	Neutral	Neutral	Not Significant	Moderate
Element 4: Upperchurch Windfarm	Not Significant	Not Significant	Neutral	Not Significant	Not Significant
Element 5: UWF Other Activities	Neutral	Neutral	Neutral	Neutral	Moderate
<u>Cumulative Impact:</u>					
All Elements of the Whole UWF Project	Not Significant	Moderate	Slight	Ranges from Not Significant to Slight	Moderate

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

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8.10 Sensitive Aspect No.9: Amphibians & Reptiles

This Section provides a description and evaluation of the Sensitive Aspect - Amphibians & Reptiles.

8.10.1 BASELINE CHARACTERISTICS of Amphibians & Reptiles

8.10.1.1 STUDY AREA for Amphibians & Reptiles

The study area for Amphibians & Reptiles in relation to the UWF Replacement Forestry is described in Table 8-77 and illustrated on **Figure RF 8.10: Amphibians & Reptiles within the UWF Replacement Forestry Study Area** (Volume C3 EIAR Figures).

Table 8-77: UWF Replacement Forestry Study Area for Amphibians & Reptiles

Study Area for Amphibians & Reptiles	Justification for the Study Area Extents
A 50m area around and incorporating the lands to be afforested	Professional Judgement and as per Best Practice (CIEEM, 2016).

8.10.1.2 Baseline Context and Character of Amphibians & Reptiles in the UWF Replacement Forestry Study Area

Suitable habitat exists within the study area for Common Frog *Rana temporaria* and Common Lizard (Viviparous Lizard).

Smooth Newt has been recorded from Co. Tipperary in suitable habitat (Meehan 2013). In general it is perceived that information gaps exist in terms of the distribution of these species in North Tipperary (Browne 2007). Extrapolated data primarily from the 2011 National Frog Survey (Reid *et al.*, 2013), used to inform Irelands Article 17 reporting to the EU does not indicate any distribution of this species within the 10km square which overlaps the UWF Replacement Forestry (R96).

Common frog is one of only three amphibians found in Ireland. It is a widespread and abundant species occurring in a broad range of habitats throughout the country. Adults congregate to spawn in ponds and ditches in the spring. Eggs develop into tadpoles as water temperature rises and following metamorphosis; young froglets emerge onto land in early summer. These young animals are particularly vulnerable to predation. They spend 2-3 years on land, feeding on terrestrial invertebrates, before returning to freshwater to breed. Life expectancy of 3-4 years would be typical.

Viviparous Lizard (*Lacerta vivipera*) is likely to occur in suitable habitat as the species is found in a range of habitat such as woodland, marshes, moors, and bog.

Survey Results: No amphibians or reptiles were recorded from site visits to the UWF Replacement Forestry lands, however as Viviparous Lizard (*Lacerta vivipera*) was recorded in suitable habitat (acid grassland) within the adjacent Upperchurch Windfarm study area, it is considered that this species is likely to occur on the UWF Replacement Forestry lands also.

8.10.1.3 Importance of Amphibians & Reptiles

All amphibian and reptile species are protected under the Wildlife Act (1976, amended 2000).

The Common Frog is also listed on the Annex V of the Habitats Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC), meaning that the removal of this species from the wild is restricted by European law.

All amphibians and reptiles present are evaluated as of Local Importance (Higher Value).

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8.10.1.4 Sensitivity of Amphibians & Reptiles

Amphibians and reptiles are sensitive to direct mortality, including at the larval stage (frogs), habitat loss, habitat fragmentation and disturbance through visual intrusion, noise and vibration. Amphibian declines have also been linked to the emergence of previously unrecorded diseases.

Populations of Amphibians and Reptiles are evaluated as Low Sensitivity receptors.

8.10.1.5 Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

The Common Frog was assessed as having a ‘Favourable’ conservation status within the National Frog survey of Ireland 2010/11 (Reid *et al.*, 2013). Its conservation status is classified as least concern in a European context (Kuzmin *et al.*, 2009). No estimate of population trend is available as the 2010/11 survey provided the first baseline for the country.

The Smooth Newt has a conservation status of least concern in a European context (Arntzen *et al.*, 2009). There is no population estimate available for Ireland and therefore, there is no evidence to illustrate the current population status.

There is no population estimate to-date for Viviparous Lizards in Ireland and hence, there is no evidence to illustrate the current population status. In a European context, the Viviparous Lizard has a conservation status of least concern (Agasyen *et al.*, 2010).

Given the above, a scenario in which this proposed project does not take place would result in a continuation of current trends relating to amphibians and reptiles within the study area.

8.10.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to amphibians and reptiles, as identified above, will be the receiving environment at the time of construction and on into the operational phase . Recorded species are expected to persist.

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8.10.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

NOTE: GREY Shading relates to additional information to facilitate the cumulative evaluations

8.10.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Amphibians & Reptiles considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.10.2.2.1](#) below.

The evaluation of cumulative impacts to Amphibians & Reptiles also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Amphibians & Reptiles with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to Amphibians & Reptiles.

8.10.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area comprises of the UWF Replacement Forestry Study Area along with the study areas for Other Elements which are described in Table 8-78.

Table 8-78: Cumulative Evaluation Study Area for Amphibians & Reptiles

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	50m area around and incorporating the construction works areas, afforestation lands and activity locations	Professional Judgement and as per Best Practice (CIEEM, 2016).
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities:	Not Relevant – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects.	

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8.10.2.2.1 Potential for Impacts to Amphibians & Reptiles

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Amphibians & Reptiles. The results of this evaluation are included in Table 8-79.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on **Figure CE 8.10: Amphibians & Reptiles within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-79: Evaluation of the Other Elements of the Whole UWF Project

Other Element of the Whole UWF Project	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Evaluated as excluded</u> : No likely effects due to: No evidence of Amphibian or Reptile species was recorded from habitat or other surveys of the UWF Other Activities locations.

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8.10.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.10.2.3.1 Element 1: UWF Grid Connection

Extrapolated data primarily from the 2011 National Frog Survey (Reid *et al.*, 2013), used to inform Irelands Article 17 reporting to the EU does indicate distribution of this species within at least one 10km square overlapping the UWF Grid Connection (R86).

Common frog: Adult frogs were recorded in 6 locations along the UWF Grid Connection. Tadpoles were recorded in 2 locations. These are illustrated on **Figure GC 8.10: Amphibians & Reptiles within the UWF Grid Connection Study Area**. **Figure GC 8.10** is part of the EIA Report for the UWF Grid Connection, and is included in **Volume E: Reference Documents** with this planning application.

Smooth Newt: Due to their wide distribution across Ireland, there is the possibility that Smooth Newt (*Lissotriton vulgaris*) occurs within suitable habitat (typically garden ponds, natural pools, drainage ditches and quarry ponds). However, this species was not recorded during walkover surveys of the UWF Grid Connection which we note overlapped the optimum survey period for the species (late - March and early April 2016).

Viviparous Lizard (*Lacerta vivipera*) was also not recorded.

8.10.2.3.2 Element 2: UWF Related Works

Extrapolated data primarily from the 2011 National Frog Survey (Reid *et al.*, 2013), used to inform Irelands Article 17 reporting to the EU does not indicate any distribution of this species within either 10km square overlapping the UWF Related Works (R95 and R96).

Viviparous Lizard (*Lacerta vivipera*) was recorded in suitable habitat (acid grassland) within the UWF Related Works study area boundary. No Common Frog or Smooth Newt was noted, but both species is considered as likely to occur in suitable habitat. As per the 2013 EIS, Common Frog is described from a number of locations within the overlapping Upperchurch Windfarm.

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8.10.2.3.3 Element 4: Upperchurch Windfarm

Upperchurch Windfarm: As per the 2013 EIS, Common Frog is described from a number of locations within the Upperchurch Windfarm. Viviparous Lizard (*Lacerta vivipera*) was also recorded in suitable habitat in acid grassland within the Upperchurch Windfarm. This species has not been previously recorded in the study area (NBDC, 2016). The location of this survey record is identified on **Figure CE 8.10: Amphibians & Reptiles within the Cumulative Evaluation Study Area.**

8.10.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 8.10.2.2.1.

8.10.2.3.5 Other Projects or Activities

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.10.2.1.

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8.10.3 PROJECT DESIGN MEASURES for Amphibians & Reptiles

At the conception of the UWF Replacement Forestry, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-80 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Amphibians & Reptiles**.

Table 8-80: UWF Replacement Forestry Project Design Measures relevant to Amphibians & Reptiles

PD ID	Project Design Environmental Protection Measure (PD)
RF-PD 03	All planting and maintenance activities will be carried out during daylight hours

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection, UWF Related Works and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in **Appendices 5.3, 5.4 and 5.5**, in **Volume C4: EIAR Appendices**.

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8.10.4 EVALUATION OF IMPACTS to Amphibians & Reptiles

In this Section, the likely direct and indirect effects of the UWF Replacement Forestry are identified and evaluated. Then the likely cumulative effects of the UWF Replacement Forestry together with the Other Elements of the Whole UWF Project are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Amphibians & Reptiles.

As a result of the exercise, no impacts were included for evaluation.

Table 8-81: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
No impacts included for evaluation	<i>Habitat degradation (compaction, change in drainage), (construction stage)</i>
	<i>Reduction in foraging and breeding habitat, (construction stage)</i>
	<i>Disturbance/Displacement, (construction stage)</i>
	<i>Physical injury/destruction of individual amphibians and reptiles, (construction stage)</i>

The source-pathway-receptor links and the rationale for excluded impacts are described in **Section 8.10.4.1**

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8.10.4.1 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-82 below.

Table 8-82: Description and Rationale for Excluded Impacts to Amphibians & Reptiles

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Planting Stage/Construction Stage				
Landtake	1,2,3,4	Soils/ Surface Water	Habitat degradation (compaction, change in drainage)	Evaluated as Excluded: Construction Works associated with Elements 1,2,4 may result in some secondary effects on habitat composition for Amphibians and Reptiles, however the spatial extent of this will be Negligible and any habitat degradation effects to local populations are likely to be Neutral. No compaction or habitat degradation likely as a result of Element 3 or 5.
Landtake	1,2,3,4,5	Landcover	Reduction in foraging and breeding habitat	Evaluated as Excluded: In relation to Element 1,2, 4 - There is a high probability that the Construction Works will include some land use change of suitable foraging or breeding habitat. Any other habitat loss is temporary as reinstatement will occur within 2 weeks. No permanent land use change associated with Element 5. Any permanent land use change (Elements 1,2,3,4) is unlikely to be significant within the context of available habitat and low occurrence of species as described herein. The extent of land use change is evaluated as negligible in the context of available habitat. The spatial extent of any loss will be limited to works within the construction boundary comprising permanent features. Neutral effects on Amphibians or Reptiles.
Noise and human activity	1,2,4,5	Visibility	Disturbance/Displacement	Evaluated as Excluded: Construction works and activities may result in some cross-factor effects from disturbance stimuli (visual and vibration related), however due to the spatial extent, limited frequency, and brief duration of any disturbance/displacement, it is considered that any disturbance or displacement effects to local populations are likely to be Neutral.
Operating Machinery	1,2,3,4,5	Direct Contact	Physical injury/mortality of individuals	Evaluated as Excluded: Identified locations do not overlap construction works areas or activity locations. Neutral effects.
Growth Stage/Operational Stage				
Evaluated as Excluded: Operational Stage works or activities will cause Negligible source magnitude or duration of effects, and any effects on Amphibians and Reptiles are expected to be Neutral.				
Decommissioning Stage				
Evaluated as Excluded: Decommissioning Works may result in some cross-factor effects from disturbance stimuli (visual and vibration related), however the spatial extent, limited frequency, and brief duration will be Negligible and any effects to local populations are likely to be Neutral.				

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8.10.5 Mitigation Measures for Impacts to Amphibians & Reptiles

Mitigation measures were incorporated into the project design, and it is this design that has been evaluated in this topic chapter. No additional mitigation measures are required as the topic authors conclude that **Neutral impacts** are likely to occur to Amphibians & Reptiles as a consequence of the UWF Replacement Forestry.

8.10.6 Evaluation of Residual Impacts to Amphibians & Reptiles

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in the Description and Rationale for Excluded Impacts to Amphibians & Reptiles in Section 8.10.4.1, i.e. **Neutral impact**.

8.10.7 Application of Best Practice and the EMP for Amphibians & Reptiles

Best Practice Measures (BPM), although not part of the Project Design for the UWF Replacement Forestry, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Amphibians & Reptiles**, by the authors of this topic chapter, using industry best practice:

RF-BPM-01	Monitoring of non-native invasive plant species
RF-BPM-02	Management of general non-native invasive species
RF-BPM-03	Best practice methods to ensure the protection of Viviparous lizard (<i>Lacerta (Zootoca) vivipara</i>)

These Best Practice Measures are included in full at the end of this topic chapter, and also included as **Appendix 5.1: UWF Replacement Forestry Best Practice Measures** in **Volume C4: EIA Appendices**

8.10.7.1 Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species.

The Invasive Species Management Plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to any incursions and to control existing invasive species populations. The Invasive Species Management Plan is included as **Appendix 5.2: Invasive Species Management Plan**.

8.10.8 Summary of Impacts to Amphibians & Reptiles

Neutral impacts to Amphibians & Reptiles are concluded by the topic authors as likely to occur.

Table 8-83: Summary of the impacts to Amphibians & Reptiles

Impact to Amphibians & Reptiles	No Impacts
<i>Evaluation</i>	<i>Section 8.10.4.1</i>
Project Life-Cycle Stage	All
<u>UWF Replacement Forestry</u>	Neutral Impacts / No Likely Impacts
Element 1: UWF Grid Connection	Neutral impacts / No likely impacts
Element 2: UWF Related Works	Neutral impacts / No likely impacts
Element 4: Upperchurch Windfarm	Neutral impacts / No likely impacts
Element 5: UWF Other Activities	No Likely Impacts - Evaluated as excluded, See Section 8.10.2.2.1
<u>Cumulative Impact:</u>	
All Elements of the Whole UWF Project	No Potential for Cumulative Impacts (as Neutral impacts from any individual Element)

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Amphibians & Reptiles with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.10.2.1).

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8.11 Sensitive Aspect No.10: Marsh Fritillary

This Section provides a description and evaluation of the Sensitive Aspect - Marsh Fritillary.

8.11.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

8.11.1.1 Baseline Characteristics of Marsh Fritillary in relation to UWF Replacement Forestry

Marsh Fritillary (*Euphudras aurinia*) has a wide distribution across Ireland, but the distribution is patchy and it is still considered overlooked in some parts of its range. Colonies can be found in a variety of habitats including calcareous grassland, degraded bogs, wet heath, transition mires and fens up to 300m (Reagan *et al.*, 2010). It is the only protected butterfly species in Ireland. The population often fluctuates within its range dependant on weather, food supply and interaction with parasites. Larvae overwinter in a small web close to the ground and emerge in early spring. At a local level, populations can fluctuate highly and are subject to extremely low levels or periodic extinctions.

No suitable habitat for Marsh Fritillary was recorded on or adjacent (50m) to the UWF Replacement Forestry lands.

8.11.1.2 Evaluation of UWF Replacement Forestry

It is evaluated that the UWF Replacement Forestry has **no potential to cause impacts to Marsh Fritillary**, for the following reasons:

- No potential for habitat loss as there is no suitable habitat for Marsh Fritillary in or adjacent (50m) to the afforestation lands,
- No potential for mortality of in-flight adults or in-situ larvae, as no suitable habitat or Marsh Fritillary populations were recorded within or adjacent (50m) to the afforestation lands,
- No potential for disturbance or displacement effects during planting or management activities, as no suitable habitat or Marsh Fritillary populations were recorded within or adjacent (50m) to the afforestation lands and no heavy machinery is required.

8.11.1.3 Cumulative Evaluation for the Other Elements (grey background)

UWF Replacement Forestry is part of a whole project which comprises the following Other Elements; Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Replacement Forestry is Element 3. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

UWF Replacement Forestry has no potential to cause impacts to Marsh Fritillary by itself, and therefore cannot have a cumulative effect. However, the Other Elements must be considered because the UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in Section 8.11.2 to Section 8.11.4 and included in the summary table in Section 8.11.8 in order to show the totality of the project.

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8.11.2 CUMULATIVE INFORMATION for Other Elements and Other Projects or Activities

8.11.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Marsh Fritillary considered all of the Other Elements of the Whole UWF Project. A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.11.2.2.1](#) below.

The evaluation of cumulative impacts to Marsh Fritillary also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Marsh Fritillary with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.3: Scoping of Other Projects or Activities \(Section A2.3 .1 and Section A2.3. 8\)](#).

The results of this scoping exercise are that: no other projects or activities will cause cumulative effects to Marsh Fritillary with UWF Replacement Forestry, however in order to present the totality of the project – Forestry, Agriculture and Turf-Cutting activities have been scoped in for evaluation of cumulative effects relating to the Other Elements.

8.11.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area is described in Table 8-84.

Table 8-84: Cumulative Evaluation Study Area for Marsh Fritillary

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	50m area around and incorporating the construction works areas, afforestation lands, activity locations	Professional Judgement and as per Best Practice (CIEEM, 2016).
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities: Forestry Agriculture Turf-Cutting Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. <u>There is no potential for cumulative effects with the UWF Replacement Forestry.</u>		

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8.11.2.2.1 Potential for Impacts to Marsh Fritillary

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect Marsh Fritillary. The results of this evaluation are included in Table 8-85.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on **Figure CE 8.11: Marsh Fritillary within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 8-85: Evaluation of the Other Elements and Other Projects or Activities

<u>Other Element of the Whole UWF Project</u>	
Element 1: UWF Grid Connection	<u>Included</u> for the evaluation of cumulative effects
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Evaluated as excluded</u> : No potential for effects due to: No suitable habitat for Marsh Fritillary overlaps Haul Route Activity locations or the Upperchurch Hen Harrier Scheme. Marsh Fritillary was recorded proximal to Overhead Line Activities on Shower Bog in 2001. The exact location is unknown however no suitable habitat exists at structure locations in close proximity along the overhead line route.
<u>Other Projects or Activities</u>	
Forestry/Agriculture/Turf-Cutting	<u>Yes, included</u> for the evaluation of cumulative effects (Forestry is included as afforestation is a source of habitat loss). Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. <u>There is no potential for cumulative effects with the UWF Replacement Forestry.</u>

8.11.2.3 Cumulative Information: Baseline Characteristics – Context & Character

The identification and protection of breeding sites is listed as a regional issue of concern in the Tipperary County Development Plan with inadvertent loss of previously unknown colonies an identified threat. Previous records exist from 2 locations proximal to the Whole UWF Project, Cumber Bog near Kilcommon (<2km) and Dromsallagh, near Cappawhite (~10km). The evidence all indicates that the Marsh Fritillary is relatively sedentary, rarely dispersing beyond 750m, although colonisation may rarely take place over longer distances of 5–20 km (Warren 1994). The distance of 2km has been previously considered as a standardised ‘functional landscape’ i.e. the area within which most dispersal, new colonisation and regular exchange of genetic material will occur (Fowles & Smith 2006).

The total area of suitable habitat identified from all 3 colonies within the UWF Related Works/Upperchurch Windfarm and UWF Grid Connection study areas comprises 1.2Ha in total with colonies being dispersed at intervals of 10.7km and 12km respectively.

Further detail on survey results, including the distribution of recorded webs and larvae are presented in **Appendix 8-1: Detailed Biodiversity Information and Data (Section A8-1.2.4.11)**. The location and extent of Marsh Fritillary habitat and species within the Cumulative Evaluation Study Area is illustrated on **Figure CE 8.11: Marsh Fritillary within the Cumulative Evaluation Study Area**, with more detailed mapping provided on **Figure GC 8.11: Marsh Fritillary within the UWF Grid Connection Study Area** and **Figure RW 8.11: Marsh**

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Fritillary within the UWF Related Works Study Area. Figure GC 8.11 is part of the EIA Report for the UWF Grid Connection, and Figure RW 8.11 is part of the EIA Report for the UWF Related Works, both are included in Volume E: Reference Documents with this planning application.

8.11.2.3.1 Element 1: UWF Grid Connection

Survey Results

Suitable Marsh Fritillary habitat patches were identified at two locations, Bournadomeeny and Bealaclave, along the UWF Grid Connection. Subsequent visits were undertaken during optimal periods (September 2016, April 2017 and September 2017) to map the scale of these habitat patches and measure/confirm occupancy through the recording in situ larval webbing or emerged Larvae as applicable to the survey period.

The total area of suitable habitat at Bournadomeeny comprises 0.57Ha of which 0.003ha (0.52 %) overlaps or is within the construction area boundaries. The available habitat is spread over a number of scattered pockets as is typical of the species. In September 2016, larval webs were located 42.5 and 65.8 m south of the construction works area boundary whilst single larvae were located 169.8 m north and 60.4 m south of the works area. In April 2017 a total of 583 no. larvae and 1 no. web were confirmed during walked transects through all suitable habitat at this location. Three clusters of larvae (31, 16 and 2 individuals) were located within suitable habitat overlapping the works area. In September 2017, 16 larval webs were recorded within habitats present at this location. This colony size is classified as (Medium i.e. the predicted peak population is 100-1000 adults).

The total area of suitable habitat at Bealaclave comprises 0.1Ha of which 0.00005ha (0.05%) overlaps or is within the construction area boundaries. Two larval webs were recorded on 22nd September 2016, 34.6 m and 36.5 m south of the works area. In April 2017, 69 larvae were counted during the walked transects at this location. The majority were grouped (12, 40 and 11) together, close to the location of a larval web recorded in September 2016. The remaining larvae were scattered in small numbers across the larger area of suitable habitat. The nearest larva was recorded 21.7 m south of the construction works area boundary. The main cluster of larvae was 32.1 m south of the construction works area. No larvae were located within suitable habitat overlapping the works area boundary. In September 2017 a single web was recorded. This colony size is classified as Small (i.e. the predicted peak population is <100 adults).

The location and extent of Marsh Fritillary habitat and species is illustrated on Figure GC 8.11: Marsh Fritillary within the UWF Grid Connection Study Area. Figure GC 8.11 is part of the EIA Report for the UWF Grid Connection, and is included in Volume E: Reference Documents with this planning application.

8.11.2.3.2 Element 2: UWF Related Works

Suitable habitat for Marsh Fritillary overlaps UWF Related Works construction works areas at Shevry, where cabling as part of UWF Related Works are to be placed under roads consented as part of the Upperchurch Windfarm.

Habitat for Marsh Fritillary to the extent of 0.54Ha is present at Shevry, of which 0.062Ha (11.5%) overlaps the construction works area. Evidence of breeding in the form of larval webbing was recorded at 4 locations within this habitat in September 2017 - all outside the works area boundary. A parasitic Braconid wasp of the genus *Cotesia* was also recorded. This species can be an influencing factor in local level population fluctuations and may be a limiting factor in records of the species from this location. This colony size is classified as (Small i.e. the predicted peak population is <100 adults) and is located 10.7km east of Bournadomeeny and 12.1km east of Bealaclave.

The location and extent of Marsh Fritillary habitat and species is illustrated on Figure RW 8.11: Marsh Fritillary within the UWF Related Works Study Area. Figure RW 8.11 is part of the EIA Report for the UWF Related Works, and is included in Volume E: Reference Documents with this planning application.

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8.11.2.3.3 Element 4: Upperchurch Windfarm

Habitat for Marsh Fritillary at Upperchurch is the same habitat identified in relation to the UWF Related Works above– i.e. 0.54Ha is present at Shevry, of which 0.062Ha (11.5%) overlaps the construction works area for both the Upperchurch Windfarm and the UWF Related Works (the Internal Windfarm Cabling will be constructed within the new windfarm road at this location).

8.11.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded – see Section 8.11.2.2.1.

8.11.2.3.5 Other Projects or Activities

Turf-Cutting: Only one Marsh Fritillary colony is known within the geographical study area for Cumulative effects (2km); this is located at Cummer Bog. Cummer bog is subject to peat extraction (turf cutting).

Colonies may occur in wet grassland (Agriculture) but are unlikely to be present in Forestry.

Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is no potential for cumulative effects with the UWF Replacement Forestry.

8.11.2.4 Cumulative Information Baseline Characteristics - Importance of Marsh Fritillary

Marsh Fritillary is the only butterfly species resident in Ireland that is listed in Annex II of the EU Habitats Directive 92/43/EEC. The population/habitat extent recorded from the current study is evaluated as of County Importance.

8.11.2.5 Cumulative Information Baseline Characteristics - Sensitivity of Marsh Fritillary

Marsh Fritillary is sensitive to habitat loss, directly through land take or indirectly through compaction from vehicular movement. Individuals are considered as sensitive to vibrations on a precautionary basis. At the webbing stage larvae are sensitive to habitat disturbance and direct mortality from contact with machinery. Marsh fritillary habitat is sensitive to land use change from drainage regime modification, the application of nutrients, higher intensities of grazing, the introduction of invasive species and alteration of physical structure. At a landscape level habitat fragmentation may affect population function at a larger scale (Asher *et al.*, 2001).

8.11.2.6 Cumulative Information Baseline Characteristics - Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)

The species was assessed as having an ‘Inadequate’ conservation status with an overall declining conservation trend in the most recent Article 17 report (NPWS, 2013) as required under the EU Habitats Directive 92/43/EEC. Within the Article 17 report, the range was assessed as ‘favourable’, the population was assessed as ‘inadequate’ with a qualifier of declining, habitat was assessed as ‘favourable’ and future prospects as ‘inadequate’ with a qualifier of declining. The species is classified as vulnerable due to a population decline of ≥ 30 percent (A2c) in the Irish Red List for Butterflies (Reagan *et al.*, 2010). Its conservation status is classified as least concern in a European context (Van Swaay *et al.*, 2010).

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Given the trends presented above, a scenario in which this project does not take place would result in a continuation of current trends relating to Marsh Fritillary, within the study area, in line with the decline cited above in respect of future prospects.

8.11.2.7 Cumulative Information Baseline Characteristics - Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to invertebrates, particularly Marsh Fritillary, as identified above, will be the receiving environment at the time of construction given the short time period likely to elapse in the interim. With respect to the operational phase, the above described decline is likely to be observed over the lifetime of the Whole UWF Project.

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8.11.3 CUMULATIVE INFORMATION: Project Design Measures for Marsh Fritillary

Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Grid Connection and UWF Related Works. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in **Appendices 5.3 and 5.4 in Volume C4: EIA Appendices.**

8.11.4 CUMULATIVE INFORMATION: Evaluation Of Impacts to Marsh Fritillary

It was evaluated, in Section 8.11.1, that UWF Replacement Forestry has **no potential to cause impacts to Marsh Fritillary.**

This Section evaluates the likely cumulative effects of the Other Elements of the Whole UWF Project and Other Projects or Activities. This evaluation is based on the residual effects of the Other Elements of the Whole UWF Project and of Other Projects.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Marsh Fritillary.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-86: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	<u>Impacts Excluded</u> (Justification at the end of the Impact Evaluation Table section)
Habitat Loss (construction stage)	<i>Habitat Degradation (Introduction of invasive alien species which may out-compete food plants such as DBS), (construction stage)</i>
	<i>Habitat degradation (drainage alteration) - Marsh Fritillary, (construction stage)</i>
	<i>Habitat degradation (Compaction) - Marsh Fritillary, (construction stage)</i>
	<i>Mortality to in-flight MF Adults through contact with machinery, (construction stage)</i>
	<i>Potential disturbance/displacement from Vibration, (construction stage)</i>
	<i>Mortality of in situ Larvae, (construction stage)</i>
	<i>Potential disturbance/displacement of Marsh Fritillary individuals breeding in suitable habitat proximal to the Whole UWF Project during maintenance, (construction stage)</i>

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Table in the next section - Section 8.11.4.1.

The source-pathway-receptor links and the rationale for impacts excluded are described in Section 8.11.4.2, directly after the Impact Evaluation Table section.

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8.11.4.1 Impact Evaluation Table: Habitat Loss

Evaluation of UWF Replacement Forestry Excluded: As no Marsh Fritillary habitat was recorded on the site during surveys, it was evaluated that there is no potential for UWF Replacement Forestry to cause habitat loss effects to Marsh Fritillary by itself, and consequently this project cannot have a cumulative effect.

However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the cumulative information and evaluation for the Other Elements of the Whole UWF Project are included in this Impact Evaluation Table, in order to show the totality of the project.

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: <i>(for Other Elements only)</i>	Construction stage
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Cumulative Impact Source: Excavation Works
Impact Pathway: Land Cover

Impact Description: Marsh Fritillary is a medium sensitivity receptor of County Importance.

Permanent land use change or Habitat loss of Marsh Fritillary habitat such as Devils-Bit scabious rich swards may result in loss of habitat ‘patches’ , a size reduction in individual colonies or reduce meta-population connectivity, and cause secondary, population level declines. Temporary land use change will not result in long term effects as all lands will be reinstated immediately.

Effects have been reduced by the selective placement of e.g. temporary roads within the construction works areas to avoid DBS rich swards or locations where larvae were recorded. Management prescriptions to be implemented as part of the Upperchurch Hen Harrier scheme, such as a limitation on the excavation of drains, will allow improved grassland to revert back to wet grassland/semi-natural grassland habitats and possibly further Marsh Fritillary habitat, meta-population interconnectivity.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 1: UWF Grid Connection

Impact Magnitude:

Temporary landtake of suitable habitat comprising 0.00299 Ha (29.9m²) or 0.56% of total suitable habitat present will occur during the construction stage.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- No permanent loss of suitable habitat will occur, and;
- Habitat extent to be temporarily lost represents a negligible amount (<0.6%) of total suitable habitat present,
- No webs or larvae were recorded from the habitats under consideration, and;
- The temporary to short-term duration (up to 1 year), and;
- The reversibility of the impact with the restoration of lands.

Element 2: UWF Related Works

Impact Magnitude:

Permanent land use change of 0.062Ha or 11.5% of suitable habitat present will occur during the construction stage.

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<p><u>Significance of the Impact:</u> Slight</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The magnitude of the habitat loss: evaluated as medium (5-20% of habitat present), and; • The absence of webs within the habitats to be removed and low overall number present, and; • The contrast to the baseline environment represents a partial change to baseline attributes, and; • The long-term nature of the loss, and; • The low reversibility of the identified effect
<p>Element 4: Upperchurch Windfarm</p>
<p><u>Impact Magnitude:</u> Permanent land use change of 0.062Ha (620m²) or 11.5% of suitable habitat present at the location will occur during the construction stage.</p>
<p><u>Significance of the Impact:</u> Slight</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The magnitude of the habitat loss: evaluated as medium (5-20% of habitat present), and; • The absence of webs within the habitats to be removed and low overall number present, and; • The contrast to the baseline environment represents a partial change to baseline attributes, and; • The long-term nature of the loss, and; • The low reversibility of the identified effect
<p>Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.11.2.2.1.</p>
<p>Cumulative Information: Individual Evaluations of Other Projects or Activities</p>
<p>Other Project: Forestry /Agriculture/Turf-cutting</p>
<p><u>Impact Magnitude:</u> Afforestation can result in direct habitat loss for Marsh Fritillary of suitable habitat. Agricultural activities such as reclamation (land use change) can also effect habitat loss whilst turf-cutting can directly remove suitable habitat. A corollary of this is that suitable habitat for Marsh Fritillary often exists on the margins of cutover bog due to the grassland structure brought about from peat extraction. Only one colony is known within the geographical study area for Cumulative effects (2km); this is located at Cumber Bog. Cumber bog is subject to peat extraction and therefore Marsh Fritillary habitat loss is considered. The probability of Habitat Loss is evaluated as High on a precautionary basis. In the absence of predictive estimates on extraction the magnitude of habitat loss is evaluated as High (20-80% pf population or habitat change). Afforestation within the geographical study zone is considered unlikely to result in significant habitat loss; as much of the suitable habitat is within the Slieve Felim to Silvermines SPA and afforestation will be limited. Agricultural activities are considered unlikely to result in any contrast to baseline activities.</p>
<p><u>Significance of the Impact:</u> Moderate</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The likely continuance of Peat Extraction in Cumber Bog
<p>Evaluation of Cumulative Impacts – Habitat Loss</p>
<p>All Elements of the Whole UWF Project</p>
<p><u>Cumulative Impact Magnitude:</u> In total 1.2Ha of suitable habitat for this sensitive receptor of County Importance is present within the Cumulative Evaluation Study Area. 0.00299ha of this will be temporarily lost prior to re-instatement within the UWF Grid Connection element whilst 0.062ha will be lost within the UWF Related Works and Upperchurch Windfarm elements. As the works areas overlap at this location, there is no potential for cumulative effects</p>

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between the UWF Related Works and the Upperchurch Windfarm (the effect will only occur once). Furthermore there is no potential for likely cumulative effects to Marsh Fritillary between the UWF Grid Connection and the UWF Related Works/Upperchurch Windfarm colonies due to the separation distance between the colonies.

Cumulative effects to the wider county population level may occur due to impacts to individual local populations.

Significance of the Cumulative Impact: Slight

Rationale for Cumulative Impact Evaluation:

- The overall extent and degree of Habitat loss (5.1% of available habitat) in respect of a County Important receptor, and;
- The long-term nature of the loss, which is offset by;
- The absence of webs in the habitats to be lost.

All Elements of the Whole UWF Project with Other Projects or Activities

Cumulative Impact Magnitude:

In total 1.2Ha of suitable habitat for this sensitive receptor of County Importance is present within the Whole UWF Project Study Area. 0.25% of this will be temporarily lost prior to re-instatement within the UWF Grid Connection whilst 5.1% will be lost within the UWF Related Works/Upperchurch Windfarm.

Habitat loss from peat extraction within the geographical study zone is evaluated as high on a precautionary basis and may impact at least one colony *potentially* connected to those identified within the Windfarm Study areas; notwithstanding that the distance from the Cummer Bog colony is greater than 5km to either the UWF Grid Connection or the UWF Related Work/Upperchurch Windfarm colonies.

Significance of the Cumulative Impact: Moderate

Rationale for Cumulative Impact Evaluation:

- The overall extent and degree of Habitat loss from the Whole UWF Project and;
- The long-term nature of the loss, and;
- The likely continuance of peat extraction at the nearest known colony within the study zone.

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8.11.4.2 Cumulative Information: Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-87 below.

Table 8-87: Description and Rationale for Excluded Impacts to Marsh Fritillary

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Movement of soils and machinery	1,4	Soils	Habitat Degradation (Introduction of invasive alien species which may out-compete food plants such as DBS.)	Evaluated as Excluded: Marsh Fritillary is a medium sensitivity receptor of County Importance. In total across the 5 elements no invasive species of Flora are present within construction works areas that overlap Marsh Fritillary habitat. There is extremely low probability of invasive flora being transferred to habitat patches present. Effects are unlikely.
Landuse Change	1,2,4	Surface Water	Habitat degradation (drainage alteration)	In respect of the UWF Grid Connection habitat patches/colonies implemented surface water management will maintain surface water flows to down-gradient areas of habitat, and; <ul style="list-style-type: none"> •Access roads at Baurnadomeeny (S66) are temporary, with no permanent effects expected, whilst; •Effects will not be significant at Beaclave (S55) with flows expected to be maintained; In respect of UWF Related Works/Upperchurch Windfarm habitat patches/colony: <ul style="list-style-type: none"> •Implemented surface water management at Shevry will maintain surface water flows to down-gradient areas of habitat. Neutral effects are considered likely.
Movement of Soils and Machinery	1,2,4	Soils	Habitat degradation (Compaction)	Evaluated as Excluded; In relation to Elements 1,2,4 - Vehicular movement will be limited to temporary and permanent roads within the construction area boundaries, the effect of which is appraised under Habitat Loss.
Operating Machinery	1,2,4	Direct Contact	Mortality to in-flight MF Adults through contact with machinery	Evaluated as Excluded; It is considered as extremely unlikely that the short duration of the works period at any Marsh Fritillary colony will result in this secondary effect. No contrast to baseline conditions (e.g. the presence of operating farm machinery) is expected. Neutral effects are considered likely.
Excavation Works	1,2,4	Ground and Air Vibrations	Potential disturbance/displacement from Vibration	Low levels of ground and air vibrations are expected to be detectable within the immediate vicinity (1-5m) of tracking machines. A maximum estimate is (0.5 to 1mm/s). There is a low probability of this affecting in situ Marsh Fritillary. In respect of the UWF Grid Connection habitat patches/colonies:

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Marsh Fritillary	Source(s) Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
					<ul style="list-style-type: none"> •Only a single web is located within the 5m buffer zone of vehicular usage (at Baurnadomeeny, with zero at Bealaclave) •The dampening of vibrations from soft ground reduces effects, and; •The brief to temporary duration (less than 1 day to up to 1 year) of the construction period reduces effects. <p>In respect of UWF Related Works/Upperchurch Windfarm habitat patch/colony: Zero webs were located within the 5m buffer zone of vehicular usage (at Shevry). Neutral effects are considered likely.</p>
Sensitive Aspect	Excavation Works	1,2,4	Excavations	Mortality of In-Situ larvae	Project Design Measures will avoid mortality of in-situ larvae.
Operational Stage					
	Machinery Movement	1,2,4	Ground and Air Vibrations	Potential disturbance/displacement of Marsh Fritillary individuals breeding in suitable habitat proximal to the Whole UWF Project during maintenance	<p>Evaluated as Excluded: In relation to UWF Grid Connection - Annual maintenance, comprising 1-2 people, travelling in light vehicles along new/existing road to Joint Bay locations, or walking over lands between Joint Bays will have Neutral effect.</p> <p>In relation to UWF Related Works/Upperchurch Windfarm – regular maintenance will typically comprise light vehicles travelling along windfarm roads to turbine locations or walking over lands during cable route inspections, Neutral effect.</p>
Decommissioning Stage					
Evaluated as Excluded: Neutral effects on General Invertebrates are considered likely due to the scale of works required.					

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8.11.5 UWF Replacement Forestry: Mitigation Measures for Impacts to Marsh Fritillary

Mitigation measures are not relevant as, due to the absence of Marsh Fritillary habitat at the UWF Replacement Forestry lands, there is **no potential for impacts** to occur to Marsh Fritillary as a consequence of the UWF Replacement Forestry.

8.11.6 UWF Replacement Forestry: Evaluation of Residual Impacts to Marsh Fritillary

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. Mitigation measures are not relevant and thus the Residual Impact is the same as the Impact set out in the Evaluation of UWF Replacement Forestry (Section 8.11.1), i.e. **no potential for impacts**.

8.11.7 UWF Replacement Forestry: Application of Best Practice and the EMP

No UWF Replacement Forestry Best Practice Measures have been developed specifically for Marsh Fritillary.

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8.11.8 Summary of Impacts to Marsh Fritillary

No impacts to Marsh Fritillary are concluded by the topic authors as likely to occur as a consequence of the development of UWF Replacement Forestry.

Table 8-88: Summary of the impacts to Marsh Fritillary

Impact to Marsh Fritillary:	Habitat Loss
<i>Evaluation Impact Table (Relates to Other Elements only)</i>	<i>Section 8.11.4.1</i>
Project Life-Cycle Stage (Relates to Other Elements only)	Construction
<u>UWF Replacement Forestry</u>	No Potential for Impact - see Section 8.11.1
Element 1: UWF Grid Connection	Not Significant
Element 2: UWF Related Works	Slight
Element 4: Upperchurch Windfarm	Slight
Element 5: UWF Other Activities	n/a
<u>Cumulative Impact:</u>	
All Elements of the Whole UWF Project	Slight
All Other Elements of the Whole UWF Project <i>cumulatively with</i> Other Projects or Activities Forestry, Agriculture, Turf-Cutting	Moderate

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The greyed out boxes in the summary table below relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to present the totality of the project.

Please Note: Other Projects or Activities only relate to the cumulative evaluation of Other Elements of the Whole UWF Project. There is no potential for cumulative effects with the UWF Replacement Forestry.

8.12 Policy Context

8.12.1 National Policy - National Biodiversity Action Plan

National Biodiversity Action Plan, for the period 2017-2021:

The Plan sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland’s ‘Vision for Biodiversity’, and follows on from the work of the first and second National Biodiversity Action Plans. The Plan has been developed in line with the EU and International Biodiversity strategies and policies.

119 targeted actions are contained in the Plan, underpinned by seven strategic objectives. The objectives lay out a clear framework for Ireland’s national approach to biodiversity, ensuring that efforts and achievements of the past are built upon, while looking ahead to what can be achieved over the next five years and beyond. They include:

- mainstreaming biodiversity across the decision making process in the State;
- strengthening the knowledge base underpinning work on biodiversity issues;
- increasing public awareness and participation;
- ensuring conservation of biodiversity in the wider countryside;
- ensuring conservation of biodiversity in the marine environment;
- expanding and improving on the management of protected areas and protected species;
- enhancing the contribution to international biodiversity issues

8.12.2 Regional Policy - Mid-West Regional Planning Guidelines 2010-2022

The administrative area of North Tipperary fell under the Mid-West Regional Authority until it was incorporated into the new Southern Regional Assembly in 2014. The Southern Regional Assembly is currently preparing a new Spatial Economic and Planning Strategy for the Region. The Mid-West Regional Planning Guidelines 2010-2022 still apply until this new strategy is published.

The principal issues regarding the conserving and enhancing of environmental qualities from a regional perspective include;

- The development of well-based collaborative processes or managing natural resources that cross county and regional boundaries;
- Developing common approaches to managing key environmental assets including groundwater, surface water, Natura 2000 sites and other habitats as well as air quality while acknowledging the primary role of individual Local Authorities in this work;
- The protection and enhancement of water quality in line with the Water Framework Directive and River Basin Management Plans;
- Improvement of the quality of drinking water at certain locations;
- Maintenance of the quality of drinking water where it is satisfactory at present;
- Managing flood risk is also a key planning and development challenge, particularly as there is a multiplicity of agencies managing the Shannon River System;

Maintaining the architectural heritage and improving the design quality of new developments

Policy Context

8.12.3 North Tipperary County Development Plan 2010 (as varied):

North and South Tipperary County Councils were amalgamated into Tipperary County Council in June 2014.

The relevant County Development Plan for the formally North Tipperary local authority area is now North Tipperary County Development Plan 2010-2016 (as varied), adopted in December 2015. This plan is the current policy documents for the location of all the Project Elements at present.

Relevant provisions include,

- HERT 29 is to maintain the quality and conservation values of European Sites and other sites.

HERT 29a is to restrict any development which would be harmful to or result in significant deterioration of habitats or species in European Sites and other sites.

8.12.4 Felling and Reforestation Policy

Forest Service Policy²⁴ in respect of supporting renewable energy and energy security is herein referred. We note the following as cited in respect of ‘Overriding environmental considerations’:

“As set out in Section 3.4.2, certain natural habitat and species of Community interests are protected under the Habitats and Birds Directives. In certain situations, trees and forests may be incompatible with the conservation of protected Annex habitats and species at a site and / or national level, and deforestation may be considered. For example, the continuation (via reforestation) of forest cover on a particular site within an SAC may be deemed incompatible with the maintenance and restoration of a particular habitat for which that SAC was designated. Similar situations may also exist under the Water Framework Directive, where provisions under the Reforestation Objectives CCF and BIO may not suffice. In such situations, permanent forest removal may be considered by the Forest Service, on application. This approach was applied within the context of EU LIFE Projects focused on bog restoration – see Case Study 1. Deforestation will be viewed as an option for such sites where the conversion of the site to an ‘open habitat’ is key to benefiting the habitat or species in question. For other habitats and species, deforestation may not be strictly required. An alternative may be to use low density native woodland planting to create an open mosaic of woodland and open habitats. Each application will be assessed by the Forest Service on a case-by-case basis.”

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²⁴ Department of Agriculture, Food and the Marine (2017). Felling and Reforestation Policy.

8.13 Best Practice Measures

Best Practice Measures

RF-BPM-01	Monitoring of non-native invasive plant species.	
Environmental Commitment		
Monitoring of non-native invasive plant species.		
Work Sections/Locations		
Afforestation lands		
Responsibility of	Role/Duty	
Project Ecologist	<ul style="list-style-type: none"> • Implementation of surveying • Must be aware of the best practice guidance listed in References below. 	
Avoid adverse effects of the introduction and spread of non-native invasive species		
<ul style="list-style-type: none"> • Monitoring in the form of confirmatory surveys will be carried out by the Project Ecologist to identify any infestations within or close to the afforestation lands. • Surveying will be carried out annually and this survey information will be used to inform any maintenance activities. Surveys will focus always on the works area plus 7m. Surveying of municipal areas – i.e. public road haulage routes, will not be included in surveys. • The results of this will be made available to the Promoter, and any bodies as agreed at the consenting stage. • The measures included in the Invasive Species Management Plan will be implemented. 		
References		
<ul style="list-style-type: none"> • National Roads Authority (2010). Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority, Dublin. • Appendix 5.2: Invasive Species Management Plan. 		

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RF-BPM-02	Management of general non-native invasive species.	
Environmental Commitment		
To avoid the introduction, establishment and spread of non-native species to the afforestation lands during the planting and growth stages.		
Work Sections/Locations		
All sections		
Responsibility of	Role/Duty	
Construction Manager	<ul style="list-style-type: none"> Requiring supply companies to clean delivery vehicles before entering the site to gain access to works area Obtaining and keeping a record of delivery companies cleaning of vehicles 	
Project Ecologist	<ul style="list-style-type: none"> Carrying out spot checks on flagmen during cleaning of delivery/site vehicles. Must be aware of the best practice guidance listed in References below. 	
Inspection and Cleaning of Delivery Vehicles		
<ul style="list-style-type: none"> Prior to arrival on site, the planting contractor’s vehicles and equipment will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water > 65 degrees C, in addition to the removal of all vegetative material. Items difficult to soak/spray will be wiped down with a suitable disinfectant (e.g. Virkon Aquatic). Evidence that all machinery has been cleaned will be required to be on file for review by the statutory authorities. Given that Crayfish Plague has affected rivers in the area recently (2017) the level of evidence required of the Contractor will be actual registration plates of vehicles onsite and a register of when, how and where each of these were cleaned before they arrived on site. The planting personnel will be responsible for inspecting and cleaning site/delivery vehicles both entering and exiting the site, and will receive training from the Project Ecologist in the correct techniques. The planting crew will be equipped with a ‘disinfection box’. This will contain Virkon Aquatic or another proprietary disinfectant, a spraying mechanism, cloths or sponges, a scrubbing brush and protective gloves. Protective gloves will be worn when using any disinfectant solution. Visual inspections will be carried out on all machinery and equipment for evidence of attached plant or animal material, or adherent mud or debris. Any attached or adherent material will be removed before entering or leaving the site of operation, securely stored away from traffic for removal to the waste storage area in the Temporary Compound at the end of the work day. No removed material or run-off will be allowed to enter a water body of any sort. Following cleaning, all equipment and vehicles will be visually inspected to ensure that all adherent material and debris has been removed manually. Records of supplies and cleaning of site/delivery vehicles will be kept by Project Ecologist. Spot checks on the adequacy of cleaning will be carried out by the Project Ecologist. 		
Measures at or in watercourses		
<ul style="list-style-type: none"> Residual water in any containers/vessels used in works near watercourses will be flushed with disinfectant (Virkon Aquatic) onto grass. A drying period of at least 24 hours will be adhered to. Any observations of mass mortality of Crayfish will be reported to the relevant authorities within 1 hour of evidence being found. 		

<p>Measures for white toothed shrew</p> <ul style="list-style-type: none"> • Consignments of organic materials, such as hedging material, will be inspected for presence of Greater White-toothed Shrew.
<p>References</p> <ul style="list-style-type: none"> • http://www.fisheriesireland.ie/Research/invasive-species.html • http://www.nonnativespecies.org/checkcleandry/

Best Practice Measures

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Best Practice Measures

RF-BPM-03	Best practice methods to ensure the protection of Viviparous lizard <i>(Lacerta (Zootoca) vivipara)</i>	
Environmental Commitment		
To avoid effects on Viviparous lizard (<i>Lacerta (Zootoca) vivipara</i>) during the planting works.		
Work Sections/Locations		
All sections		
Responsibility of	Role/Duty	
Project Ecologist	<ul style="list-style-type: none"> • Monitor the planting works to ensure that mitigation measures are strictly adhered to. • Must be aware of the best practice guidance listed in References below. 	
To avoid effects on Viviparous lizard.		
<ul style="list-style-type: none"> • As Viviparous lizards are widespread in Ireland and can be found in a range of habitat types such as in bog, heath, the margins of coniferous woodlands, in addition to being common in a range of grassland habitats, particularly those not subject to heavy grazing pressure, a spot-check confirmatory survey by the Project Ecologist will be required within these habitats prior to the commencement of the planting stage to confirm the presence/absence of individuals. • Capture and relocation operations for this species can be extremely labour-intensive and in most cases the most efficient approach is to cut down and rake-off vegetation during warm weather, with the intention of displacing the resident lizards prior to earthworks or other activities that could result in their incidental mortality (NRA, 2009). Whether or not reptile-proof fencing is then required to exclude the animals will need to be reviewed on a location-specific basis by the Project Ecologist. • Note: The proposed development is beyond the geographical range of the non-native Slow-worm (<i>Anguis fragilis</i>), thus this species does not require mitigation within this Project. 		
References		
<ul style="list-style-type: none"> • NRA (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority, Dublin. 		

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8.14 Summary of the Biodiversity Chapter

The development of UWF Replacement Forestry will involve the planning of 6ha of lands with native Oak-Birch-Holly and Hazel woodland. This woodland will be permanent woodland and will not be harvested commercially. The new wood has been designed to the benefit of Hen Harrier, and is located on lands adjoining Upperchurch Hen Harrier Scheme lands. The lands to be afforested are located in the River Suir catchment, upstream of the Lower River Suir SAC, and to the east of the Slievefelim to Silvermines SPA.

Surveys of the site recorded typical upland grassland habitats and bird species, while low numbers of non-volant mammals, amphibians and reptiles were recorded. A stream, with fisheries value, flows through the western portion of the lands.

The Sensitive Aspects of Biodiversity which were evaluated in this topic chapter are: European Sites; Hen Harrier, General Bird Species, Non-Volant Mammals, and Amphibians & Reptiles. Although UWF Replacement Forestry will not adversely affect National Sites; Aquatic Habitats & Species, Terrestrial Habitats, Bats, and the Marsh Fritillary butterfly, these Sensitive Aspects were also included in the evaluation in order to show the totality of the project by presenting the effects of the Other Elements of the Whole UWF Project.

Environmental protection measures (15 no.) have been integrated into the project design of the UWF Replacement Forestry to ensure that significant effects to Aquatic Species, Hen Harrier and Otter are avoided or reduced. The planting of the new native woodland will be carried out by hand and to Department of Agriculture best practice, which will minimise effects to biodiversity.

In addition to the Project Design Measures, 3 no. Best Practice Measures will be implemented during the planting and growth stages of the UWF Replacement Forestry, these measures will provide further protection with regard to Reptiles and will provide protection against the spread of invasive species. Invasive Species will be managed under an Invasive Species Management Plan.

The Best Practice Measures and Invasive Species Management Plan are included with the afforestation licence application as Appendix 5.1 and Appendix 5.2, respectively, in Volume C4: EIAR Appendices.

8.14.1 Summary of Effects on European Sites

In relation to European Sites, it was concluded in the NIS (See Volume D), that in light of the conservation objectives and rationale for designation of the European Sites under consideration (Slievefelim to Silvermines SPA, Lower River Shannon SAC and Lower River Suir SAC); the potential for significant effects exists as a result of a single project element of the Whole UWF Project, namely the UWF Grid Connection. However, with the implementation of the Project Design Measures and the Additional Mitigation Measure AMM-01 in respect of Otter, it is concluded that neither the UWF Grid Connection, nor any Other Element of the Whole UWF Project, alone or in combination with each other or with Other Projects or Activities, will result in any effects that will adversely affect the integrity of the European Sites.

This NIS is included in Volume D: Appropriate Assessment Reporting.

8.14.2 Summary of UWF Replacement Forestry Impacts to the other Sensitive Aspects

The likely impacts to the individual Sensitive Aspects as a result of UWF Related Works are outlined below:

- Impacts to Hen Harrier will be **Very Significant and Positive** as a result of the UWF Replacement Forestry, this is due to the provision of ride lines within the new permanent native woodland, and the ongoing management of the woodland to the benefit of Hen Harrier.
- Impacts to General Bird Species as a result of the UWF Replacement Forestry will be Slight adverse in relation to habitat loss to Golden Plover and Meadow Pipit and Slight Positive due to habitat enhancement effects to General Bird species.
- In relation to Non-Volant Mammals, positive impacts are expected to Badger (habitat gain) as a consequence of the development of UWF Replacement Forestry. Habitat loss effects to Otter and Other Mammals (Irish Hare, Pine Marten, Fallow Deer) will be Neutral.
- Neutral effects to Amphibians & Reptiles are expected as a consequence of the development of UWF Replacement Forestry.
- UWF Replacement Forestry will not cause effects to National Sites, Aquatic Habitats & Species, Terrestrial Habitats, Bats or to Marsh Fritillary.

8.14.3 Summary of Cumulative Impacts with Other Elements of the Whole UWF Project

As UWF Replacement Forestry is one element of the larger Whole Upperchurch Windfarm Project (Whole UWF Project), the potential for cumulative effects was examined with these Other Elements.

- In-combination impacts to Hen Harrier will remain **Positive and Significant** when both adverse effects of UWF Grid Connection, UWF Related Works and Upperchurch Windfarm along with the Very Significant Positive effects of the Upperchurch Hen Harrier Scheme (UWF Other Activities) are taken into consideration.
- In-combination impacts to General Bird Species will remain cumulatively Slight adverse in relation to habitat loss effects to Golden Plover and Meadow Pipit and cumulatively slight positive in relation to habitat enhancement effects to General Bird Species, when all Elements are taken into consideration. Cumulative displacement/disturbance effects to Golden Plover as a result of the Other Elements (only) will be Not Significant.
- Cumulative effects to Non-Volant Mammals will be adverse when the Other Elements are taken into consideration. Cumulative adverse impacts will range from Not Significant to Moderate in relation to Badger and other mammals (Irish Hare, Pine Marten, Red Squirrel and Fallow Deer), and Slight adverse in relation to Otter.
- There is no potential for in-combination impacts to Non-Volant Mammals or Amphibians & Reptiles.

Although UWF Replacement Forestry will not cause effects to National Sites, Aquatic Habitats & Species, Terrestrial Habitats, Bats or to Marsh Fritillary, and therefore will not contribute to cumulative effects on these Sensitive Aspects, in order to show the totality of the project, an overview of the in-combination impacts of the Other Elements of the Whole UWF Project is presented below:

- Cumulative adverse effects of the Other Elements to Aquatic Habitats & Species will range from Slight to Moderate.
- Cumulative effects of the Other Elements to Terrestrial Habitats will be Not Significant in relation to adverse habitat reduction or hedgerow severance and Moderate positive in relation to habitat enhancement effects.

- Cumulative adverse effects of the Other Elements to Bats will be Imperceptible or Not Significant.
- Cumulative adverse impacts of the Other Elements to Marsh Fritillary will be Slight.
- There is no potential for cumulative impacts of the Other Elements to National Sites as the UWF Grid Connection will be the only element with potential to cause effects (effects will be Neutral).

8.14.4 Summary of Cumulative Impacts with Other Projects or Activities

The cumulative impact with Other Projects or Activities relates to the in-combination effect of UWF Replacement Forestry together with the Other Elements of the Whole UWF Project with the consented Bunkimalta Windfarm, Castlewaller Windfarm and Forestry activities.

- Cumulative impacts to Hen Harrier will be Neutral, when the consented Bunkimalta Windfarm and Castlewaller Windfarm and forestry activities are considered in-combination with all Elements of the Whole UWF Project.
- Cumulative impacts to General Bird Species is limited to cumulative habitat loss effects to Meadow Pipit and cumulative habitat enhancement effects to general birds, as a result of the cumulative effects of Bunkimalta Windfarm. Cumulative effects will not be greater than for the cumulative Whole UWF Project – i.e. Slight adverse and Slight positive cumulative effects.
- There is no potential for cumulative effects to Amphibians & Reptiles with Other Projects or Activities.

Although UWF Replacement Forestry will not cause effects to National Sites, Aquatic Habitats & Species, Terrestrial Habitats, Bats or to Marsh Fritillary, and therefore will not contribute to cumulative effects on these Sensitive Aspects, **in order to show the totality of the project, an overview of the in-combination impacts of the Other Elements of the Whole UWF Project with Other Projects or Activities Bunkimalta Windfarm, Castlewaller Windfarm, Newport Distributor Road, and the activities - Forestry, Agriculture and Turf-Cutting), is presented below:**

- Cumulative impacts of the Other Elements of the Whole UWF Project to Aquatic Habitats & Species only relates to UWF Grid Connection, which together with Bunkimalta Windfarm and Newport Distributor Road could cause Slight cumulative reductions in aquatic habitat quality.
- Cumulative impacts of the Other Elements of the Whole UWF Project to Marsh Fritillary with Other Projects or Activities have potential to be Moderate adverse at a wider county-level population scale when Turf-Cutting activities in Cummer Bog were taken into account.
- No cumulative impacts of the Other Elements of the Whole UWF Project with Other Projects or Activities are expected to National Sites, Terrestrial Habitats, or Bats.

The authors conclude that **no significant adverse effects to Biodiversity are likely to occur as a result of the development of the UWF Replacement Forestry**, either alone or in combination with Other Elements of the Whole UWF Project or Other Projects or Activities.

The UWF Replacement Forestry on its own will result in very significant positive effects to Hen Harrier.

Summary of the Biodiversity Chapter

Topic
Biodiversity

8.15 Reference List

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Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

May 2018

UWF Replacement Forestry **Chapter 8 Biodiversity Figures**



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Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.1:
UWF Replacement Forestry Location Map

Legend:
UWF Replacement Forestry Area

For illustrative purposes only. Map not to scale

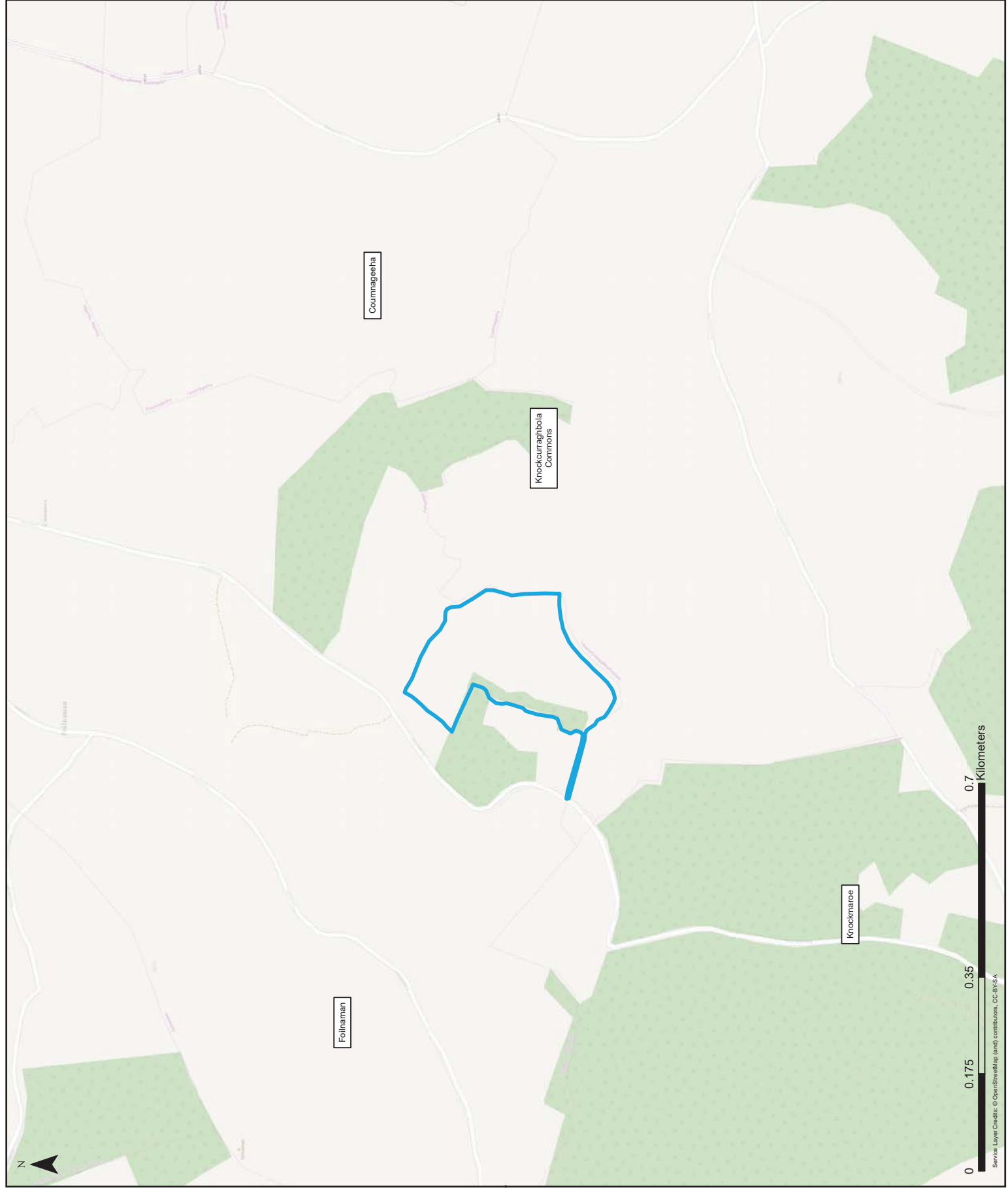
Disclaimer: Although presented in mapping, please note that the construction works boundary for the Consented Windfarm is included for illustrative purposes only as it is already subject to planning consent. For study area boundaries, please see Figure 8.1, and the accompanying ERAR Boundary/Consent/Permitting Appendix.

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Date: 05/02/2018		
Map Reference: EDL - A4 - GC - 8.1		

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Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.2:
European Sites within the
UWF Replacement Forestry Study Area

- Legend:
- UWF Replacement Forestry Area
 - Special Areas of Conservation within 15km
 - Special Protection Areas within 15km
 - Replacement Forestry 5km, 10km, 15km Buffer

For illustrative purposes only. Map not to scale

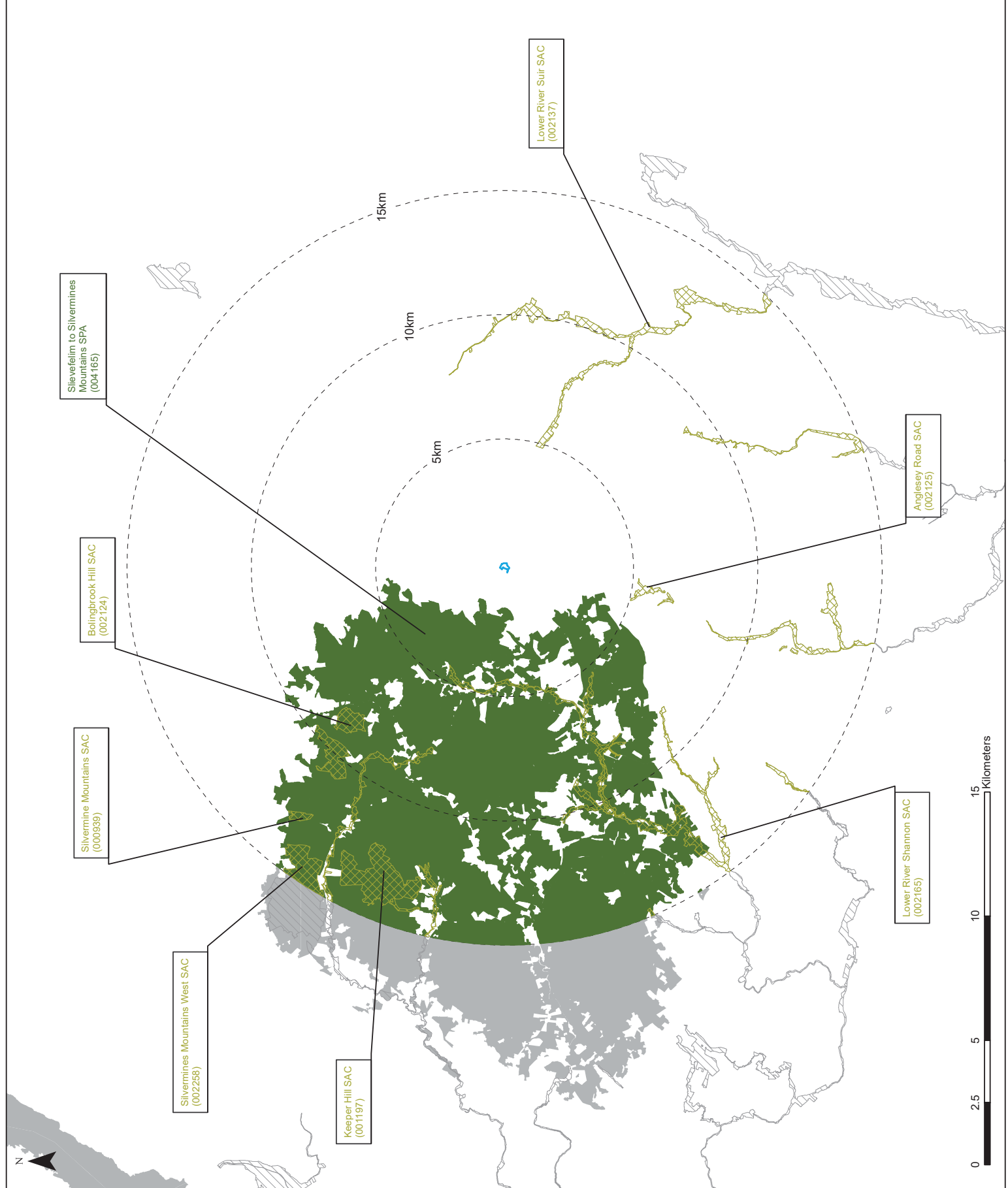
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0 2.5 5 10 15 Kilometers



Client: Ecopower Developments Ltd.

Project: Whole Windfarm Project

Title:
Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area

- Legend:**
- Projects/Activities
 - Upperchurch Windfarm 2013 Study Area
 - LWWF Related Works Construction Works Area
 - LWWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Construction Works Area
 - UWF Other Activities Construction Works Boundary
 - ▨ Special Areas of Conservation within 15km
 - Special Protection Areas within 15km Buffer (Designated European Sites)

* Forestry & Agriculture: Please see those map book figures which illustrate terrestrial habitats on aerial photography, for reference purposes with respect to the extent of Forestry and Agricultural lands.

** Please Refer to Natura Impact Statement in Volume E

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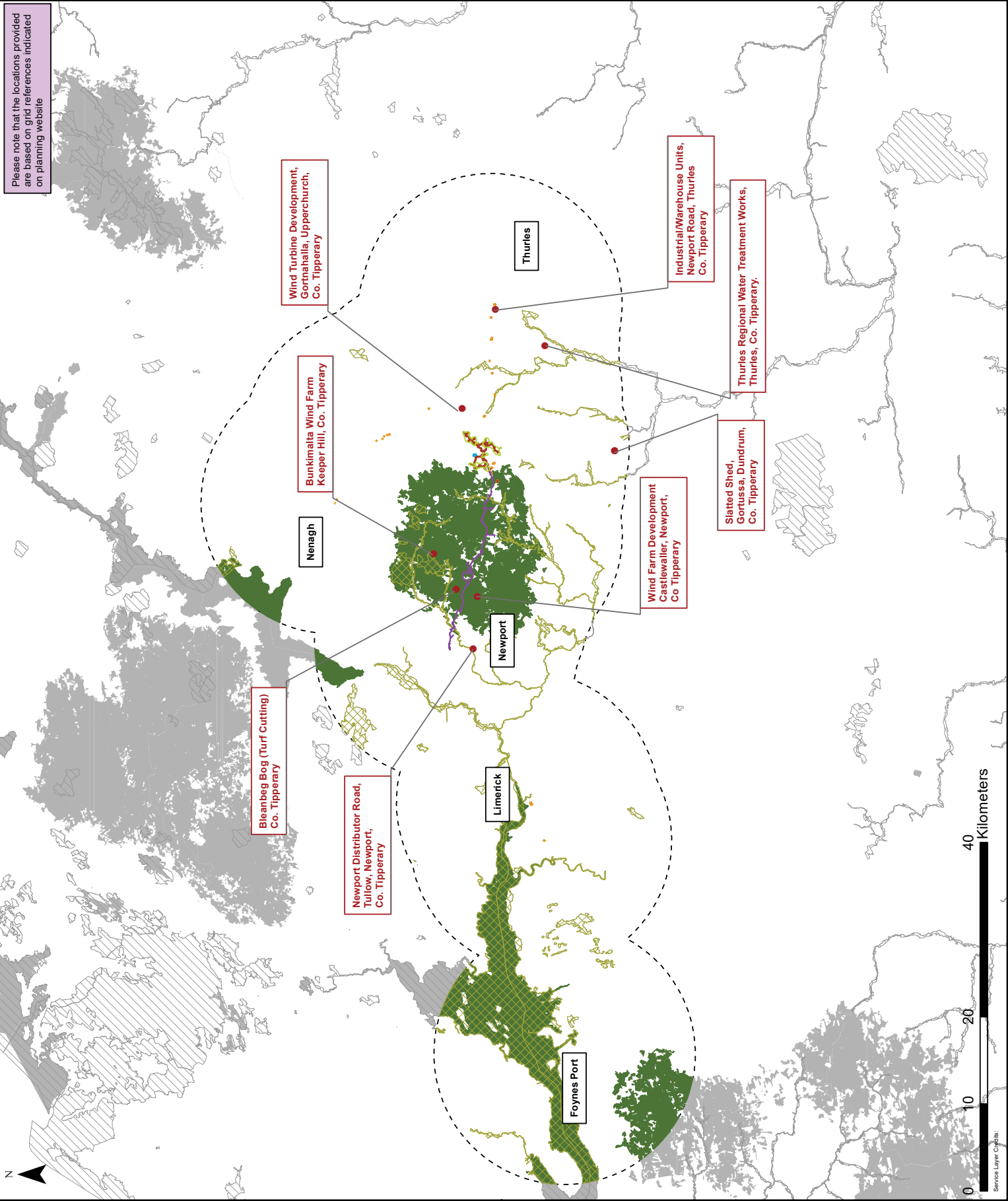
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Project: Whole UWF Project

Title:

Figure RF 8.3:
National Sites within the UWF
Replacement Forestry Study Area

Legend:

- UWF Replacement Forestry Area
- National Heritage Areas within 15km
- Proposed Natural Heritage Areas within 15km
- Replacement Forestry 5km, 10km, 15km Buffer

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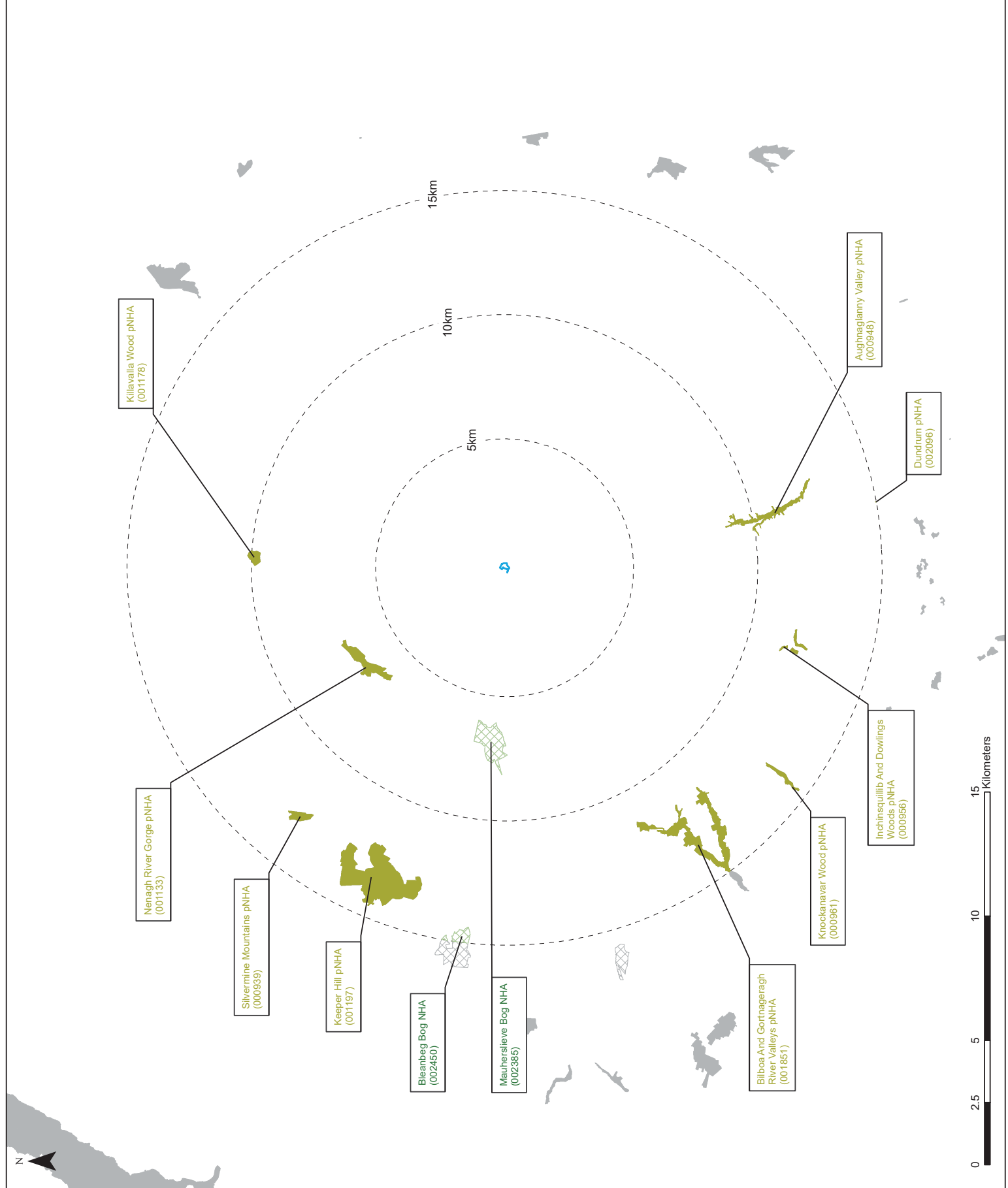
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Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.3: National Sites
within the Cumulative Evaluation Study
Area

- Legend:
- Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Area
 - UWF Other Activities Construction Works Boundary
 - Proposed Natural Heritage Areas within 15km
 - Natural Heritage Areas within 15km
 - 15km Buffer (NHA and pNHA sites)

No Other Projects or Activities scoped in for evaluation

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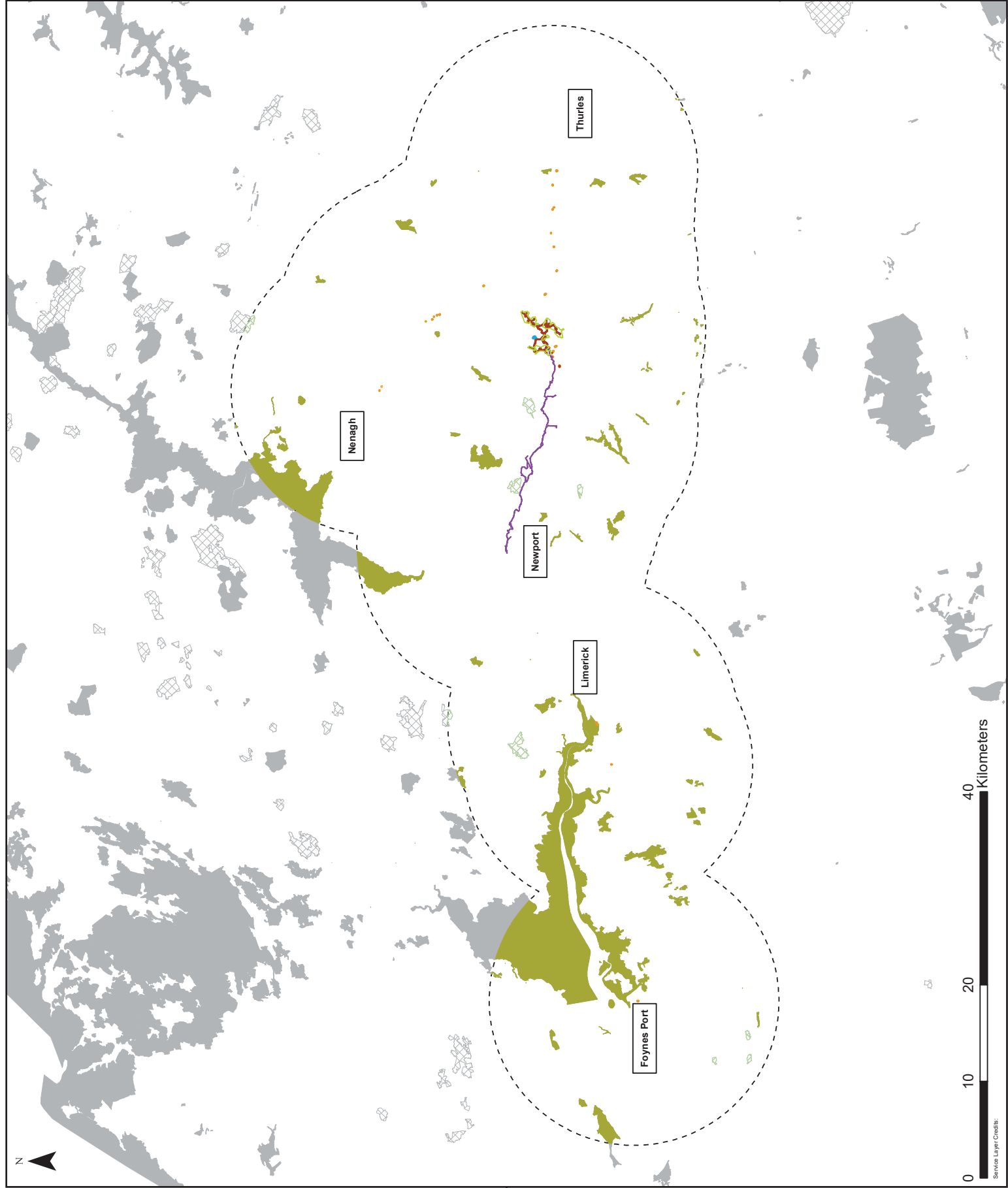
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Source Layer Credits:

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.4: Aquatic Habitats & Species
within the UWF Replacement Forestry
Study Area

Legend:

- UWF Replacement Forestry Area
- Watercourses

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Client: Ecopower Developments Ltd.

Project: Whole UWF Project

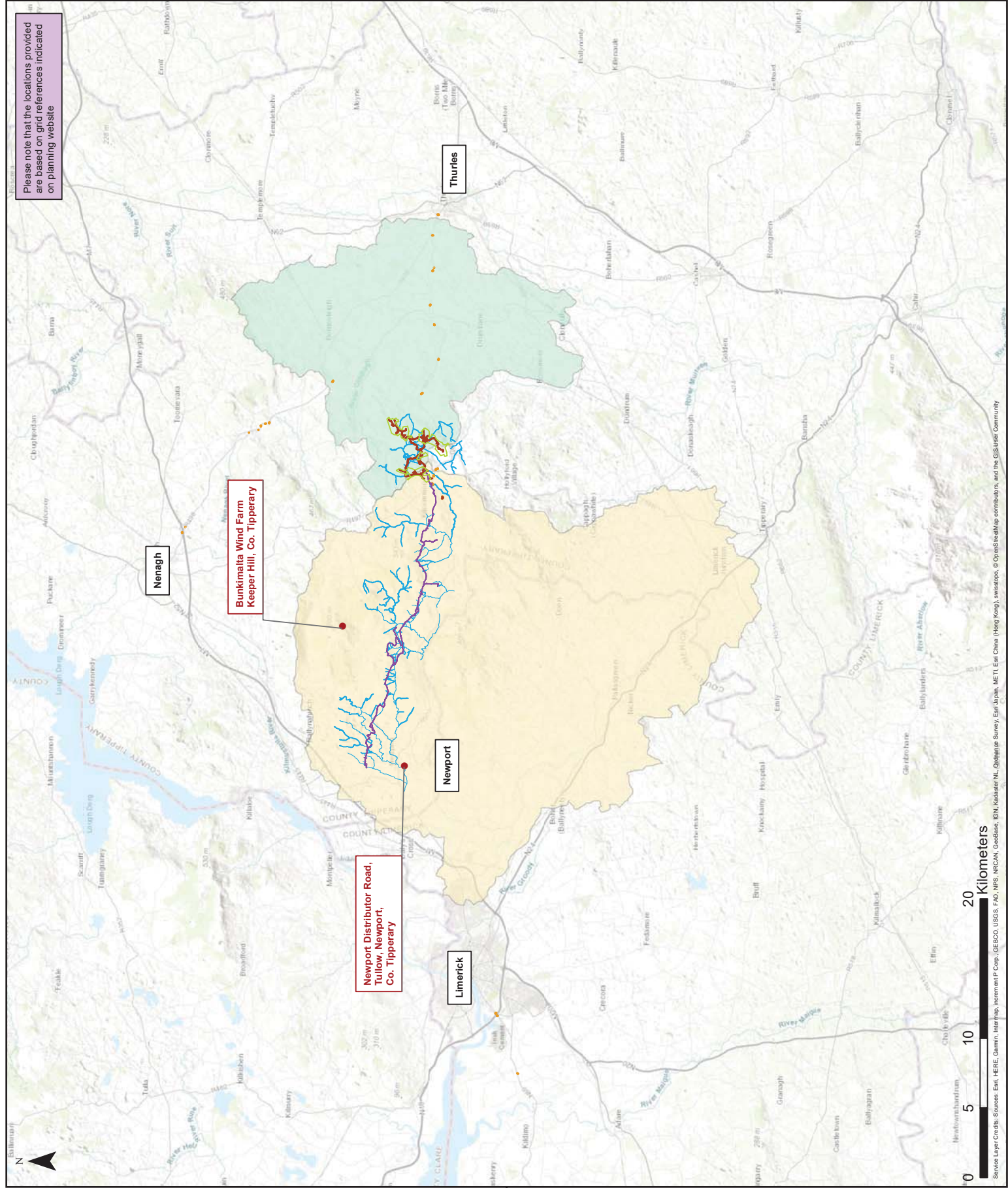
Title:
Figure CE 8.4: Aquatic Habitats & Species within the Cumulative Evaluation Study Area

- Legend:**
- Project/Activities
 - Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Area
 - UWF Other Activities Construction Works Boundary
 - Watercourses
 - Clodiagh River Catchment
 - Mulkear River Catchment

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Project: Whole UWF Project

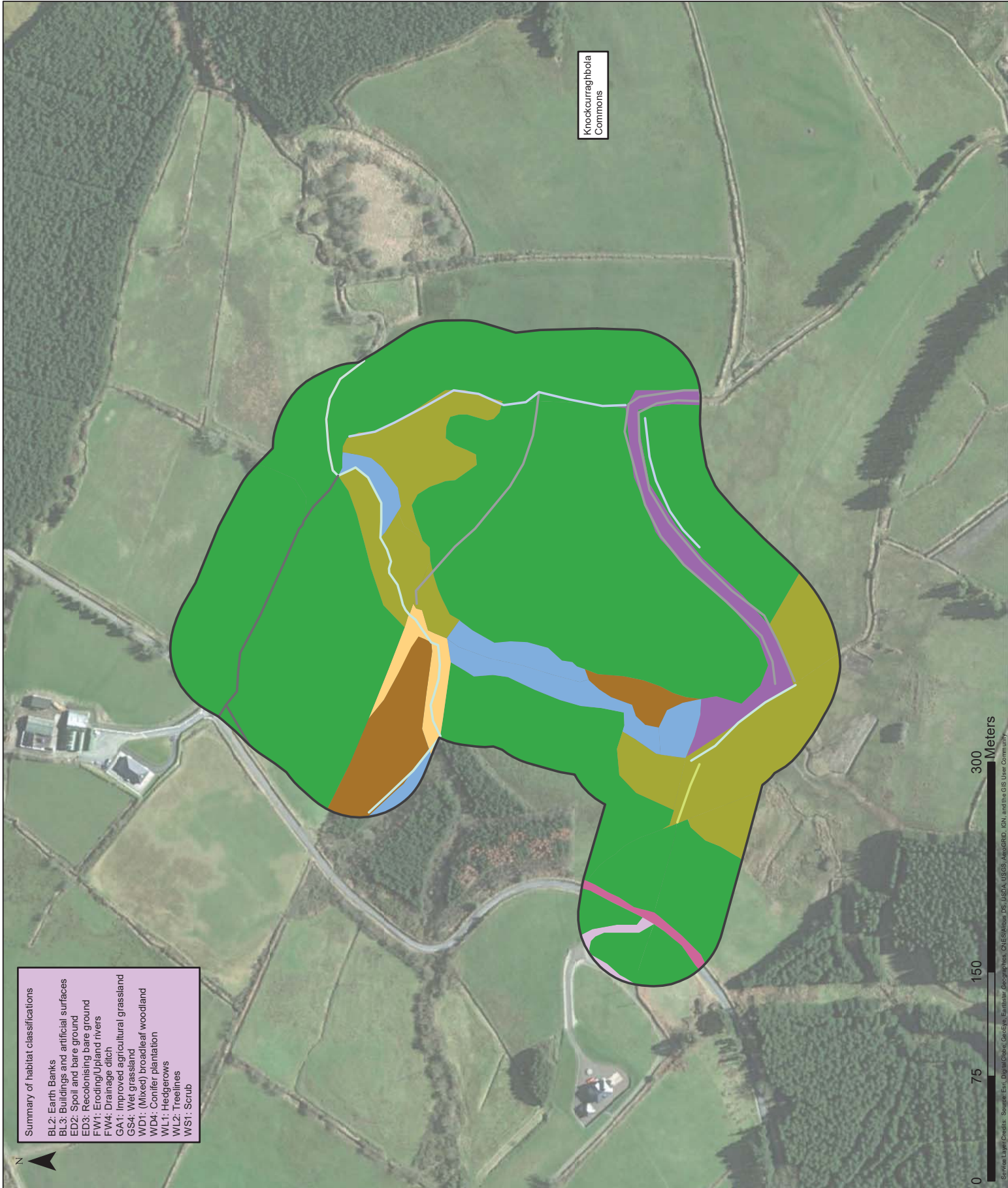
Title:
Figure RF 8.5: Terrestrial Habitats within
the UWF Replacement Forestry Study
Area.

- Legend:
- BL3
 - BL2
 - ED2
 - BL3
 - ED3
 - FW1
 - GA1
 - FW4
 - GS4
 - WL1
 - WD1
 - WD4
 - WS1
 - WL2
- Study Area Boundary (50m)

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- Summary of habitat classifications
- BL2: Earth Banks
 - BL3: Buildings and artificial surfaces
 - ED2: Spoil and bare ground
 - ED3: Recolonising bare ground
 - FW1: Eroding/upland rivers
 - FW4: Drainage ditch
 - GA1: Improved agricultural grassland
 - GS4: Wet grassland
 - WD1: (Mixed) broadleaf woodland
 - WD4: Conifer plantation
 - WL1: Hedgerows
 - WL2: Treelines
 - WS1: Scrub

Knockcurraghobla
Commons



Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:

Figure CE 8.5: Terrestrial Habitats within the Cumulative Evaluation Study Area

Legend:

Upperchurch Windfarm 2013 Study Area

Habitats 100m Buffer

No Other Projects or Activities scoped in for evaluation

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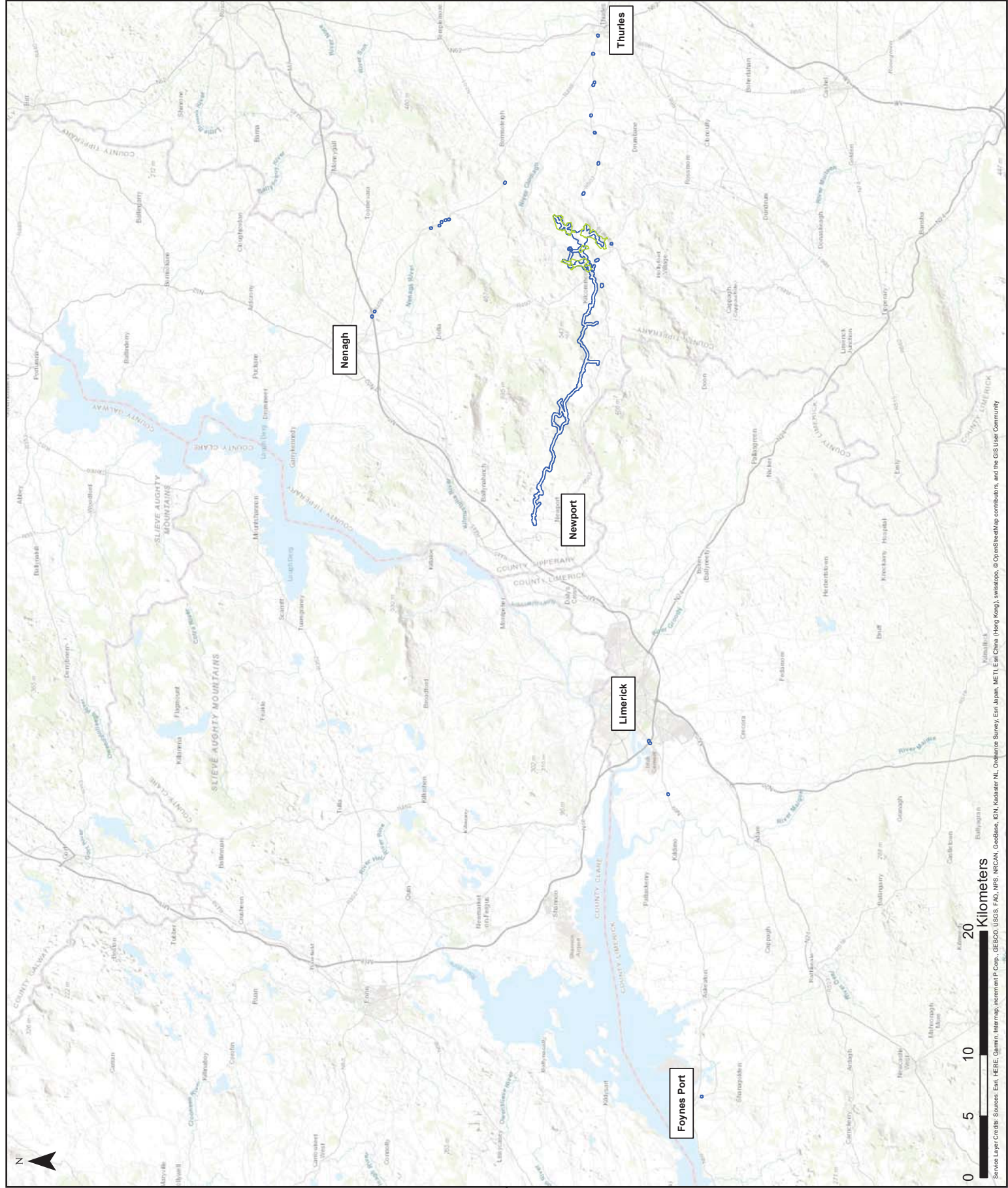
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Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.6: Hen Harrier within the
UWF Replacement Forestry Study Area.

Legend:

- UWF Replacement Forestry Area
- Study Area Boundary (50m)

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Nest locations, Roost locations and locations
of significant flight activity are not shown on
the map to protect Hen Harriers

Knockouragholla
Commons



Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.6: Hen Harrier within the Cumulative Evaluation Study Area

- Legend:**
- Projects/Activities
 - Slieveleim to Silvermines Mountains SPA plus Consented Wind Farm plus 5 km Buffer (Hen Harrier)
 - Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Area
 - UWF Other Activities Construction Works Boundary

* Forestry & Agriculture: Please see those map book figures which illustrate terrestrial habitats on aerial photography, for reference purposes with respect to the extent of Forestry and Agricultural lands.

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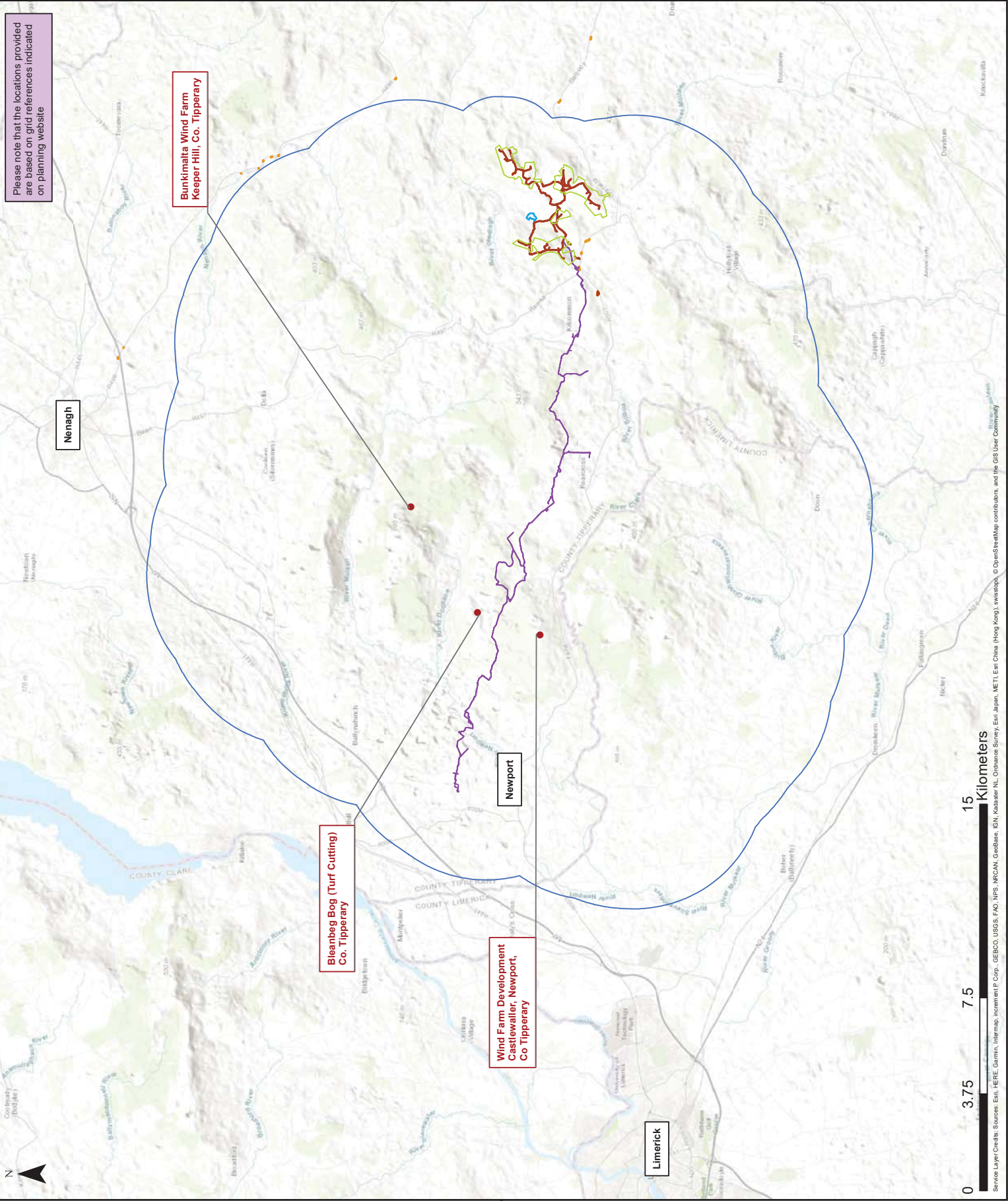
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Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.7: General Bird Species within
the UWF Replacement Forestry Study
Area.

Legend:

-  UWF Replacement Forestry Area
-  Study Area Boundary (50m)

Nil Observations of Note

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Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.7: General Bird Species within the Cumulative Evaluation Study Area

- Legend:**
- Project/Activities
 - Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Area
 - UWF Other Activities Construction Works Boundary
 - 1km Buffer (General Bird Species)

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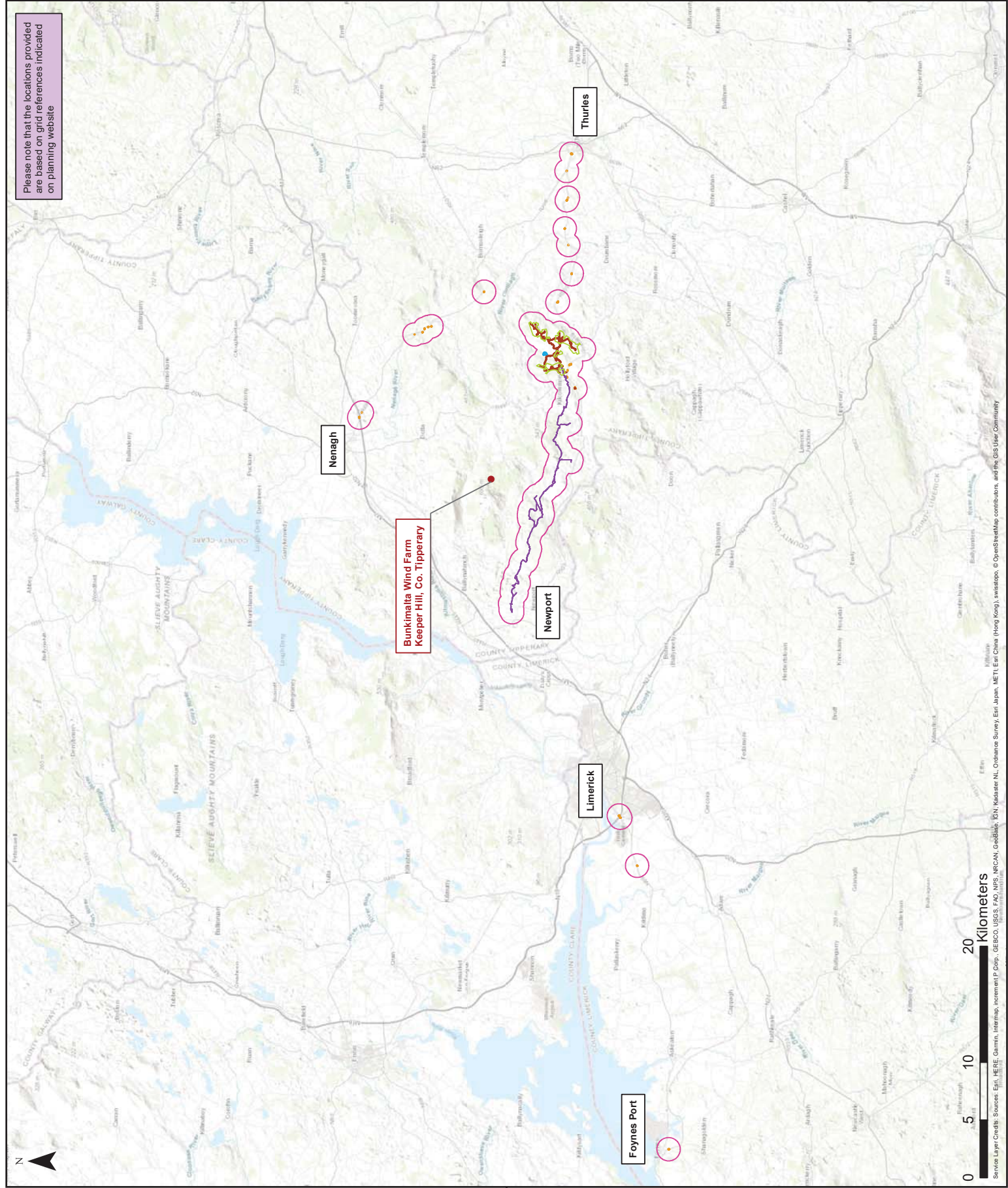
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Project: Whole UWF Project	
Title: Figure RF 8.8: Bats within the UWF Replacement Forestry Study Area.	
Legend: Bat Roost Suitability: * Buildings  Low  Study Area Boundary (150m)  UWF Replacement Forestry Area  Study Area Boundary (50m)	
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Project: Whole UWF Project

Title:
Figure CE 8.8: Bats within the Cumulative Evaluation Study Area

- Legend:**
- Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Area
 - UWF Other Activities Construction Works Boundary
 - Bats 300m Buffer

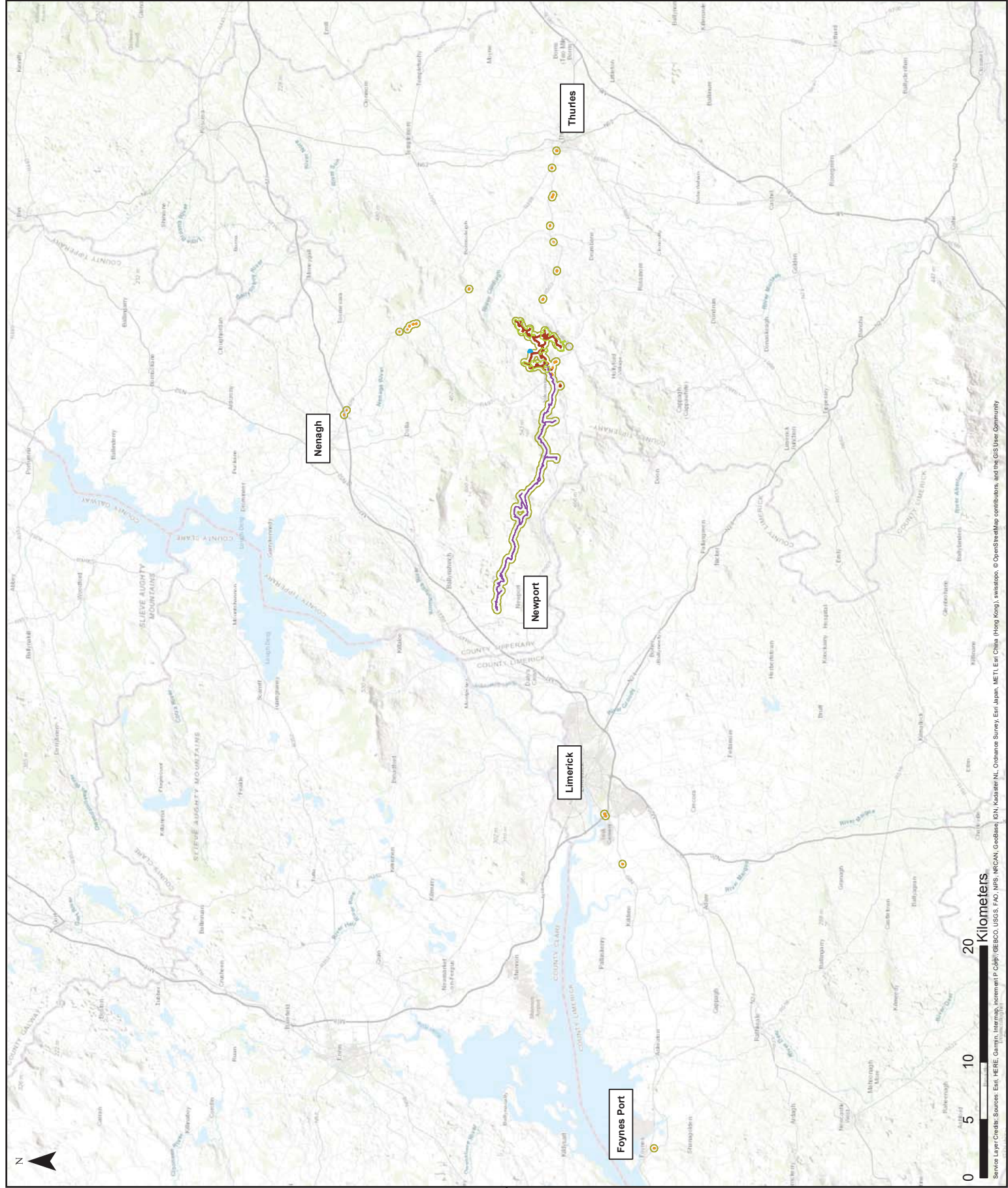
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Project: Whole UWF Project

Title:
Figure RF 8.9: Non-Volant Mammals within
the UWF Replacement Forestry Study Area

Legend:

- UWF Replacement Forestry Area
- Study Area Boundary (50m)

Survey Results:*

- Badger
- Fox

*Note: Fallow Deer, Pine Martin, Red Staircase and Irish Hare and
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Project: Whole UWF Project

Title:

Figure CE 8.9: Non-Volant Mammals within the Cumulative Evaluation Study Area

Legend:

- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Area
- UWF Other Activities Construction Works Boundary
- General Non-Volant Mammals 100m Buffer
- Badger 2km Buffer
- Other 7km Buffer

* Forestry: Please see those map book figures which illustrate terrestrial habitats on aerial photography, for reference purposes with respect to the extent of Forestry lands.

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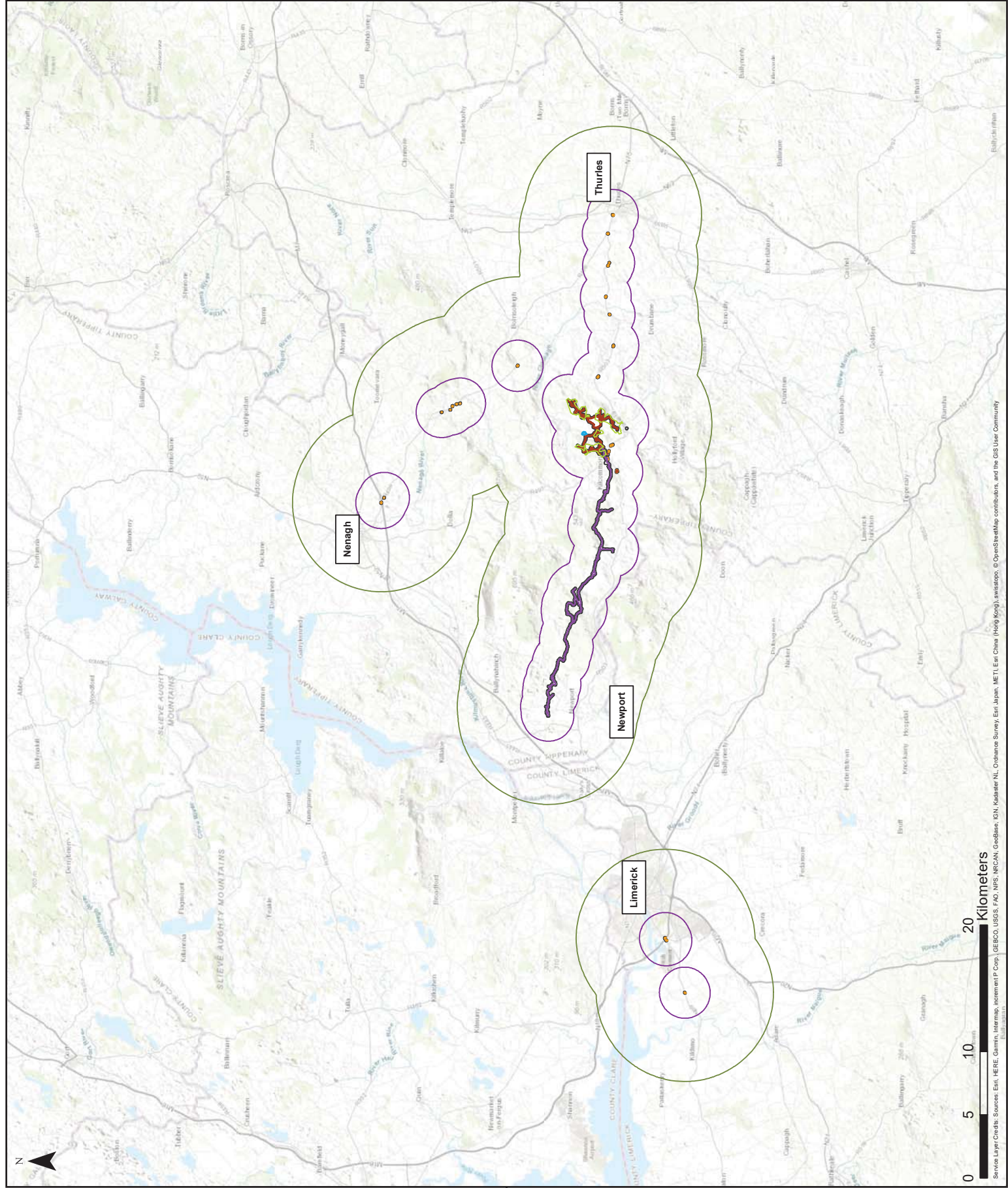
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Title:
Figure RF 8.10: Amphibians & Reptiles
within the UWF Replacement Forestry
Study Area

Legend:

-  UWF Replacement Forestry Area
-  Study Area Boundary (50m)

Nil Observations

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Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:

Figure CE 8.10: Amphibians & Reptiles within the Cumulative Evaluation Study Area

Legend:

- Upperchurch Windfarm 2013 Study Area
- Amphibians & Reptiles 100m Buffer

No Other Projects or Activities scoped in for evaluation

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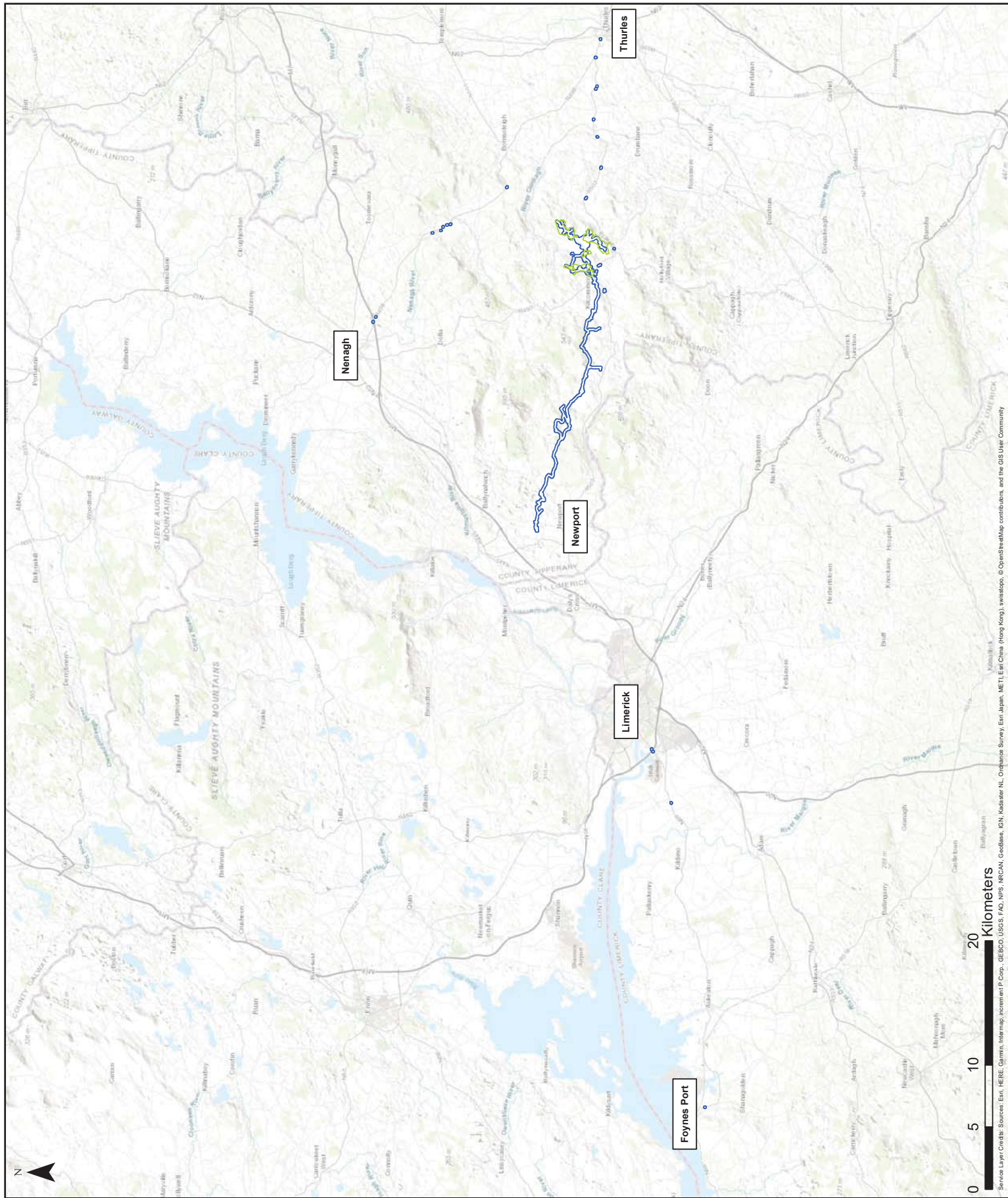
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Project: Whole UWF Project

Title:
Figure CE 8.11: Marsh Fritillary within the Cumulative Evaluation Study Area

- Legend:**
- Projects/Activities
 - Upperchurch Windfarm 2013 Study Area
 - UWF Related Works Construction Works Area
 - UWF Grid Connection Construction Works Area
 - UWF Replacement Forestry Area
 - UWF Other Activities Construction Works Boundary
 - 2km Buffer (Badger, Invertebrates - Marsh Fritillary)

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