

UWF GRID CONNECTION REFERENCE DOCUMENTS

UWF REPLACEMENT FORESTRY VOLUME F6: EIA MAIN REPORT (PART 1 of 2)

Volume A	Planning Application Documents – Application Form; Site/Newspaper Notice; Letters of Consent; Schedule of Submitted Documents etc.	
Volume B	Planning Drawings	
Volume C	UWF Grid Connection EIA Report (EIA)	Volume C1: EIA Non-Technical Summary Volume C2: EIA Main Report Volume C3: EIA Figures Volume C4: EIA Appendices
Volume D	Environmental Management Plan for UWF Grid Connection	
Volume E	Appropriate Assessment Reporting	
VOLUME F	REFERENCE DOCUMENTS FOR OTHER ELEMENTS OF THE WHOLE UWF PROJECT	Volume F1 to F3: UWF Related Works EIA Report Volume F4: Environmental Management Plan For The UWF Related Works Volume F5 TO F7: 2018 UWF Replacement Forestry EIA Report VOLUME F6: EIA MAIN REPORT (2 PARTS) Volume F8 to F9: Upperchurch Windfarm DETAILS OVERLEAF

Planning Application to An Bord Pleanála
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Project Website: www.upperchurchwindfarmgridconnection.ie

REFERENCE DOCUMENTS DETAILS

Volumes F1 to F3: 2018 UWF Related Works EIA Report

Volume F1: EIAR Non-Technical Summary & EIAR Figures

Volume F2: EIAR Main Report (2 Parts)

Volume F3: EIAR Appendices (3 Parts)

Volume F4: Environmental Management Plan for the UWF Related Works

Volumes F5 to F7: 2018 UWF Replacement Forestry EIA Report

Volume F5: EIAR Non-Technical Summary & EIAR Figures

Volume F6: EIAR Main Report (2 Parts)

Volume F7: EIAR Appendices (3 Parts)

Volumes F8 to F9: Upperchurch Windfarm

Volume F8: 2013 EIS for Upperchurch Windfarm

Volume F9: 2013 RFI for Upperchurch Windfarm & 2014 ABP Inspector's Report for Upperchurch Windfarm & 2014 Grant of Permission & Conditions for Upperchurch Windfarm

Upperchurch Windfarm Replacement Forestry (UWF Replacement Forestry)

UWF Replacement Forestry EIA Report (EIAR) VOLUME C2: EIAR MAIN REPORT (Part 1 of 2)

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ECOPOWER

May 2018

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UWF Replacement Forestry EIA Report

Volume C2: EIAR Main Report

Chapter 1: Introduction



May 2018

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Figures and mapping referenced in this chapter can be found in **Volume C3 EIAR Figures**.

Glossary of Terms

<u>Term</u>	<u>Definition</u>
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Environmental Factors	The factors in the environment required to be identified, described and assessed during the EIA process. These are specified in Article 3 (1) of the EIA Directive as Population and Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Material Assets; Cultural Heritage and Landscape.
Competent Authority	The body legally delegated to decide on the Licence/Planning Application
Competent Expert	Experts who are qualified and competent in their field of expertise
Consented Windfarm	Upperchurch Windfarm – 22 wind turbines, substation, windfarm roads and ancillary works, consented in August 2014 under Planning Reference: Tipperary County Council 13/51/0003, ABP PL 22.243040
Element	One of the 5 No. elements listed in ‘Whole UWF Project’ below.
Project Design Environmental Protection Measures	Measures for environmental protection, incorporated into the design of the project.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Whole UWF Project	Project made up of 5 No. elements – UWF Grid Connection; UWF Related Works, UWF Replacement Forestry, Upperchurch Windfarm (UWF) and UWF Other Activities.

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
ABP	An Bord Pleanála
EDL	Ecopower Developments Limited
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GC	Grid Connection
kV	kilovolt
OA	Other Activities
OSI	Ordnance Survey Ireland
RF	Replacement Forestry
RFI	Response to Further Information
RW	Related Works
UWF	Upperchurch Windfarm
UGC	Underground Cables

1 Introduction

1.1 Introduction to the Applicant

Ecopower Developments Limited (EDL) is part of the Ecopower group of specialist on-shore wind energy development, operation & maintenance and asset management companies, and has been involved in wind energy developments in Ireland since 1996.

1.2 Introduction to the EIA Report

This Environmental Impact Assessment Report (EIA Report or EIAR¹) has been prepared to accompany the afforestation licence application by EDL to the Minister of the Department of Agriculture, Food and the Marine for forestry replanting.

The application is called UWF Replacement Forestry throughout this EIA Report. UWF Replacement Forestry is part of a much larger project – the Whole Upperchurch Windfarm (UWF) Project. The other components are UWF Grid Connection; UWF Related Works; Upperchurch Windfarm and UWF Other Activities.

¹ Directive 2011/92/EU as amended by 2014/52/EU uses the term environmental impact assessment report rather than environmental impact statement. EIA Report and EIAR are used throughout these submission documents, in the place of EIS and Environmental Impact Statement.

1.3 Structure of the Planning Application

This afforestation licence application comprises a suite of application particulars, which include a) this EIA Report and accompanying Figures and Appendices b) Licence Application Documents; Drawings; Appropriate Assessment Reporting and Reference Documents included for cumulative assessment.

The documents are presented in separate volumes. Table 1.1 below, summarises the contents of these volumes so that it is clear, to the reader, where information can be found.

Table 1-1: Documents accompanying the planning application

Volume No.	Document Title	
Volume A	Afforestation Licence Application Documents – Application Form; Site/Newspaper Notice; Letters of Consent; Schedule of Submitted Documents etc.	
Volume B	Drawings	
Volume C	UWF Replacement Forestry EIA Report	Volume C1: EIAR Non-Technical Summary Volume C2: EIAR Main Report Volume C3: EIAR Figures Volume C4: EIAR Appendices
Volume D	Appropriate Assessment Reporting and Appendices	
Volume E	Reference Documents for Other Elements of the Whole UWF Project	<u>UWF Grid Connection</u> 2018 UWF Grid Connection EIA Report 2018 UWF Grid Connection Environmental Management Plan <u>UWF Related Works</u> 2018 UWF Related Works EIA Report 2018 UWF Related Works Environmental Management Plan <u>Upperchurch Windfarm</u> 2013 EIS for Upperchurch Windfarm 2013 RFI for Upperchurch Windfarm 2014 ABP Inspector's Report for Upperchurch Windfarm 2014 Grant of Permission & Conditions for Upperchurch Windfarm
Volume C4: EIAR Appendices:		<u>UWF Other Activities</u> Appendix 5.6 Description of UWF Other Activities

1.4 Description of UWF Replacement Forestry

UWF Replacement Forestry relates to the planting with forestry, of 6ha of agricultural lands. The forestry will comprise native tree and shrub species.

1.4.1 Purpose of UWF Replacement Forestry

The UWF Replacement Forestry will fulfil the replanting obligation which will arise from the felling of forestry for the development of the whole Upperchurch Windfarm project.

Note: UWF received planning consent in 2014, but is not yet constructed.

1.4.2 Location of UWF Replacement Forestry

The UWF Replacement Forestry lands are located in two adjoining parcels of agricultural lands in Foilnahan townland, near the village of Upperchurch in County Tipperary.

Relevant Volume C3 EIAR Figures:

Figure RF 1.1: Location of UWF Replacement Forestry on OSI Discovery Mapping (The Subject Development)

1.4.3 Overview Description of UWF Replacement Forestry

It is proposed to plant six hectares (6ha) of agricultural grassland with 20,000 saplings of native woodland species, set in clusters of well-matched native species, to be managed as permanent forest.

All species which will be planted will be silviculturally compatible, native to the Island of Ireland, representative of the native wood land type Oak-Birch-Holly Hazel Woodland, and acceptable to the Forest Service. The lands will be planted with a mixture of tall trees and understory shrubs, and the design includes varied spacing between the clusters of trees. Wide ride-lines between deeper areas of core woodland will be provided which will create an open space with tree-lined boundaries, which is much favoured by birds of prey during the day (e.g. hen harrier) and bats at night, as hunting ground.

Tree guards will be used to protect the saplings and young trees from rabbit damage and the new native woodland will be protected from livestock by perimeter fencing.

A small stream within the Clodiagh River catchment, flows through the western part of the lands. A setback distance of 10m will be established from this watercourse, and no planting works will take place within this area.

An existing agricultural entrance leading off the L-2264-34, will be used to access the new forestry. The existing sightlines at the entrance already comply with North Tipperary County Development Plan 2010 (as amended) Table 10.1: Sightline Requirements.

1.4.4 Guidance Documents for UWF Replacement Forestry

The following documents were considered for the design of the development;

Forest Service Department of Agriculture, Food & the Marine Guidelines for;

- *Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards (2015)*
- *Environmental Requirements for Afforestation (2016)*
- Management Guidelines for Ireland Native Woodlands (2017).

1.5 Cumulative Evaluation of UWF Replacement Forestry

The subject application (UWF Replacement Forestry) is part of a whole project which comprises the following other elements – UWF Grid Connection, UWF Related Works, Upperchurch Windfarm (UWF) and UWF Other Activities. These are collectively referred to as the Whole UWF Project in this EIAR.

The purpose of the UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and UWF Other Activities elements is to facilitate the construction and operation of the already consented Upperchurch Windfarm (UWF). Upperchurch Windfarm when operational, will produce renewable electricity from the wind to supply the National Grid.

Table 1-2: Element 3 of the Whole UWF Project

	The Subject Development	Composition of the Subject Development	Planning Status and Competent Authority for the Subject Development
3	UWF Replacement Forestry (RF)	Replacement Forestry at Foilnaman	Subject afforestation license application to the Minister for Agriculture, Food and the Marine

Table 1-3: Element 1,2,4 and 5 of the Whole UWF Project

	Element of the whole UWF project	Composition of each Element	Planning Status and Competent Authority for each Element
1	UWF Grid Connection (GC)	Mountphilips Substation Mountphilips – Upperchurch 110kV UGC Grid Connection Access Roads Grid Connection Ancillary Works	Current planning application to An Bord Pleanála
2	UWF Related Works (RW)	Internal Windfarm Cabling Realigned Windfarm Roads Haul Route Works Telecom Relay Pole RW Ancillary Works	Current planning application to Tipperary County Council
4	Upperchurch Windfarm (UWF)	Consented UWF Turbines Consented UWF Substation Consented UWF Roads UWF Ancillary Works	Already consented under Planning Reference: Tipperary Co.Co. 13/51/0003, ABP PL 22.243040
5	UWF Other Activities (OA)	Haul Route Activities Upperchurch Hen Harrier Scheme Monitoring Activities Overhead Line Activities	No planning permission required

An EIA Report has also been prepared to accompany concurrent planning applications to the relevant Competent Authorities, for the UWF Grid Connection and UWF Related Works. These EIA Reports can be found in **Volume F: Reference Documents for Other Elements of the Whole UWF Project**. *Note: The Individual Elements are numbered 1 to 5 consistently throughout all three concurrent EIA Reports per the above table.*

Relevant Volume C3 EIAR Figures:

The location of each element of the whole UWF project is illustrated on:

Figure CE 1.1: Location of UWF Replacement Forestry and the Other Elements of the Whole UWF Project on OSI Discovery Mapping

1.5.1 Cumulative Locational Context of all the Elements

The vast majority of the Whole UWF Project is located in County Tipperary with some minor activities along the Upperchurch Windfarm turbine component haul route and on the Killonan to Nenagh 110kV overhead line, in County Limerick (these activities are part of Element 5: UWF Other Activities).

- The vast majority of the interaction of the Elements is in and around the consented Upperchurch Windfarm.
- The UWF Replacement Forestry is adjacent to UWF Related Works in Foilnahan.

Relevant Volume C3 EIAR Figures:

Figure CE 1.2: UWF Replacement Forestry and the Other Elements of the Whole UWF Project in the vicinity of Upperchurch Windfarm (Discovery Mapping).

Figure CE 1.3: UWF Replacement Forestry and the Other Elements of the Whole UWF Project in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands (Ariel Photography).

UWF Replacement Forestry EIA Report

Volume C2: EIAR Main Report

Chapter 2: The EIAR Process including Scoping



May 2018

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Appendix 2.2	Environmental Topic Authors Statement of Competency
Appendix 2.3	Scoping of Other Projects or Activities
Appendix 2.4	<u>Completed</u> EIA Report Checklist

Appendices referenced in this chapter can be found in **Volume C4 EIAR Appendices**.

Glossary of Terms

<u>Term</u>	<u>Definition</u>
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Environmental Factors	The factors in the environment required to be identified, described and assessed during the EIA process. These are specified in Article 3 (1) of the EIA Directive as Population and Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Material Assets; Cultural Heritage and Landscape.
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List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
ABP	An Bord Pleanála
EDL	Ecopower Developments Limited
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
RFI	Response to Further Information
PD	Ecopower Project Design Environmental Protection Measure developed by members of the EIAR Team
UWF	Upperchurch Windfarm
UGC	Underground Cables

2 The EIA Report Process including Scoping

2.1 Legislative Context of EIA

2.1.1 The EIA Directive

The Environmental Impact Assessment (EIA) of projects is governed by the terms of European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU) on the assessment of the effects of certain public and private projects on the environment. The EIA Directive requires that public and private Projects that are likely to have significant effects on the environment be made subject to an assessment prior to development consent being given.

The previous Directive - Directive 2011/92/EU has been amended by Directive EIA 2014/52/EU, in a number of respects. Generally the amending EIA Directive is an elaboration/expansion of matters referred to in the 2011 Directive, with additional matters to be considered. It is required that the amending Directive be transposed by the member states, by 16th May 2017. The amending Directive had not been transposed to Irish Planning Law at the time of submission of this planning application (June 2018). The application documents have been prepared in compliance with the requirements of both 'Directive 2011/92/EU' and 'Directive 2011/92/EU as amended by 2014/52/EU' and fulfils all the requirements of an EIS under Directive 2011/92/EU as well as the requirements of an Environmental Impact Assessment Report under Directive 2011/92/EU as amended by 2014/52/EU.

In EIA Directive Article 1: Paragraph 2(a) defines 'project' as

- The execution of construction works or of other installations or schemes and
- Other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources.

The EIA Directive divides potential Projects into two lists;

- Annex I – where EIA is required in all cases.
- Annex II – where Member States shall determine whether an EIA is required.

The UWF Replacement Forestry as a Project is not an Annex I or Annex II type project.

2.1.2 National Afforestation, Forest Road Construction and Felling Licenses

Under the Forestry Regulations 2017 (SI No 191 of 2017), all applications for licences for afforestation require the prior written approval of the Minister for Agriculture, Food and the Marine. Before the Minister can grant approval for afforestation, the Minister must first determine if the project is likely to have a significant environmental effect.

Under the Forestry Regulations 2017; Part 7: Environmental Impact Assessment

Environmental impact assessment of forestry development

13. (2) The Minister shall ensure that an environmental impact assessment is carried out in respect of an application for a licence for—

- (a) afforestation which would involve an area of 50 hectares or more
- (c) afforestation which does not exceed an area of 50 hectares but which the Minister considers likely to have significant effects on the environment taking into account the criteria set out in Schedule 3.

The subject afforestation licence application is for afforestation of 6 hectares and therefore sub-threshold for environmental impact assessment. However, the application is qualified by Schedule 3 of the Regulations.

In Schedule 3: *Criteria to determine if a sub-threshold project should be subject to an environmental impact assessment*, it states that the;

Characteristics of projects must be considered with particular regard to cumulation with other existing and approved projects (1.(b)Schedule 3;) and

The likely significant effects of projects on the environment must be considered, taking into account the cumulation of the impact with the impact of other existing and approved projects (3.(g) Schedule 3).

2.1.3 Screening for the requirement for EIA

The afforestation planned for UWF Replacement Forestry is part of a whole project (Upperchurch Windfarm UWF) which includes a Project described in Annex II: Paragraph 3. Energy Industry (i) Installations for the harnessing of wind power for energy production (wind farms).

Under Irish planning law, Part X (Ten): Environmental Impact Assessment of the Planning and Development Act 2000 (as amended) sets out the requirements under the Act, for environmental impact assessment on Projects of a Class listed in Schedule 5 of the Planning and Development Regulations 2001. Schedule 5: Part 2: Paragraph 3 (i) lists 'Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts'.

Therefore screening was carried out to establish if an Environmental Impact Assessment (EIA) was required to be carried out by the Department of Agriculture, Food and the Marine (the Competent Authority) on the subject development – UWF Replacement Forestry – because it is part of a whole project containing a windfarm of more than 5 turbines i.e in cumulation with other existing and approved projects.

2.1.3.1 Result of Screening for EIA

UWF Replacement Forestry is part of the Whole UWF Project, one element of which, Upperchurch Windfarm, did require that an environmental impact assessment be carried out. In order that a cumulative assessment of the impact, with the impact of other existing and approved projects, can be carried out for the afforestation licence, an EIA Report has been prepared.

2.2 The EIA Report

The desirability of an environmental impact assessment thus screened in, the promotor (EDL) is obliged to prepare an environmental impact assessment report (EIA Report)¹.

2.2.1 EIA Report Requirements under EIA Directive

The information to be provided by the developer in the EIA Report, is set out in Article 5 and also in Annex IIA and Annex IV of the EIA Directive. This EIA Report was compiled having regard to the generality of the EIA Directive (meaning both Directive 2011/92/EU¹ and 'Directive 2011/92/EU as amended by 2014/52/EU') and specifically to the requirements of Article 5; Annex IIA and Annex IV.

2.2.2 Guidance Documents for the EIA Report

This EIA Report has been prepared in accordance with the following documents:

- **S.I. No. 191/2017** - Forestry Regulations 2017: Part 7: Environmental Impact Assessment and Schedule 4: Information to be Contained in an EIS (www.irishstatutebook.ie/eli/2017/si/191/made/en/print)
- **Felling and Reforestation Policy** - Forest Service Department of Agriculture, Food & the Marine (2017) (www.agriculture.gov.ie/media/migration/forestry/treefelling/FellingReforestationPolicy240517.pdf)
- **EIA Directive**: Article 5, Annex IIA and Annex IV
(ec.europa.eu/environment/eia/pdf/EIA_Directive_informal.pdf).
- **Transposition of 2014 EIA Directive** (2014/52/EU) in the Land Use Planning and EPA Licensing Systems (Department of Housing, Planning, Community and Local Government, 2 May 2017). (www.housing.gov.ie/sites/default/files/publications/files/key_issues_in_transposition_of_2014_eia_directive_-_stakeholder_consultation_document_02may2017.pdf)
- **Guidance on the preparation of the EIA Report** (European Commission, 2017) (ec.europa.eu/environment/eia/eia-support.htm)
- **Guidance on Screening** (European Commission, 2017) (ec.europa.eu/environment/eia/eia-support.htm)
- **Guidance on Scoping** (European Commission, 2017) (ec.europa.eu/environment/eia/eia-support.htm)
- **Guidelines for the Assessment of Indirect and Cumulative Impacts** as well as Impact Interactions, (European Commission, 1999). (ec.europa.eu/environment/eia/eia-support.htm)
- **Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports** (EIAR) (EPA 2017) (www.epa.ie/pubs/advice/licensee/drafteiarguidelines.html)
- **Guidelines on the information to be contained in Environmental Impact Statements** (EPA 2002); (www.epa.ie/pubs/advice/ea/guidelines)
- **Advice Notes on Current Practice in the preparation of Environmental Impact Statements** (EPA 2003). Both at (www.epa.ie/pubs/advice/ea/guidelines)
- **Planning and Development Act 2000** (as amended) – Part X Environmental Impact Assessment
- **Planning and Development Regulations** (as amended) – Part 10 Environmental Impact Assessment
- **Chapter 3: The Scoping Consultations**

¹ Directive 2011/92/EU as amended by 2014/52/EU uses the term Environmental Impact Assessment Report rather than Environmental Impact Statement. EIA Report and Environmental Impact Assessment Report are used throughout these submission documents, in the place of EIS and Environmental Impact Statement

2.2.3 The Project Design Team

An EIA Report Co-ordinator was appointed, who arranged for all the initial consultations, site investigations, development designs and technical investigation to be carried out; appointed engineering and scientific experts as The Project Design Team to prepare the final project design; assembled the EIA Report Team of experts (which includes the project design team members) to prepare the specialist environmental factors or topic chapters for the EIA Report on the chosen design; co-ordinated the assembly and presentation of the EIA Report and carried out continuous reviews of the Report. Julie Brett of EDL is the EIA Report Co-ordinator for the UWF Replacement Forestry project.

In order to anticipate and avoid adverse effects on the environment, EDL engaged specialist environmental consultants for planning and design of UWF Replacement Forestry. The specialists considered the technical requirements according to ESB specifications and also alternative locations, design and processes. These specialists are competent experts² in their field of expertise and, are identified in Table 2.1 below.

Table 2-1: The Project Design Team

Team Member	Competence	Design Area
Ecopower Developments (EDL)	Windfarm planning and development specialists Project Supervisor Design Process (PSDP) EIA practitioners	Supervision of overall design Overall Alternatives Considered Project Design Environmental Protection Measures development. EIAR Co-ordinators
INIS Environmental	Environmental Consultants specialising in ecology & environmental management	Alternatives Considered in relation to Biodiversity Project Design Environmental Protection Measures development.

2.2.4 The EIA Report Team

Including the Project Design Team, EDL engaged the services of additional suitably qualified and experienced Competent Experts to appraise the likely effects on all the Environmental Factors of the UWF Replacement Forestry development as proposed and to put forward additional Project Design Environmental Protection Measures and Additional Mitigation Measures (if required). The competency of these experts is summarised in Table 2-2 below.

Table 2-2: The EIAR Team

Environmental Factor	EIAR Chapter/ Appendix Title	EIA Report Chapter	EIAR Team Competent Expert Involved	Company & Experience
EIAR Coordination & Management			Julie Brett	EDL Managers in EIA and AA Reporting for Ecopower since 1996
	Introduction	Chapter 1	Lead Assessor (Dip. EIA)	

² Competent Experts: Article 5(3) Directive 2014/52/EU

Environmental Factor	EIA Report Chapter	EIA Report Chapter	EIA Report Chapter	Company & Experience
	The EIA Report Process including Scoping	Chapter 2	Philomena Kenealy (Dip. EIA)	(Philomena Kenealy) and 2003 (Julie Brett) and in that time have been part of a multi-disciplinary team which has completed site investigations, assessments and planning applications on 20 windfarm projects on-shore in Ireland.
	Scoping Consultation	Chapter 3		
	Alternatives Considered	Chapter 4		
	Description of the Development	Chapter 5		
	Interaction of the Foregoing	Chapter 18		
	Monitoring Arrangements	Chapter 19		
	Executive Summary	Chapter 20		
	Non-technical Summary	Volume C1		
Population & Human Health	Population (Socio-economics)	Chapter 6 & Appendix 6.1 CSO Data	John Lawler (M. Econ. Sc. Hons) Ciara Morley	John has a M. Econ. Sc. Hons and is a Director at EY-DKM Economic Advisory Services (EY-DKM). John has over 20 years' experience of economic analysis and prior to that worked in the Environmental Policy Research Centre of the ESRI. Ciara Morley has a Ph.D. Finance and is a Senior Consultant with EY-DKM and also previously worked in the ESRI.
	Human Health	Chapter 7	Dr Andrew Buroni PhD, MSc, BSc (Hons) Fellow of the Royal Society of Medicine and Fellow of the Royal Society of Public Health	RPS Group Energy Resources and Environmental Consultancy Experience in Health and Social Impact Assessment in the energy, oil and gas, waste management, transport, civil aviation, spatial planning, regeneration and sustainable development sectors.

Environmental Factor	EIAR Chapter/ Appendix Title	EIA Report Chapter	EIAR Team Competent Expert Involved	Company & Experience
Biodiversity ³	Chapter 8 Biodiversity & Appendix 8.1 Detailed Biodiversity Data and Supplementary Information and Figures		Howard Williams BSc CEnv MCIEEM CBIol MRSB MIFM Christopher Cullen Dip. Eng. Dip. Ecol. ACIEEM Sarah Ingham BSc MSc ACIEEM John Deasy BSc. MSc. Rosemarie McDonald MSc. B.A (Mod) (Hons) GradCIEEM Gyr Penn Bird Surveyor Patrick Quinn BSc (Hons.) AMIFM Timothy Gallagher Ecologist/ Mammologist	Inis Environmental Consultants specialising in ecology & environmental management. Howard Williams (Chartered Environmentalist and Chartered Biologist, CEO Inis) has acted as Lead Ecologist on more than 50 operating wind farm developments in Ireland and the UK since 2000. He has also prepared surveys and ecological/ environmental documentation for more than 600km of high voltage grid infrastructure. Christopher Cullen (Senior Ecologist, COO Inis) has a broad range of experience within the ecological consultancy sector including bird and habitat surveys. He is a specialist in ornithological surveys and assessments, in particular, collision risk modelling (CRM).
Land	Land	Chapter 9	Andy Dunne BAgrSc: MSc (Agr)	Director of EAEC (Environmental Agricultural Engineering Consultancy) 20 years' experience in land use and agricultural development activity and national and EU regulation and policy in the area.

³ Referred to as 'Flora and Fauna' in Directive 2011/92/EU

Environmental Factor	EIA Report Chapter	EIA Report Chapter	EIA Report Chapter	Company & Experience
Soils	Soils	Chapter 10	Michael Gill B.A., B.A.I., M.Sc., Dip. Geol, MIEI Hydrogeologist David Broderick BSc, H. Dip Env Eng, MSc Environmental Engineer	Hydro Environmental Services (HES) Geologist and Hydrogeologist Environmental engineering consultancy established in 2005 as a hydrological, hydrogeological and environmental practice, specialising in peatland and upland hydrology in Ireland and Northern Ireland.
Water	Water	Chapter 11	Michael Gill B.A., B.A.I., M.Sc., Dip. Geol, MIEI Environmental Engineer	Hydro Environmental Services (HES) Geologist and Hydrogeologist Environmental engineering consultancy established in 2005 as a hydrological, hydrogeological and environmental practice, specialising in peatland and upland hydrology in Ireland and Northern Ireland.
			David Broderick BSc, H. Dip Env Eng, MSc Hydrogeologist	
Air	Air Quality	Chapter 12	Ciara Nolan BSc (Hons) in Energy Systems Engineering and Master in Applied Environmental Science	AWN Consulting, multidisciplinary environmental consultancy with specialities in Acoustics, Air Quality, Climate.
	Noise & Vibration		Peter Barry Environmental scientist and EIA Practitioner	Malachy Walsh & Partners, Consulting and Environmental Engineers. Peter has particular expertise in the measurement, assessment, prediction and control of environmental noise and is a member of the Institute of Acoustics and the Institute of

Environmental Factor	EIAR Chapter/ Appendix Title	EIA Report Chapter	EIAR Team Competent Expert Involved	Company & Experience
				Environmental Management and Assessment.
	Electromagnetic Radiation		John McAuley MSc (Hons) in Engineering Lewis Brien B (Hons) in Electronics Nigel Duignan MSc (Hons) in Electronics	John is CEO of CEI (Compliance Engineering Ireland) engineering consultancy specialising in electromagnetic fields. Experience includes the 400kV North South Interconnector, East West Interconnector, many windfarm, solar and compressed air projects, and assisted Eirgrid with EMF evidence-based studies. Lewis is experienced in carrying out site surveys and measurements on power lines, power stations and substations. Nigel is experienced in carrying out site surveys and measurements on power lines, trains and substations.
Climate	Climate	Chapter 13	Ciara Nolan BSc (Hons) in Energy Systems Engineering and Master in Applied Environmental Science	AWN Consulting, multidisciplinary environmental consultancy with specialities in Acoustics, Air Quality, Climate.
Material Assets	Built Services: Electricity Network	Chapter 14	Ruairí Geary Chartered Engineer	TLI (Transmission Links Ireland) Utility Infrastructure Development Consultancy Ruairí has over 10 years' experience in a wide range of Electrical/Mechanical engineering projects, specialising in the area of distribution and transmission network Design, and in particular working on the ESB system.
	Built Services: Communication Network		Kevin Hayes Master of Electronic Engineering Software Design Engineer	Engineering Director, Ai Bridges Telecommunication Specialists Kevin has 15 years of experience in telecommunications network design, analysis and troubleshooting of radio frequency issues and

Environmental Factor	EIAR Chapter/ Appendix Title	EIA Report Chapter	EIAR Team Competent Expert Involved	Company & Experience
				development of telecommunication projects.
	Built Services: Water Supply Infrastructure		David Broderick Hydrogeologist	HES (as above)
	Roads & Traffic	Chapter 15 Appendix 15.1 Traffic & Transportation Assessment	Eoin Reynolds Chartered Engineer	Director of NRB Consulting Engineers Eoin has 26 years' experience in a wide range of civil engineering projects, specialising in the area of Traffic & Transportation and Roads Design, and in particular in assessing the infrastructure needs of development.
Cultural Heritage	Cultural Heritage	Chapter 16 Appendix 16.1.1 Archaeological & Historical Background Appendix 16.1.6 Field Walking Description	Barry Fitzgibbon MA Archaeology	Archaeologist with Kilkenny Archaeology, an experienced archaeology consultancy since 1998 specialising in evaluating the impact of large-scale development on Cultural Heritage sites involving the production of more than 50 EISs for large-scale developments.
Landscape	Landscape	Chapter 17	Richard Barker MLArch Landscape Architecture	Principle Landscape Architect with Macroworks Visualisation Specialists. Richard's experience includes the landscape and visual impact assessment of more than 90 wind energy development proposals including 5 no. SID and also road schemes, electricity transmission lines (overhead and underground) as well as water and sewage pipelines.
Interaction of the Foregoing,		Chapter 18	All Competent Experts EIA Coordinators	As above

See [Appendix 2.2 Environmental Topic Authors Statement of Competency](#) for further details of the competent expert's qualifications and experience ([Volume C4: EIAR Appendices](#)).

2.2.5 Cumulative Evaluation

2.2.5.1 Cumulative Evaluation Requirements

Under the EIA Directive, the totality of a project must be considered which includes off-site projects, secondary developments and other projects and activities.

2.2.5.2 What are Cumulative Impacts?

Cumulative impacts are the addition of many neutral or significant effects, including effects of other projects, to create larger, more significant effects.

While a single activity may itself result in a neutral impact, it may, when combined with other impacts (neutral or significant), result in a cumulative impact that is collectively significant. For example, effects on water quality due to construction activity may be neutral for the subject development, however it may be necessary to assess the cumulative impacts, taking account of construction activities for other off-site, secondary or other projects or activities.

2.2.5.3 Cumulative Projects

Off-Site Projects are integral to the primary project, i.e. they are required for the primary project to operate. UWF Replacement Forestry is part of a whole project which comprises the following elements – Element 1: UWF Grid Connection, Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF) and Element 5: UWF Other Activities. Elements 1, 2, 4 and 5 are off-site projects relevant to the Subject Development – UWF Replacement Forestry.

Secondary projects are projects that may arise largely because of the existence of the principal project, though they are usually not carried out by the promotor of the principal project.

Other Projects or Activities relate to existing or consented projects in the area which by addition, could create larger, more significant effects.

2.3 Scoping for Content and Extent of the EIA Report

According to 'EC 2017 Guidance on Scoping', scoping is the process of determining the content and extent of the information to be submitted to the Competent Authority to ensure that the environmental assessment is focused on the project's most significant effects on the environmental factors. Scoping was carried out throughout the whole EIA Report preparation process for UWF Replacement Forestry.

2.3.1 Key Activities in the preparation of the EIA Report

The key activities involved in the preparation of this EIA Report included:

- A preliminary description of the proposed development was prepared by EDL
- Scoping by competent experts and consultation with local authorities to define the EIA Report content.
- Scoping following the results of consultation to finalise the particulars of the development, identify the potentially significant effects on environmental factors and consider alternative options to those particulars.
- The final particulars thus established, a description of the final proposed development was prepared by EDL which included the final proposed characteristics of the Project including the Environmental Protection Measures designed into the Project; the life-cycle stages including planting and growth phases; the use of natural resources including Land, Biodiversity, Water and Soils; and expected residues, emissions, and waste from the Project. The particulars of off-site projects, secondary projects and other projects and activities are described.
- This is followed by the 12 No. topic specific chapters (Chapters 6 – 17) covering Population; Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Built Services; Roads & Traffic; Cultural Heritage and Landscape. These were prepared by topic specific experts. These chapters describe the Baseline Information sources; Evaluation methodology, Scoping of Sensitive Aspects; relevant Project Design Environmental Protection Measures; Evaluation of effects (including direct, indirect, and cross-factor effects) on individual Receptors directly from the UWF Replacement Forestry and cumulatively with off-site projects, secondary projects and other projects and activities; Mitigation Measures and Evaluation of Residual Impact; followed by a description of Best Practice Measures and the Policy Context for the topic. A summary table was prepared for each Receptor Evaluation and a summary description was prepared for the end of the chapter itself.
- The Interaction of the Foregoing (Chapter 18) was then finalised. Some impacts can affect more than one environmental factor. Consideration of interactions ensures that cross factor effects are evaluated.
- Chapter 19 – the Monitoring Arrangements for the UWF Replacement Forestry was prepared by the EIA Co-Ordinator, based on the survey and monitoring requirements which form part of project design or best practice measures.
- Chapter 20 - an Executive Summary of the results of the EIA Report evaluations, was prepared by the EIA Co-ordinator.
- A non-technical summary of the information contained in the EIA Report, was prepared by the EIA Co-ordinator.
- The EIA Report was reviewed, by the EIA Co-ordinator, for compliance with EIA Legislation and completeness of the EIA Report.

2.3.2 Scoping for Receptors and Effects

Scoping to identify the likely receptors of significant impacts from the Project was carried on through all iterations of the afforestation project from initial design; through to alternatives; inclusion of environmental protection measures in the project design and finally during examination of the final design of the afforestation project.

The scoping process considered topics specific publications; legislation or regulatory controls relevant to the project; information from the Local Authority; competent expert fieldwork and desktop studies; combined Design Team walkover surveys on site and EIA Report Team meetings at EDL's offices.

The Scoping process followed the same pattern irrespective of Project design stage;

- **Identification of a Study Area:** The receiving environment relevant for each topic was scoped using a combination of industry guidance and competent expert's knowledge and expertise, to delineate a study area boundary where effects could arise.
- **Scoping to identify Receptors:** All Receptors within this Study Area likely to be affected by the project were identified using a combination of field surveys; desktop surveys of mapping including designated sites mapping; industry guidance on protection standards for the environmental topics and the competent expert's knowledge and expertise.
- **Scoping to identify Impact Pathways:** The Conceptual Site Model technique was used by the Competent Experts to identify likely source-pathway-receptor links to these Receptors (see Table 2-3 below).
- **Receptors which could likely be affected** were then examined for magnitude of impact. If impacts were likely to occur then the Receptor was included as a Sensitive Receptor, for evaluation for significance of effects, in the topic chapter.
- **Meetings were held between members the EIA Report team** wherein it was decided in which topic chapters certain Sensitive Aspects or Impacts Pathways would be evaluated, and cross-factor effects were discussed between experts.

The terms used in this EIA Report to describe impacts/ source/ pathway/ receptor are defined in Table 2-3.

Table 2-3: Definition of Terms – Source, Pathway, Receptor (EPA, August 2017)

Term	Description
Effect/Impact	A change resulting from the implementation of a project
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, i.e. a Sensitive Aspect

2.3.2.1 Scoping out of effects

During all stages of EIAR preparation, the competent experts also scoped out (excluded) potential effects to Receptors. This was because either:

- there will be no potential for effect, or
- the effect is not likely to take place or
- the effect will be Neutral

Note: EPA define 'Neutral' as 'No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error'. In this EIA Report, the terms 'less than imperceptible' and 'no measurable effect' have the same meaning as 'Neutral'.

2.3.2.2 Scoping for Cumulative Effects

There are two cumulative studies in this EIA Report –

- A cumulative evaluation of the UWF Replacement Forestry in-combination with all the other Elements of the Whole UWF Project and
- A cumulative evaluation with Other Projects and Activities in the area.

2.3.2.2.1 Cumulative Evaluation of UWF Replacement Forestry with the Whole UWF Project Elements

All of the other Elements of the Whole UWF Project are scoped in (included) for cumulative evaluation in the Environmental Factor topic chapters, and are included in the initial cumulative scoping for each Sensitive Aspect.

The competent expert's evaluations start from certain basic assumptions for the other elements:

- The evaluation is based on the description of the UWF Grid Connection; UWF Related Works; and UWF Other Activities Elements provided in this **EIAR Chapter 5: Description of the Development: Section 5.6.1 and Appendices 5.3; Appendix 5.4 and Appendix 5.6 respectively.**
- The evaluation of the cumulative effects of the Consented Windfarm is based on the 2014 An Bord Pleanála Inspectors Report and the 2013 windfarm planning application EIS; 2013 Reply to Further Information and additional information submitted. It is assumed that the Consented Windfarm will be constructed incorporating all mitigation measures and planning conditions imposed by the Board's 2014 Order to Grant Permission. **Note:** The topic specific competent experts did not carry out a new evaluation of the Consented Windfarm, rather they relied on the effects of the Consented Windfarm (with all mitigation measures) as have been already established and deemed acceptable, by An Bord Pleanála. Impact information and impact significance is drawn from the Board's assessment, from the reasons and considerations and planning conditions as set out in the Board's Order and from the EIS, Reply to Further Information and additional information submitted during the planning process in 2013/2014. A compiled chapter has been prepared in the same format as the Description of the Development chapters for the UWF Grid Connection, the UWF Related Works and the UWF Replacement Forestry EIAR. **This compiled chapter is provided in this EIAR Chapter 5: Description of the Development: Section 5.6.1 and Appendix 5.5.**
- In the event of any new impact pathway being identified, during scoping for cumulative receptors, then this new impact pathway was examined for the Consented Windfarm also, so that the cumulative impact of the Whole UWF Project could be determined for this new impact.

2.3.2.2.2 Cumulative effects with Other Projects and Activities

A 15km area around the footprint of all Elements of the Whole UWF Project was drawn, and research of other large projects within this area was carried out by Construction Information Services (CIS), one of Ireland's leading research companies. To cover all projects which may have received planning (and an additional extension of duration) and which could be constructed at the same time as the Whole UWF Project. The search covered the period from January 2011. In addition to this, the EIAR Team's knowledge of the area added existing projects such as existing windfarms, to the list. Activities in the area surrounding the works were also considered. This extensive list was reduced to 35 No. Projects or Activities which had potential to cause cumulative effects. (See **Appendix 2.3 Scoping of Other Projects & Activities in the Cumulative Evaluation Study Area**).

This list was examined for the geographical or 'spatial' boundary and the temporal or 'time frame' boundary relevant for each environmental factor and was scoped to identify the projects likely to have a measureable

cumulative effect. These projects were brought forward for cumulative evaluation in the topic specific chapters.

In total, 11 No. of Other Projects or Activities were brought forward for cumulative evaluation, these Other Projects or Activities are identified on **Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters.**

The Other Projects or Activities brought forward for cumulative evaluation in the Environmental Factor topic chapters, are included in the initial cumulative scoping for each Sensitive Aspect.

2.3.3 Presentation of Information on the Other Elements where there are no effects from the UWF Replacement Forestry

The Subject Development UWF Replacement Forestry, which is small in scale, new native woodland, sensitively designed and which will be sensitively planted and managed, will not cause negative effects to most aspects of the receiving environment. When this occurs the section heading at the start of the Sensitive Aspect section of the Environmental Factor Chapters 6 to 17 will be

UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED.

Underneath this heading, the evaluation consists of a brief description of the baseline environment, neutral effects or effects that have no potential or no likelihood to occur are identified and the rationale for excluding UWF Replacement Forestry from further in-depth evaluation is presented.

If UWF Replacement Forestry does not affect a Sensitive Aspect, then it follows that it cannot cause cumulative effects with either the Other Elements of the Whole UWF Project or with Other Projects or Activities. However, as UWF Replacement Forestry is one part of a whole project, the Other Elements of the Whole UWF Project must be considered in order to present the whole project in totality. Therefore the rest of the Sensitive Aspect section, where UWF Replacement Forestry is EVALUATED AS EXCLUDED, consists of information on the effects on that Sensitive Aspect of the Other Elements, including the cumulative effects of the Other Elements with each other and with Other Projects or Activities.

To make it clear that the information only relates to Other Elements – the section heading titles are preceded by ‘Cumulative Information’ and the section text is fully ‘greyed out’.

2.4 Descriptive Terminology Used in this EIA Report

Terms that have a widely accepted meaning are used consistently throughout this EIA Report. Specialised or technical terms are listed in the Glossary of Terms at the beginning of every topic chapter (Chapter 6 - 17). The terms 'effect' and 'impact'; 'appraised' and 'evaluated'; 'indirect impact' and 'secondary impact' are used interchangeably in this EIA Report.

The terms used to describe effects are EPA definitions taken from the latest relevant guidance per;

- EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (draft August 2017);

The standard descriptive terminology for Effects, which is used in this EIA Report is set out below, for;

- Probability
- Significance
- Extent and Context
- Quality
- Duration and Frequency
- Type of Effects

Table 2-4: Definition of Probability of Effects

Probability of Effect	Description
Likely Impact	The effects that are specifically predicted to take place - based on an understanding of the interaction of the proposed project and the receiving environment or the effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project, if all mitigation measures are properly implemented.

Source: EPA (draft August 2017) Guidelines on the information to be contained in EIA Reports

Table 2-5: Definition of Quality of Effects

Quality of Effect	Description
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 by removing nuisances or improving amenities)
Neutral Effect	No effects or effects that are imperceptible, within 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).

Source: EPA (draft August 2017) Guidelines on the information to be contained in EIA Reports

Extent and Context refers to the 'size' or 'amount' of an impact, determined on a quantitative basis and the 'context' which refers to whether the effect is unique or, perhaps, commonly or increasingly experienced.

Table 2-6: Definition of the Extent and Context of Effects

Extent and Context	Description
Extent	The size of the area, the number of sites and the proportion of a population affected by an effect
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

Source: EPA (draft Sept. 2015) Revised Guidelines on the information to be contained in EIS

Table 2-7: Definition of the Duration and Frequency of an Impact

Duration of Effect	Description
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
Frequency of Effects	How often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

Source: EPA (draft August 2017) Guidelines on the information to be contained in EIA Reports

Table 2-8: Definition of Significance of Effects

Significance of Effect	Description
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 Effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Effect	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

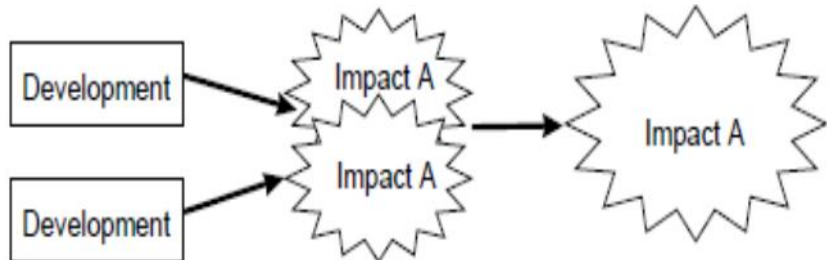
Source: EPA (draft August 2017) Guidelines on the information to be contained in EIA Reports

2.4.1 Types of Effects

Direct effects are those that result from direct cause-effect consequences of interactions between the environmental factor and the Project.

Indirect and cumulative impacts and impact interactions are also considered. The definitions presented below have been used in the appraisals of the various environmental factors in the Environmental Topic Chapters 6-17.

Table 2-9: Definition of Indirect, Cumulative and Impact Interaction

Type of Effect	Description
Indirect Effects (aka 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. 

Source: EPA (draft August 2017) Guidelines on the information to be contained in EIA Reports

Graphics from EC (May 1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions: Section 2.1

Table 2-10: Definition of Other Types of Effects

Type of Effect	Description
'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.
Reversible Effects	Effects that can be undone, for example through remediation or restoration
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
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 SO _x and NO _x to produce smog).

Source: EPA (draft August 2017) Guidelines on the information to be contained in EIA Reports

2.5 Presentation of the EIA Report

In this EIA Report the Coordinators' aim is to set out the herein environmental information in a rational and systematic format so that the EIA Directive requirements are shown to be addressed. This is achieved thorough briefing and editing by the lead assessor during the whole EIAR process in order to keep the focus on evaluating the likely effects on important or sensitive environmental receptors. Accessibility, legibility and clarity were the key considerations during chapter review and editing. The result is an EIA Report that is concise and well integrated across the specialist chapters.

To achieve this concise and focused style, the key presentation techniques deployed were;

- The **Non-Technical Summary is presented in a handy, short, separate volume with figures** included. This is **Volume C1: Non-Technical Summary**.
- In the **Main Report**, the information in the Environmental Factor topic Chapters 6 – 17 is prepared by various experts but presented in the chapters using a standardised structure with a pre-defined layout, terms and definitions; standard evaluation processes (including scoping) and standard descriptive methods and impact descriptions in order to ensure that all likely and significant effects are clearly communicated, placed in context and **easily cross-referenced**.
- **The impacts are evaluated by Sensitive Aspect.**
- Every Environmental Factor chapter is set out in the following manner;
 - **Section X.1:** (*'X' being the chapter number, e.g. Section 6.1 in the Population chapter*): comprises an introduction to the topic, a list of the Sensitive Aspect (receptors); overview of the development, the authors; sources of baseline information; and methodology for evaluation.
 - **Section X.2 – X.X** (*depending on how many Sensitive Aspects are Evaluated*): comprises an evaluation of the Sensitive Aspects including the study area; baseline characteristics; relevant project design measures; evaluation of impacts (Section X.X.4) including cumulative evaluations; mitigation; residual impact; application of best practice measures, and summary table.
 - **Final Sections** - Policy Context followed by **Best Practice Measures** relevant to the topic, and a **Summary of the Topic Chapter**.
- To help readers navigate to various individual Sensitive Aspects and their descriptions/evaluations, an **individual colour code is used for each Sensitive Aspect** throughout the topic chapter. The colour-codes have been applied to section headings; tables; and on sidebars on the edge of the page.
- The impacts are evaluated for the Project as it is described in Chapter 5: Description of Development. At the conception of the Project, the design team evaluated the potential or likely significant effects of the development on the receiving environment. Any potential or likely significant effects were avoided, in most cases, by integrating **Project Design Environmental Protection Measures** into the fundamental design of the development. **The development, as described in Chapter 5, is the final iteration of the project including these project design measures.** It is this final iteration that is examined in Chapters 6 to 17, for effects on the prescribed environmental factors, by the topic competent experts.
- **Appendices** have been used for including detailed or supplementary information and photographs that is not core to the EIA Report but which is nonetheless required for a more detailed understanding, or technical scrutiny of significant issues. Appendices are cross referenced in the text of the EIA Report where relevant. These appendices are contained in a separate volume - **Volume C4: EIAR Appendices**;
- **Mapping and Illustrations**, including maps, plans, sections and diagrams are presented in a separate volume so that they can be prepared at a scale that is legible and so that they do not distract from the flow of the text. Illustrations are cross referenced in the text of the EIA Report where relevant. These illustrations are contained in a separate volume – **Volume C3: EIAR Figures**.

- **Red Font** is used to **cross reference** to the **location** of all appendices, illustrations and references to interacting environmental factors in other chapters of the EIA Report.
- At the beginning of each chapter is a **table of contents**, **lists of figures**, and **list of appendices**, to make the EIA Report easier to navigate.
- A **Glossary of Terms** and **list of abbreviations** (if required), is located under the table of contents, figures and appendices for each chapter.
- **Red Font** is also used for indicating the **Chapter Section** in the page header.
- **EPA evaluation criteria and definitions** are used across all the topic Chapters. EIA Report Descriptive Terminology is set out in **Section 2.4 above**.

2.5.1 Presentation of Cumulative Evaluations in the EIA Report topic chapters

So that the information for the **cumulative evaluation** is clearly distinguishable from the information on the subject development, all information on other projects which facilitated the cumulative evaluation is highlighted in light grey.

In the evaluation sections of each environmental topic chapter, the cumulative information appears greyed out but the cumulative evaluation at the bottom of each evaluation table appears again with white background, as it serves as the cumulative evaluation of the Subject Development.

Please Note: In some instances, the Subject Development will not cause any effects 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 order to present the totality of the project.

2.6 EIA Report Review

The EIA Report was reviewed by the EIA Co-ordinator using a checklist (compiled by the EIA Co-ordinator) of the information that must be provided by the promotor, in the EIA Report. The completed checklist details the location in the EIA Report, of all the prescribed information provided. The checklist was used as a final check that the legislative requirements regarding information, were met. The completed Compliance with Legislation Checklist can be found in [Appendix 2.1: Review of Compliance with Legislation](#).

A more in-depth review of the information contained in the EIA Report, was carried out by the EIA Report Co-ordinator, using a checklist from the EC Guidance document 'Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) Part C: [The EIA Report Checklist](#)'. This checklist is designed to demonstrate that the required information is provided; that it is sufficient and that there are no omissions vital to the evaluation or assessment process; and if there are vital omissions the checklist should provide an indication of what supplementary information is needed.

As well as the EIA Report team, this checklist can be used by the Licencing Authority and others (including members of the public) involved in the consultation process, as a quick guide to the location and sufficiency of all of the information provided in the EIA Report. The final completed EIA Report Checklist can be found at [Appendix 2.4 Completed EIA Report Checklist](#).

UWF Replacement Forestry

Volume C2: Main EIA Report

Chapter 3: The Scoping Consultations



Chapter	The Scoping Consultation

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Appendices referenced in this chapter can be found in **Volume C4 EIAR Appendices**.

Glossary of Terms

<u>Term</u>	<u>Definition</u>
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Element	One of the 5 No. elements listed in 'Whole UWF Project' below.
Whole UWF Project	Project made up of 5 No. elements – UWF Grid Connection; UWF Related Works, UWF Replacement Forestry, Upperchurch Windfarm (UWF) and UWF Other Activities.

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
EDL	Ecopower Developments Limited
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
NPWS	National Parks and Wildlife Services of Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

3 The Scoping Consultations

The main provisions of the EIA Directive on consultations are Articles 6 and 7. Article 7 refers to trans-boundary projects so just Article 6 is relevant here. Article 6 requires consultations with two different groups on the content of the EIA Report 1) the public concerned and 2) public authorities when they are likely to be concerned.

3.1 Consultation with Public Authorities

Scoping consultation in the form of written consultation with Public Authorities and presentations to The Public in the general area of development, was carried out as part of the overall consultation on the Whole UWF Project.

Initially, UWF Replacement Forestry was proposed for a site in Firoda, County Kilkenny. Feedback specific to UWF Replacement Forestry was received from Kilkenny County Council – both the Planning and Environment Section - by letter, phone calls and a meeting. Kilkenny County Council requested that an alternative location for the new forestry be considered on Biodiversity, Road Safety and Cultural heritage grounds. This feedback was given due consideration and UWF Replacement Forestry was relocated to an alternative site at Foilnahan, County Tipperary.

Appendix 3.1.1: Consultation Response from Kilkenny County Council (Volume C4: EIAR Appendices).

During discussions on the Whole UWF Project, NPWS expressed a preference for forestry replanting to be carried out in the same general area as where the felling occurred and Tipperary County Council also echoed this preference.

3.1.1 Consultation with other Statutory Bodies and Parties

Written consultation in the form of the scoping document, was also carried out as part of the overall consultation on the Whole UWF Project, with other statutory bodies including the environmental authorities and local and regional authorities, NGOs and other parties who were likely to have either or both, a thematically specific or area specific concern. There was no feedback specific to the UWF Replacement Forestry element of the whole UWF project received from these parties.

3.2 Consultation with the Public

As part of the public consultation element, EDL held public consultation & information days on the Whole UWF Project, which included the final location of the UWF Replacement Forestry in Foilnahan, County Tipperary. These consultation & information days were held in the following three venues (at the same time and date for all three venues); Kilcommon Community Centre; Rear Cross Community Centre and Lee's Bar, Newport on Tuesday 10th October, 2017 from 2pm to 8pm. The events were advertised in the two newspapers widely read locally – the Tipperary Star and the Nenagh Guardian and the Rear Cross Kilcommon Newsletter; by word of mouth through the landowners involved in the Whole UWF Project; poster in and around the 3 venue locations and by email to the local authority members representing the relevant municipal districts i.e Templemore Thurles Municipal District and Nenagh Municipal District.

Most attendees were landowners involved in the Whole UWF Project and some residents not connected with the project, but living in the area. Neither residents nor landowners, expressed any concerns about the location or design of UWF Replacement Forestry at these events.

All of the licence application documents submitted to the licencing authority, are also available for public examination on the project website at www.upperchurchwindfarm.ie .

UWF Replacement Forestry

Volume C2: Main EIA Report

Chapter 4: Alternatives Considered



Chapter	Alternatives Considered

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Glossary of Terms

<u>Term</u>	<u>Definition</u>
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Environmental Factors	The factors in the environment required to be identified, described and assessed during the EIA process. These are specified in Article 3 (1) of the EIA Directive as Population and Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Material Assets; Cultural Heritage and Landscape.
Consented Windfarm	Upperchurch Windfarm – 22 wind turbines, substation, windfarm roads and ancillary works, consented in August 2014 under Planning Reference: Tipperary County Council 13/51/0003, ABP PL 22.243040
Element	One of the 5 No. elements listed in ‘Whole UWF Project’ below.
Project Design Environmental Protection Measures	Measures for environmental protection, incorporated into the design of the project, also called ‘Project Design Measures’.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Whole UWF Project	Project made up of 5 No. elements – UWF Grid Connection; <u>UWF Related Works</u> , <u>UWF Replacement Forestry</u> , <u>Upperchurch Windfarm (UWF)</u> and <u>UWF Other Activities</u> .

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
ABP	An Bord Pleanála
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
UWF	Upperchurch Windfarm

4. Alternatives Considered

4.1 Introduction

The consideration of alternatives is an information requirement of Annex IV of the EIA Directive, and the single most effective means of avoiding significant environmental effects.

Annex IV (2) of the amended Directive¹ requires;

“A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”

In this Chapter 4, a description of the process of consideration of alternative locations, design and processes which was carried out by the EIAR design team, during the design and environmental appraisal of the UWF Replacement Forestry, is presented. The chosen options was decided having regard to a comparison of the relevant and significant environmental effects of each option.

4.1.1 Comparison of Environmental Effects

An integer is assigned to environmental effects according to the impact level per;

	Potential to cause
4	slightly Positive Effect (<i>An effect which causes noticeable changes in the character of the environment without affecting its sensitivities</i>)
3	Neutral Effect (<i>No effects or effects that are imperceptible within normal bounds of variation or within the margin of forecasting error</i>)
2	slightly Negative Effect (<i>An effect which causes noticeable changes in the character of the environment without affecting its sensitivities</i>)
1	potentially Significant Negative Effect – (<i>An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment</i>).

This high level ranking of options provides a guide to the EIAR design team, of the likely significant effects on the Environmental Factors of the various options, which assisted in the choice of final option.

¹ EIA Directive 2011/92/EU as amended by Directive 2014/52/EU

4.2 Alternative Locations

Some locations have more inherent environmental problems than others. Such sites have been avoided in favour of sites which have fewer constraints and the maximum capacity to sustainably assimilate the new forestry into the receiving environment.

4.2.1 Alternative Locations for UWF Replacement Forestry

The proposed UWF Replacement Forestry, is required in order to fulfil the replanting obligation which will arise from the felling of forestry for the various Elements of the Whole UWF Project.

The following types of lands were investigated when looking for alternative locations for the replacement forestry:

- Lands that have already received technical approval from the Forest Service **or**
- Lands that can achieve technical approval from the Forest Service.

Technical approval is dependent on avoiding unsuitable lands which are summarised in the Department of Agriculture, Food and the Marine: Working Document March 2016 - Land Types for Afforestation as

- *Unsuitable Land includes a range of sites that are deemed to be not suitable for afforestation under the Afforestation Scheme, due to infertile conditions (as indicated by vegetation) and / or other inhibiting site factors. (Considerable overlap occurs within this land type with Annex 1 habitats, particularly wet and dry heath and blanket and raised bog.)*

4.2.1.1 Description & Comparison of Alternative Locations

Three alternative locations were investigated for planting;

Site A: Technically approved lands (5.12ha) at Ballaghaderreen, Co. Roscommon.

Site B: Technically approved lands (4ha) at Firoda Upper, Co. Kilkenny.

Site C Lands (6ha) at Foilnaman, Co. Tipperary, near Upperchurch Windfarm, technically suitable for afforestation but without approval.

During the investigations of alternative locations, the lands at Ballaghaderreen, Co. Roscommon became unavailable to the promotor. Site B in Kilkenny and Site C in Tipperary then became the alternatives and were compared for environmental effects on the Environmental Factors.

Table 4-1: Comparison of Environmental Effects of Alternative UWF Replacement Forestry Locations

Potential Effects	Site B – Firoda Upper, Co. Kilkenny		Site C – Foilnaman, Co. Tipperary.	
Biodiversity/ Water (aquatic habitat/ water quality/habitat value)	Kilkenny County Council had concerns about the Freshwater Pearl Mussel catchment area downstream. Project Design Measures will protect water quality.	3	Also Freshwater Pearl Mussel catchment downstream. Project Design Measures will protect water quality. NPWS expressed a preference for reforestation to be carried out proximate to the related felling area. Also the ecology expert considered that a new native woodland would be an enhancement to the habitat available to birds and wildlife and because of it's proximity to the lands involved in Upperchurch Hen Harrier Scheme, the new native woodland would enhance this scheme also.	4
Road Users (road safety)	Kilkenny County Council considered that the existing sightlines were not adequate at the entrance to these lands.	1	Existing Entrance – existing sightlines are in accordance with North Tipperary County Development Plan 2010 (as amended) Table 10.1: Sightline Requirements.	3
Cultural Heritage (physical damage)	Kilkenny County Council had concerns about 2 No. recorded monuments at the site. Project Design Measures will protect archaeology.	2	No recorded monuments on site	3
Total Score		6		10

4.2.1.2 Reason for Selection of final location – UWF Replacement Forestry

Site C: Foilnaman, County Tipperary scored higher in comparison of environmental effects on Biodiversity, Water, Roads and Cultural Heritage. Also, NPWS were supportive of a new native woodland proximate to the UWF Hen Harrier Scheme in Tipperary. For all of the above reasons **Site C was chosen**.

4.3 Alternative Design

Many environmental issues can be resolved by design solutions that vary key aspects of the proposal. The EIAR design team were briefed at an early stage on environmental factors in order that these can be considered during the design development process.

4.3.1 Description & Comparison of Alternative Design – UWF Replacement Forestry

Two alternatives were considered for the design of UWF Replacement Forestry;

Design A: Commercial Conifer Plantation: monoculture non-native conifer plantation to replace the Whole UWF Project felling of similar type conifers. Commercial harvest when mature.

Design B: Permanent Native Woodland: The lands to be planted with a mixture of native trees both deciduous and conifer. Permanent woodland – no harvest.

Table 4-2: Comparison of Environmental Effects of Alternative UWF Replacement Forestry Designs

Potential Effects	Design A: Commercial Plantation		Design B: Permanent Native Woodland	
Land (Landuse)	Productive Commercial Plantation - Monoculture	3	Not productive – no harvest Native trees and shrubs	2
Biodiversity (habitat value)	Conifer plantation has low biodiversity potential.	1	Native woodland species abundance and diversity is supported in permanent native woodland.	4
Total		4		6

4.3.1.1 Reason for selecting final Design for UWF Replacement Forestry

Design B: Permanent Native Woodland was chosen as the design of the replacement forestry in Foilnaman. A permanent native woodland will be created, which will enhance biodiversity by encouraging the abundance and diversity of native woodland species. The loss of commercial sale of forest will be neutral in terms of the overall value of the Whole UWF Project.

4.4 Alternative Process

Within each design solution there can be a number of alternatives as to how the processes or activities of the development can be carried out.

4.4.1 Description & Comparison of Alternative Process – UWF Replacement Forestry

Two alternative processes were considered

Process A: Planting in geometric plan; using machinery; installing drainage channels; and growth management with fertilisers and weed and pest control chemicals.

Process B: Planting by hand; incorporating wide 'Ride Lines' being left unplanted to encourage hen harrier prey species (smaller birds) to nest and facilitate hunting by hen harrier and bats along the woodland boundaries; and management of growth by thinning and without fertilisers, herbicides and pesticides. Process B incorporates mitigation measures such as ride lines and non-chemical use to encourage biodiversity. These mitigation measures are incorporated into the Project Design Measures.

Table 4-3: Comparison of Environmental Effects of Alternative UWF Replacement Forestry Process

Potential Effects	Process A Standard Planting Process		Process B Planting by hand incorporating environmental measures	
Land (growth rates)	Compaction caused by machinery	2	Compaction mitigated by hand planting - No machinery compaction	3
Biodiversity (habitat value)	Risk to quality of aquatic habitat due to sedimentation and contamination from excavations and chemical use.	3	No chemical use. Planting by hand. Environmental feature comprising 'Ride Lines' being left unplanted to encourage hen harrier prey species to nest and enhance the hunting along the forestry boundary for hen harrier and bats. Increased value to general birds and non-volant mammals (badger).	4
Water (water quality)	Risk to water quality due to sedimentation and contamination from fertilisers, herbicides and pesticides	1	No chemical use – negligible risk of contamination (limited to personnel vehicle use)	3
RESULTS		6		10

4.4.1.1 Reason for selecting final process

The **environmentally sympathetic process – Process B** was chosen as the best choice environmentally in the context of management of this woodland with conservation as the primary objective, rather than a commercial tree crop.

4.5 'Do-Nothing' Alternative

The 'do-nothing' alternative examines trends currently occurring in the environment and the effects caused by not proceeding with the development.

The Forest Service of the Department of Agriculture, Food and the Marine operate the policies and procedures in relation to tree felling which are underpinned by the provisions of the Forestry Act 2014. This Act sets out the legislation governing the felling of trees and the licences required to do so. There is a replanting obligation for the felling of all forestry except for certain exceptions. Examples of these exceptions include individual trees in an urban setting, within 30m of a building, endangering the public road; tree trimming; nursery trees; hawthorn/blackthorn species; is not part of an avenue or ring of trees and of volume less than 3m³. The felling required for the Whole UWF Project is not of this nature and therefore, there is no legal 'do-nothing' alternative.

UWF Replacement Forestry

Volume C2: EIAR Main Report

Chapter 5

Description of Development (UWF Replacement Forestry)



May 2018

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

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Appendix 5.2	Invasive Species Management Plan
Appendix 5.3	Description of Development (UWF Grid Connection)
Appendix 5.4	Description of Development (UWF Related Works)
Appendix 5.5	Complied Description of Upperchurch Windfarm
Appendix 5.6	Description of the UWF Other Activities
Appendix 5.7	A Guide to Risk Assessment in Major Emergency Management Jan 2010.

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

Glossary of Terms

<u>Term</u>	<u>Definition</u>
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Environmental Factors	The factors in the environment required to be identified, described and assessed during the EIA process. These are specified in Article 3 (1) of the EIA Directive as Population and Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Material Assets; Cultural Heritage and Landscape.
Competent Authority	The body legally delegated to decide on the Licence/Planning Application
Competent Expert	Experts who are qualified and competent in their field of expertise
Consented Windfarm	Upperchurch Windfarm – 22 wind turbines, substation, windfarm roads and ancillary works, consented in August 2014 under Planning Reference: Tipperary County Council 13/51/0003, ABP PL 22.243040
Element	One of the 5 No. elements listed in the row above
Project Design Environmental Protection Measures	Measures for environmental protection, incorporated into the design of the project.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Whole UWF Project	Project made up of 5 No. elements – UWF Grid Connection; UWF Related Works, UWF Replacement Forestry, Upperchurch Windfarm (UWF) and UWF Other Activities.

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
ABP	An Bord Pleanála
EDL	Ecopower Developments Limited
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
PD	Ecopower <u>Project Design</u> Environmental Protection Measure developed by members of the EIAR Team
RFI	Response to Further Information
SAC	Special Area of Conservation
SPA	Special Protection Area (for wild birds)
OCM	Outline Construction Methodologies
UWF	Upperchurch Windfarm
UGC	Underground Cables

5. Description of the UWF Replacement Forestry

5.1. Introduction to Chapter 5

UWF Replacement Forestry is described in this chapter, in the following order:

Section 5.2	• A Description of the Location and Characteristics of the subject development (UWF Replacement Forestry). • The Project Design Environmental Protection Measures incorporated into the design to avoid, prevent or reduce likely significant adverse effects on the environment.
<u>The Development as described in Section 5.2</u> At the conception of the Project, the design team evaluated the potential or likely significant effects of the subject development, on the receiving environment. Any potential or likely significant effects were avoided <u>by integrating mitigation measures into the fundamental design of the UWF Replacement Forestry</u>. Various measures, particularly options for mitigation by avoidance and mitigation by prevention, were considered; these included alternative locations, alternative designs and alternative processes. Once the chosen location, design and process was decided the proposal was examined for opportunities to incorporate further mitigation measures (generally mitigation by reduction) in the final iteration of the development to be evaluated in the EIA Report. <u>The development, as described in Section 5.2, is the final iteration of the UWF Replacement Forestry</u>. It is this final iteration that is examined in Chapters 6 to 17, for effects on the prescribed environmental factors, by the topic competent experts.	
Section 5.3	The durations and timing, main activities, personnel and material requirements for both the planting and growth stages. Any changes to the UWF Replacement Forestry such as felling and harvesting.
Section 5.4	The use of natural resources, emissions and production of wastes for each stage.
Section 5.5	The vulnerability of the UWF Replacement Forestry to major accidents and events and risks to human health.
Section 5.6	Cumulative Descriptions: For the purposes of cumulative assessment of the whole Upperchurch windfarm (UWF) project, a description of the other elements of the Whole UWF Project namely; UWF Grid Connection; UWF Related Works; the already consented Upperchurch Windfarm (UWF) and UWF Other Activities, is provided. For the purposes of a cumulative assessment with Other Existing or Consented Projects or Activities, a description of Other Existing or Consented Projects or Activities that were scoped in by the EIAR Team is also provided.

5.2. Characteristics of UWF Replacement Forestry

UWF Replacement Forestry relates to the planting with forestry, of 6ha of agricultural lands. The replacement forestry will comprise native tree and shrub species planted in clusters, with unplanted wide ride lines provided, for the benefit of biodiversity.

5.2.1. Purpose of UWF Replacement Forestry

The UWF Replacement Forestry at Foilnaman will fulfil the replanting obligation which will arise from the felling of forestry for the development of the whole Upperchurch Windfarm project.

5.2.2. Location and Overview Description of UWF Replacement Forestry

The UWF Replacement Forestry lands are located in two adjoining parcels of agricultural lands in Foilnaman townland, near the village of Upperchurch in County. Tipperary. See Plate 5-1 below.

Relevant Volume C3 EIAR Figures

Figure RF 5.1: Location of UWF Replacement Forestry on OSI Discovery Mapping

Note: UWF Replacement Forestry is abbreviated throughout this chapter as RF. All the Figures Numbers are prefaced by RF per e.g. Figure RF 5.1

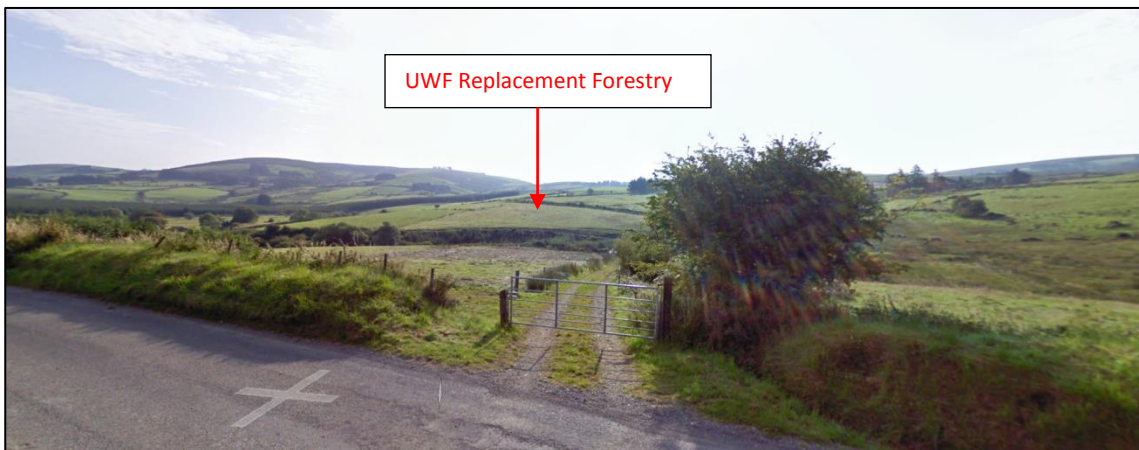


Plate 5-1: View of the UWF Replacement Forestry site from the entrance off the public road (EW10)

5.2.3. Characteristics of UWF Replacement Forestry

Six hectares (6ha) of agricultural grassland at Foilnaman townland will be planted with native woodland species, set in clusters of well-matched native species, and will be managed as permanent forest cover.

5.2.3.1. Planting Densities

The UWF Replacement Forestry site will be planted with 20,000 saplings which equates to 3,300 stems per hectare¹.

5.2.3.2. Native Woodland Type

The UWF Replacement Forestry is located in improved agricultural grassland on the eastern hills of the Slievefelim to Silvermine Mountain upland area. Soils within the UWF Replacement Forestry lands comprise mainly peaty and poorly draining soils over sandstone and shale till. An Oak-Birch-Holly with Hazel Woodland (GPC9) is considered the most appropriate for the ground conditions.

All species which will be planted at the UWF Replacement Forestry site will be silviculturally compatible, native to the Island of Ireland, representative of the native wood land type Oak-Birch-Holly Hazel Woodland, and acceptable to the Forest Service.

5.2.3.3. Species Mix, Composition and Layout

The lands will be planted with a mixture of tall trees and understory shrubs, and the design includes varied spacing between the clusters of trees and wide ride-lines between deeper areas of core woodland.

The predominant trees and shrubs associated with Oak-Birch-Holly Hazel Woodland are sessile oak, downy birch, ash, hazel, rowan & holly. Once established, the predominant ground flora will generally comprise species such as bramble, ivy, broad buckler-fern, wood sorrel, bluebell, violet, woodrush & wood avens. Dwarf shrubs are largely absent.

The planting mixture at the site will comprise: sessile oak (50%), with hazel (15%) and downy birch (10%) scattered throughout, and with wild cherry (5%) planted in groups of 5 to 10 trees. Scots pine (10%) planted in small pure groups on free-draining areas of the plot, particularly on slopes. Minor species (10%) to comprise *at least two of the following*, positioned alongside planned woodland edges & glades: hawthorn, holly, rowan, crab apple.

The UWF Replacement Forestry will be planted in accordance with Forest Service Department of Agriculture, Food & the Marine *Felling and Reforestation Policy (2017)*, and Guidance Documents – *Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards (2015)*, *Environmental Requirements for Afforestation (2016)* and *Management Guidelines for Ireland Native Woodlands (2017)*.

Ride-lines will be provided which will create an open space with tree-lined boundaries, which is much favoured by birds of prey during the day (e.g. hen harrier) and bats at night as hunting ground. A mixture of

¹ *Felling and Reforestation Policy* Forest Service Department of Agriculture, Food & the Marine (2017)

land cover – tall grasses, short grasses and scrub will be maintained under the planting and in the ride lines. Tree guards will be used to protect the saplings and young trees from rabbit damage.

5.2.3.4. Water Setback

A small stream within the Clodiagh River catchment flows through the western part of the lands. A setback distance of 10m will be established from this watercourse, and no planting works will take place within this area.

5.2.3.5. Fencing

The new native woodland will be protected from livestock through the erection of perimeter fencing around the afforestation lands.

Relevant Volume C3 EIAR Figures:

Figure RF 5.2: Planting Layout on Aerial Photography Mapping

5.2.3.6. Permanent Entrance

An existing agricultural entrance leading off the L-2264-34, will be used to access the chosen Replacement Forestry lands in Foilnahan. The existing sightlines at the entrance already comply with North Tipperary County Development Plan 2010 (as amended) Table 10.1: Sightline Requirements.

A separate application has been submitted to Tipperary County Council to change the use of this entrance from a farm entrance to a farm and forestry entrance. The application is part of the planning permission application for UWF Related Works to Tipperary County Council.

Relevant Volume C3 EIAR Figures:

Figure RF 5.3 Entrance for Replacement Forestry Lands

5.2.4. Environmental Protection Measures designed into the UWF Replacement Forestry

In order to prevent potential significant effects to Environmental Factors, the following mitigation (by design) measures are part of UWF Replacement Forestry;

The design of UWF Replacement Forestry includes the Project Design Environmental Protection Measures listed on Table 5-1, which were devised to avoid, prevent or reduce likely or potentially significant effects on the environment.

Relevant individual Project Design Environmental Protection Measures from the list below are duplicated in the **Environmental Factor topic chapters**, and the interaction of Project Design Environmental Protection Measures across the various Environmental Factors is provided in matrix format in **Chapter 18: Interaction of the Foregoing**.

Table 5-1: Environmental Protection Measures as part of the UWF Replacement Forestry design

PD ID	Environmental Protection Measure for UWF Replacement Forestry
RF-PD 01	All planting and maintenance activities will be carried out during daylight hours
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).
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.
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 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 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	Planting works in the environs of a known active badger sett outside of the breeding period will follow NRA (2005) guidelines, i.e. 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.

5.2.4.1. Best Practice Measures

In addition to the Project Design Measures listed above, the following Best Practice Measures will be implemented during the planting and maintenance of the UWF Replacement Forestry. The Best Practice Measures have been developed by the authors of the Water and Biodiversity topic chapters using industry best practice, and will afford further protection to the Environment. These Best Practice Measures are listed below and included in full in [Appendix 5.1: UWF Replacement Forestry Best Practice Measures](#).

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>)

5.2.4.2. 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 the invasive species.

This plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to incursions and control existing invasive species populations. The Invasive Species Management Plan is included as [Appendix 5.2: Invasive Species Management Plan](#).

5.2.4.3. Monitoring

An Environmental Clerk of Works will be employed during the planting stage to monitor the implementation of the environmental protection measures, listed above.

5.3. Life Cycle Stages of UWF Replacement Forestry

5.3.1. Planting Stage - UWF Replacement Forestry

5.3.1.1. Duration & Timing

Table 5-2: Duration and Timing of the Planting Stage

Planting Activities	Duration of the Planting Stage	Timing of Construction Activities
Planting of native woodland species	1 month	October through to March to correspond to the dormant period of deciduous tree species.

Hours of Work

Normal planting times will be 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays. All planting will be carried out during daylight hours.

5.3.1.2. Planting Personnel

Tree planting will be carried out by 4 No. forestry professionals.

5.3.1.3. Welfare Facilities

The facilities at the Upperchurch Windfarm, comprising offices, welfare, and canteen and parking facilities will be available to the planting personnel.

5.3.1.4. Planting Stage Activities

Planting stage activities will involve the following works:

- The planting areas and ride lines will be marked out as per **Figure RF 5.2: Planting Layout on Aerial Photography Mapping**.
- The perimeter of the lands, including the watercourse, will be fenced with livestock proof fencing.
- A spade will be used to dig a suitable sized hole at the appropriate spacing. The roots of the transplant stock will be placed in the hole and spread evenly.
- The soil dug from the hole will then be placed around the roots and the plant will be fastened in by compacting the soil using a spade and by foot.
- The plant will be checked to ensure it is upright and secure in the ground.
- Protective tree guards will be fitted to protect the young trees from rabbit damage.
- Livestock proof fencing will be erected around the perimeter of the new woodland.

5.3.1.5. Use of Machinery and Equipment

The main machinery, equipment and tools which will be required during the planting stage are listed in:

Table 5-3: Planting Stage machinery, equipment and tools

Planting Machinery
Four-wheel drive vehicle
Tractor with post-driver fitted
Planting Equipment and Tools
Planting spades
Fencing tools

5.3.1.6. Use of Hydrocarbons

Hydrocarbons will be used during planting activities and will be limited to the diesel or petrol fuel and mechanical oils used by the site vehicles and machinery.

5.3.1.7. Other Facilities - Fuel Storage & Tool Storage

There will be no requirement for either fuel or tool storage.

5.3.1.8. Imported Planting Materials

The materials, which will be brought onto the site, are listed in Table 5-4 along with details of the quantity and source of the materials.

Table 5-4: Quantities, type and source of planting materials

Materials	Quantity	Source of Materials
Tree Saplings – c.20,000	2 No. loads	Dundrum, Co Tipperary
Wooden fencing posts	2 No. loads	Arrabawn Co-Op, Reiska
Fencing – sheep wire / barbed wire, gate	2 No. loads	Arrabawn Co-Op, Reiska

5.3.1.9. Water Quality Management

All planting will be carried out by hand. No pesticides, fertilizers or herbicides will be used.

5.3.2. Growth Stage – UWF Replacement Forestry

Once planted, the trees will go through numerous stages of growth from seed to sapling, through to maturity, old age and eventual decay with natural regeneration occurring through the lifecycle of the native wood.

5.3.2.1. Duration and Timing of Growth Stage

The UWF Replacement Forestry will be a permanent native woodland, of type GPC9, according to Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards 2015.

Table 5-5: Duration and Timing of the Growth Stage

Description	Duration	Timing
Growth Stage of the UWF Replacement Forestry	Permanent	None
Maintenance Activities	2 days to 1 week per year.	Early Summer / Late Autumn

5.3.2.2. Growth Stage - Personnel

2 No. personnel will be involved in annual inspections and maintenance of the new native wood.

5.3.2.3. Operational Activities

The new wood will require more maintenance during the first five years of its growth than at later stages of growth. During the first five years, the wood will be inspected twice yearly and brambles and rough grasses removed from the area immediately around the tree trunks.

The tree guards, which will have been fitted during planting, will also be removed once the tree has outgrown them.

The level of light and mix of ground cover (tall grass, short grass & scrub) in the open space ride lines will be managed throughout the growth stage by thinning, clearing and controlled grazing.

5.3.2.4. Use of Machinery and Equipment

Use of machinery and equipment and tools which will be limited to thinning operations and scrub clearance. No materials will be required during the Growth Stage.

Table 5-5-6: Use of Machinery and Equipment during the Growth Stage

Machinery	Equipment	Materials
4x4 vehicle for routine inspection	Trimming and scrub clearance tools	None
Small tractor for fence maintenance	Chainsaws and axes	

5.3.2.5. Use of Hydrocarbons

A small volume of hydrocarbons will be used during maintenance activities and is limited to the diesel or petrol fuel used for the occasional site vehicles and equipment.

5.3.2.6. Welfare Facilities

Due to the very low levels of activity, there will be no requirement for welfare facilities.

5.3.2.7. Other Facilities - Fuel Storage & Tool Storage

There will be no requirement for fuel storage. There will also be no requirement for tool storage facilities - all tools will be brought onto the UWF Replacement Forestry site as required.

5.3.3. Changes to the Project

Other than thinning activities, natural maturation, old age and regeneration, no other changes to the native woodland are expected. The UWF Replacement Forestry will be permanent forest cover and will not be felled.

5.4. Use of Natural Resources, Emissions & Waste

5.4.1. Use of Natural Resources

The resources which will be imported onto the site or which will be obtained from within the site during planting and growth stage are described below.

5.4.1.1. Use of Resources: Land

In total, 6ha of agricultural land will permanently change use to forestry.

5.4.1.2. Use of Resources: Biodiversity

Planting and Growth Stages

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, short grasses and scrub land cover maintained during the growth stage. This will enhance biodiversity in the area.

New trees and shrubs will be set back at least 10m from the watercourse which runs through the western portion of the UWF Replacement Forestry lands.

The afforestation lands will be protected from livestock by the perimeter fence.

Invasive Species Management

Best Practice Measures will be employed during the planting of the UWF Replacement Forestry (see RF-BPM-01 and RF-BPM-02 in [Appendix 5.1 UWF Replacement Forestry Best Practice Measures](#)). These best practice measures includes; checking packaging for the presence of white toothed shrew and prior to arrival on site, thoroughly cleaning and drying the contractor's vehicles and equipment; high-pressure steam cleaning, with water hotter than 65 degrees Celsius, in addition to the removal of all vegetative material, of all vehicles and equipment involved in the planting of the new woodland.

In addition to the Best Practice Measures, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of the invasive species. This plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to incursions and control existing invasive species populations. The Invasive Species Management Plan is included as [Appendix 5.2: Invasive Species Management Plan](#).

5.4.1.3. Use of Resources: Water

Planting Stage

All water requirements for welfare facilities and drinking purposes will be supplied at the Upperchurch Windfarm Site Office during the Planting Stage, no additional water will be required.

Growth Stage

There will be no requirements for water during the growth stage.

5.4.1.4. Use of Resources: Soils**Planting Stage**

Planting will be carried out by hand using spades, small localised patches of disturbed soil will occur at the sapling tree trunks.

Growth Stage

No soils or rock will be excavated during the growth stage.

5.4.2. Emissions

Planting & Growth Stages

Dust will not arise, due to the absence of mechanical excavation of and storage of soils.

Very small quantities of **Vehicle Exhausts Fumes** will be emitted by vehicles and machinery during planting and occasional maintenance activities.

Noise: Vehicles, machinery and equipment to be used during planting and maintenance activities will emit some noise during their operation.

Vibration: Due to the type of machinery which will be used and the nature of the planting and growth activities - no vibration emissions are expected.

Light: No light emissions will occur as there will be no requirement to light any part of the UWF Replacement Forestry. All planting and maintenance activities will be carried out during daylight hours.

5.4.3. Waste

Planting Stage

Waste Water: No waste water will occur at the UWF Replacement Forestry site. Toilet facilities at the Upperchurch Windfarm site office will be used by planting personnel.

General Waste such as packaging, and excess planting materials will be generated in small quantities during the Planting Stage. This waste will be removed from the lands and stored at a designated area at the Upperchurch Windfarm site office with other General Waste arising from the Upperchurch Windfarm operational activities. General waste will be collected by licensed collector - Arlo Group or other appropriately licensed operator and transported to their approved licensed facilities at Thurles, County Tipperary or other appropriately licensed facility.

Arising's and Contaminated Material: No arisings or contaminated materials are expected.

Chemical waste: No chemical wastes are expected.

Growth Stage:

Waste will be minimal at the growth stage and confined to maintenance activities.

5.5. Vulnerability of the Project to Major Accidents and Risks to Human Health

Major accidents or natural disasters which have the potential to affect the UWF Replacement Forestry are described hereunder. The vulnerability (exposure and resilience) of the UWF Related Works to major accidents and disasters and the risk of these accidents or disasters is classified according to the *Guide to Risk Assessment in Major Emergency Management* (DoEHLG, 2010). This Guide is included as [Appendix 5.5 Volume C4: EIAR Appendices](#).

5.5.1. Vulnerability to Major Accidents

It is clear from the EIA Directive that ‘major accident’ mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, where Dangerous Substances are identified in Schedule 1.

The UWF Replacement Forestry is **not vulnerable to Major Accidents**, due to the negligible volumes of the Dangerous Substances which will be used, limited to small volumes of diesel fuel used by vehicles during the planting and growth stages. Furthermore there are no Seveso sites in proximity to the UWF Replacement Forestry site, the closest being Grassland Agro in Limerick and MSD (pharmaceutical) in Kilsheelan, near Clonmel, Co Tipperary.

5.5.2. Vulnerability to Natural Disasters

The following natural disasters are considered; land slippage and flooding. The likelihood of these natural disasters occurring is discussed below, with likelihood of the natural disaster occurring rated according to the DoEHLG 2010 Guidelines. The risk classification tables are included in [Appendix 5.5: A Guide to Risk Assessment in Major Emergency Management Jan 2010](#).

5.5.2.1. Land Slippage

The UWF Replacement Forestry is **not vulnerable to land slippage** as the afforestation site is located on agricultural grassland which is inherently stable and no excavations will occur – planting will be carried out by hand.

5.5.2.2. Flooding

In recent years, high rainfall events and subsequent flooding have become more frequent in Ireland. Where complete the Catchment Flood Risk Assessment and Management (CFRAM)² OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is not currently available for the area of the UWF Grid Replacement Forestry and therefore the PFRA maps have been consulted.

A Stage II Flood Risk Assessment was completed for the subject development by Hydro Environmental Services, a specialist hydrological and hydrogeological consultancy, who concluded that although a section of the UWF Replacement Forestry site is located in a mapped fluvial Flood Zone A (100-year flood zone),

² CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.

there will be no new permanent infrastructure (roads or watercourse crossing structures) required for the UWF Replacement Forestry. In addition, the planting will be carried out by hand with minimal disturbance to soil. The authors of the Flood Risk Assessment concluded that the UWF Replacement Forestry **is not vulnerable to flooding**.

5.5.3. Overall Risk

Should a disaster occur, unconnected to the project but in the locality – the UWF Replacement Forestry will not make the consequences of the event worst. In addition the presence of the UWF Replacement Forestry will not increase the likelihood of such an event occurring.

5.6. Cumulative Descriptions

Table 5-7: UWF Replacement Forestry - Element 3 of the Whole UWF Project

Element No.	The Subject Development	Composition of the Subject Development	Relevant Appendix Location for description of each element
3	The Subject Development UWF Replacement Forestry (RF)	Replacement Forestry at Foilnaman	Current afforestation license application to Department of Agriculture, Food & the Marine

An **overview of Element 3, UWF Replacement Forestry**, the subject development, is provided in [Section 5.2.2](#) above. A **full description** of the subject development is provided in the **successive Sections 5.2 to 5.5**.

5.6.1. Description of the Other Elements of the Whole UWF Project

In order that a cumulative evaluation can be carried out for the UWF Replacement Forestry, an overview description is provided hereunder of all the other elements of the whole UWF project.

Table 5-8: Element 1 and Element 3 to 5 of the Whole UWF Project

	Element of the whole UWF project	Composition of each Element	Relevant Appendix Location for description of each element
1	UWF Grid Connection (GC)	Mountphilips Substation Mountphilips – Upperchurch 110kV UGC Grid Connection Access Roads Grid Connection Ancillary Works	Appendix 5.1
2	UWF Related Works (RW)	Internal Windfarm Cabling Realigned Windfarm Roads Haul Route Works Telecom Relay Pole RW Ancillary Works	Appendix 5.2
4	Upperchurch Windfarm (UWF)	Consented UWF Turbines Consented UWF Substation Consented UWF Roads UWF Ancillary Works	Appendix 5.3
5	UWF Other Activities (OA)	Haul Route Activities Upperchurch Hen Harrier Scheme Monitoring Activities Overhead Line Activities	Appendix 5.4

Relevant Volume C3 EIAR Figures:

[Figure CE 1.1: Location of UWF Replacement Forestry and the Other Elements of the Whole UWF Project on OSI Mapping.](#)

An EIA Report has also been prepared to accompany concurrent planning applications to the relevant Competent Authorities, for the UWF Grid Connection and the UWF Related Works.

This information on these other elements of the whole UWF project can be found in the following locations;

- **Full EIA Report** or EIS (as appropriate) for **Elements 1, 2, and 4** in [Volume E: Reference Documents for Other Elements of the Whole UWF Project](#).
- **Description of each elements 1, 2, 4, and 5** (presented in a format similar to this chapter and with smaller scale reference mapping and figures) in [Appendix 5.1 to Appendix 5.4](#), see [Volume C4: EIAR Appendices](#).
- **Overview description of each elements 1, 2, 4, and 5** in this Section hereunder.

5.6.1.1. Element 1: UWF Grid Connection

An application for planning permission for UWF Grid Connection has been submitted directly to An Bord Pleanála under Section 182A (9) of the Planning and Development (Strategic Infrastructure) Act (2006). The application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Grid Connection** is included in **Volume E: Reference Documents for Other Elements of the Whole UWF Project**.

An extract from Volume E of the **detailed description** of the UWF Grid Connection (presented in a format similar to 5.2 to 5.5 above) along with a **copy of the accompanying figures** is included in **Appendix 5.1: Description of Development (UWF Grid Connection)**.

A summary overview of UWF Grid Connection is provided hereunder.

5.6.1.1.1. Location and Characteristics of UWF Grid Connection

The UWF Grid Connection will comprise of the following:

Mountphilips Substation: A new substation is proposed for a location adjacent to the existing Killonan - Nenagh 110kV overhead line in agricultural grassland in Mountphilips townland, 2km north of Newport, 4km south of Birdhill, 17km north east of Limerick City and 23km west of the Upperchurch Windfarm. The new 110kV electrical substation will comprise 2 No. End Masts located at the Killonan – Nenagh 110kV overhead line; a compound, 230 meters east of the overhead line, measuring 95 meters x 94 meters which will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightening protection monopoles and other electrical apparatus. The 2 No. End Masts will be connected to the electrical equipment in the compound via underground cable.

Mountphilips - Upperchurch 110kV UGC: The 110kV UGC will connect the Mountphilips Substation to the Upperchurch Windfarm through the Consented UWF Substation, through the installation of underground cables. The route of the underground cables, which is 27.5km in length, will follow a generally west/east course through a mix of agricultural grassland (11.9km), commercial forestry plantations (1.9km), private forestry and farm roads (c.12km) and public roads (c.1.7km) through the townlands of Mountphilips, Coole, Freagh, Oakhampton, Newross, Castlewaller, Killeen, Knockacullin, Bealaclave, Bournadomeeny, Goulmore, Laghile, Churchquarter, Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons. The 110kV UGC will be installed underground in trenches, which will be laid with ducts through which the electrical cables and communications cables will be pulled. The cable lengths will be pulled through and joined together at Joint Bay locations, in joint bay chambers. The ducts will be surrounded by concrete and the trench backfilled with excavated material or aggregate depending on the location. The only surface expression of the 110kV UGC will be the man-hole type covers over the Joint Bays and the over-ground identification marker posts and marker plates.

UWF Grid Connection Access Roads: To provide access to Mountphilips Substation and the Joint Bay locations along the 110kV UGC, New Permanent Access Roads will be constructed. Permanent access will also include upgraded existing farm and forestry roads.

UWF Grid Connection Ancillary Works will support the construction of UWF Grid Connection and will include the construction of Temporary Access Roads along the 110kV UGC construction works areas; Permanent Site Entrances (including the provision of sightlines) at Mountphilips, Bealaclave and Knockcurraghbola Commons; Temporary Site Entrances at public road crossings along the 110kV UGC; installation of temporary and permanent watercourse crossing structures; construction and use of 3 No.

Temporary Compounds, installation of drainage systems at Mountphilips Substation, around Temporary Compounds and along new UWF Grid Connection Access Roads; forestry felling; temporary and permanent hedgerow/tree removal; permanent hedgerow replanting; fencing; relocation of existing overhead electricity and telephone services and; storage of excavated materials at various locations within the construction works area boundary.

5.6.1.1.2. UWF Grid Connection: Construction & Operation

UWF Grid Connection Construction Phase: All elements of the whole UWF project will be constructed at the same time. Construction of UWF is expected to commence in 2018/2019 and will take approx. 12 months. Approximately 100 persons will be engaged in the pre-construction, main construction, cable jointing and commissioning works for the UWF Grid Connection. 1050 No. loads of concrete; 455 No. loads of aggregate; 59 No. loads of hard core; and 108 No. loads of surface dressing (public road sections) will be imported from Roadstone Killough, Co Tipperary and Bunratty, Co Clare and Shanballyedmond, Rear Cross. 22 No. loads of general building materials including geotextile, and 126 No. loads of electrical plant and equipment including lattice towers, control building doors and switching gear, will be imported to the site from various suppliers throughout Ireland and the EU.

UWF Grid Connection Operational Phase: Once commissioned and energised, the Grid Connection will be taken in charge by ESB Networks and the Mountphilips Substation and the Mountphilips – Upperchurch 110kV UGC will become part of the national electricity network. The new asset will be managed and operated by ESB Networks. Scheduled inspection and maintenance activities will be carried out by ESB Networks personnel (2 men crews) over a total of 13 days per year. Very infrequent planned maintenance or unplanned repairs may be required, if at all, during the lifetime of the Grid Connection, it is expected that one crew with c.6 ESB Networks personnel would be required for 1 week – 2 weeks duration, depending on the nature of the repairs work. The Grid Connection will remain permanently in place as part of the national electricity network and thus decommissioning is not envisaged.

UWF Grid Connection use of Natural Resources: Construction Phase – There will be 39.1 hectares of **land** required for the construction works site. 1.3ha of **coniferous forestry** will be permanently felled. 45m of **hedgerow** and 30 No. of **trees** of varying maturity will be permanently removed to facilitate either a permanently widened entrance off the public road or a new permanent access road. These hedgerows and trees will be replaced immediately adjacent to the area. On a number of hedgerows, a specially designed bat crossing structure will be erected at new entrances. These structures will be timber frames with vegetation attached, which will provide a continuation of flight-line for bats during the works. 820m of hedgerows, which include trees of varying maturity, located close to works areas will be pruned to facilitate passage of machinery along works areas. c.700m of new hedgerow will be planted with locally sourced native species. **Water** required for welfare facilities will be brought onto site. Approximately 9,615m³ of **topsoil**, 1,265m³ of **peat**, 2,390m³ of **subsoil** and 120m³ of **rock** will be permanently excavated from the works areas. 660m³ of spoil will also arise during excavations in public roads. 8,370m³ of the excavated material will be permanently stored along the 110kV UGC works area as linear berms and remainder (5,020m³) will be reinstated within the works area. In addition, up to 11,140m³ of soils will be temporarily excavated from the construction works area boundary, including from the cable trench and from the footprint of any excavated temporary stone roads and will be temporarily stored, within the construction works area, to backfill, reinstate and landscape the works areas.

UWF Grid Connection use of Natural Resources: Operation Phase – The Land required will reduce considerably to just 4.2ha of land permanently changing use - mainly comprising the footprint of the Mountphilips Substation and the footprint of any new access roads which will provide access to the Joint Bays. No further **forestry felling, hedgerow or tree pruning or removal** will be required during the operational stage. Non-potable **water** requirements will be provided at the Mountphilips Substation via a

rain water harvesting system, and drinking water will be brought onto site as needed. **No excavations of soils** will be required during the routine operation of the Grid Connection. Planned maintenance or unplanned repairs, if any occur are likely to involve the re-opening of the underground chambers, at Joint Bays. This work which will result in very small volumes of crushed stone and sand being temporarily removed from the area directly over the joint bay covers, stored adjacent to the Joint Bay, and re-used to reinstate the top of the Joint Bay following the completion of the repairs.

UWF Grid Connection Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage, negligible levels are associated with the operation and maintenance activities. During operation, Mountphilips Substation will emit **noise** however this is unlikely to be audible above the existing background noise levels at nearest residence, which is 385m distant. The operational sub-station and 110kV underground cable will be a source of very low frequency (50Hz) **electromagnetic fields**.

UWF Grid Connection Waste: Waste water from construction stage welfare facilities will be contained in self-contained units and emptied by a licenced facility. General and chemical waste will be segregated and stored in allocated tanks, bins, skips or areas at the Temporary Compounds, C1, C2 and C3. Waste will be collected by an appropriately licensed waste contractor. Any wastes which result from the construction of the UWF Grid Connection will be managed under a specific **Waste Management Plan**. During operation, there will be minimal general and chemical waste during the Operational Stage, with any waste taken offsite by ESNB personnel.

5.6.1.2. Element 2: UWF Related Works

An application for planning permission for UWF Related Works has been submitted to Tipperary County Council. This application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Related Works** is included in **Volume E: Reference Documents for Other Elements of the Whole UWF Project**.

An extract from Volume E of the **detailed description** of the UWF Related Works (presented in a format similar to 5.2 to 5.5 above) along with a **copy of the accompanying figures** is included in **Appendix 5.2: Description of Development (UWF Related Works)**.

A summary overview of UWF Related Works is provided hereunder.

5.6.1.2.1. Location and Characteristics of UWF Related Works

The UWF Related works comprises of the following:

Internal Windfarm Cabling of c. 17.9km in length, to connect the Consented UWF Turbines to the Consented UWF Substation, through the installation of underground cables within ducts in trenches 1.25m deep and 0.6 wide. The majority (11.1km) of the Internal Windfarm Cabling will be installed under Consented Windfarm Roads or Realigned Windfarm Roads. The remainder of the Internal Windfarm Cabling will be installed in agricultural lands (4.6km), forestry lands (2.1km, requiring forestry felling of 0.1ha.), and crossing under 9 No. public roads (40 meters). The cabling will traverse the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin.

The Internal Windfarm Cabling consists of electrical cables and communication cables and the copper conductor cables which are installed inside High Density Polyethylene (HDPE) ducting in underground trenches. The trench will be excavated, ducting and warning tapes installed and trench backfilled and reinstated. When the ducting installation is finished and the trench reinstated, the electrical, communication and copper conductor cables will then be pulled through the ducting. The only surface expression of the Internal Windfarm Cabling will be the over-ground identification marker posts and marker plates which will be installed at regular intervals above the cables trench

Realigned Windfarm Roads to realign the consented UWF Roads at three locations;

The consented windfarm road to Turbine No.5 in Shevry is 560m in length, and it will replace this road in its entirety with a new road 230m in length through forestry. This will require forestry felling of 0.2ha.

The consented UWF road between Turbine No.19, Turbine No. 20 and Turbine No. 21, is 840m in length. It will replace 370m of this road with a new road also 370m in length. 220m of this road will be located on grassland field, with the remaining 150m in length located on existing farm road. The existing farm road section will be upgraded during construction works.

A short length (30m) of new access road will be between the consented UWF roads in Knockmaroe to the new Telecom Relay Pole.

Haul Route Works are along public road verges, roadside boundaries and grassland fields in order to widen parts of the L4139-0, L4138-12, L2264-50, L6188-0, L6185-13 by between 0.5m and 1.5m and to widen an entrance off the R503 by 30m. These works will facilitate the delivery of turbine components to the Upperchurch Windfarm site and will take place in the following townlands: Shevry, Knockcurraghbola Commons, Knocknabansha, Knockmaroe and Grousehall. Works include the removal of soils and laying of crushed stone and hard-core in roadside verges for 1710m in total; temporary removal and reinstatement of 1035m of hedgerow and earthen banks which form roadside boundaries; permanent removal of 25m of roadside boundary and the construction of 290m temporary access roads on private lands.

The **Telecom Relay Pole** will relay communication signals around the Consented UWF Turbines in order to avoid interference from the operating Upperchurch Windfarm. The Telecom Relay Pole will comprise a wooden pole, up to 18m in height, with relay equipment attached to the top of the pole. A small compound, 5m X 5m in size, will enclose the relay pole, along with a ground based outdoor cabinet 2m high, 1.2m long and 1m wide and ancillary equipment. The compound will be securely fenced with 2.4m high palisade fencing; a native hedgerow will be planted on the berm created from the excavations. A communications and low voltage (LV) electricity supply will be cabled to the compound, from the existing supply at the Foilnahan mast, by 300m in length of cabling.

RW Ancillary Works will facilitate the construction of the UWF Related Works and will include a change of use for and existing agricultural entrance to agricultural and forestry entrance in permanent use, and 14 No. temporary site entrances; 5300m of temporary access roads; temporary and permanent watercourse crossings, involving 24 No. small field drains and 8 no. streams; drainage systems around permanent features and temporary drainage around works areas; 0.3 hectares of forestry to be felled; temporary and permanent hedgerow/tree removal; temporary and permanent fencing, temporary goal posts and bat crossing structures; relocation of 5 No. existing telephone poles; 11,830m³ of material will be excavated and temporarily stored for subsequent reinstatement or permanently placed in berms; reinstatement of roadside boundaries and public road surfaces.

5.6.1.2.2. UWF Related Works: Construction & Operation

UWF Related Works Construction Phase: All elements of the whole UWF project will be constructed at the same time and is expected to commence 2018/2019 and will take approx. 12 months. 5 of the c.100 persons working directly on the Upperchurch Windfarm site will work on UWF Related Works. A specialist communication engineering crew, made up of c. 2 personnel, will be involved in the erection and set up of the Telecom Relay Pole. The UWF Related Works, 23 No. loads of concrete and 292 No. loads of aggregate will be transported to the site by HGV, from local suppliers. A further 2 No. loads of road surfacing material, 7 No. loads of hard core and 43 No. loads of specific building materials will also be imported to the site, from various suppliers in the Region.

UWF Related Works Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning. UWF Related Works will operate for the same period as the windfarm. The personnel employed in O&M for the windfarm will also maintain the UWF Related Works.

UWF Related Works use of Natural Resources: 20.9 hectares of land within the full UWF Related Works construction site which is reduced to just 25m² around the Telecom Relay Pole compound, during the operational phase; 4750m³ of topsoil, 6670m³ of subsoil and 360m³ of rock will arise from excavation works; small amounts of potable and non-potable water will be imported onto the site as required; 170m of hedgerow and 4 No. trees will be removed and the equivalent amount replanted following construction.

UWF Related Works Emissions: Insignificant dust, construction machinery exhaust, noise, vibration and light will be emitted during the **Construction Stage**. During the **Operational Stage** there will be negligible dust, vehicle exhaust, noise, vibration and light emitted. The operational electrical plant will be a source of electromagnetic fields but these will not be at levels to cause significant effects.

UWF Related Works Waste UWF Related Works personnel will use the welfare facilities and waste facilities provided at the Windfarm Site Compound No. 1 and No. 2. At these facilities, waste water will be contained

in self-contained units and emptied by a licenced facility or, in the case of the Site Offices, will be treated in the existing septic tank. General and chemical waste will be segregated and stored in allocated tanks, bins, skips or areas at Site Compound No.1 and collected by an appropriately licensed waste contractor. There will be minimal general and chemical waste during the **Operational Stage**. This waste will be stored in a designated and secure area at the windfarm site offices and collected by an appropriately licenced operator. Welfare facilities for the O&M crew will be provided at the windfarm site offices. Any wastes which result from the construction, operation and decommissioning of UWF Related Works will be managed under the Waste Management Plan for the operating UWF.

5.6.1.3. Element 4: Upperchurch Windfarm

An overview description of already consented Upperchurch Windfarm (UWF) is provided hereunder.

An application for planning permission for Upperchurch Windfarm (Consented UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by an EIA Report (known as EIS at the time) and Natura Impact Statement. The full planning documents for consented UWF can be found in [Volume E: Reference Documents for Other Elements of the Whole UWF Project](#).

5.6.1.3.1. Overview of the Location and Characteristics of Upperchurch Windfarm

UWF will comprise 22 wind turbines with an overall height up to 126.6 metres, 2 meteorological masts with an overall height of up to 80 metres, turbine foundation and crane hardstanding areas, access roads and an electrical substation.

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnahan, Gleninchaveigh, Coumnamee, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary.

The 22 wind turbines, associated crane hardstandings and ancillary works will be constructed on a series of small hills ranging in elevation from 280m to 401m OD, set out generally over four areas. The substation will be constructed in Knockcurraghbola Commons and the turbines will be connected by underground cables to the substation. There will be two meteorological masts erected, one in Grousehall and a second in Knocknamena townlands. Ancillary Works will include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; 1 No. site entrance from the R503 Regional Road at Graniera and; 10 No. site entrances from local public roads, through and around the site, which will provide access to the windfarm.

A document, with a **detailed description of the Upperchurch Windfarm**, has been compiled from the original 2013 Upperchurch Windfarm EIS, from the Reply to Further Information, the additional information submitted during the planning process and mitigation measures and planning conditions attaching to the Grant of Permission, to reflect a description of the development as it is now permitted. This compilation document has been prepared in the same format as the current application Chapter 5, for ease of cross referencing. The compilation document can be found in [Appendix 5.3: Compiled Description of Upperchurch Windfarm](#).

The full planning documents for consented UWF can be found in [Volume E: Reference Documents](#).

Upperchurch Windfarm (UWF) is comprised of the following parts:

- **Consented UWF Turbines** - 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour and an overall height to blade tip upto 126.6m. The turbines will be constructed on concrete bases with an adjacent hard-core hardstand area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation.
- **Consented UWF Substation** - 110kV substation compound which includes a control building, main transformer and other electrical equipment enclosed in a compound by a palisade fence. The substation will measure 64m x 41m.
- **Consented UWF Windfarm Roads** - 11.6km of windfarm access roads will comprise 8km of newly built 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (by an average of 2m).
- **Consented Ancillary Works** - The main items of ancillary works will include, 2 No. meteorological masts up to 80m in height; 11 No. site entrances; 1 No. stream crossing; site drainage system; 2 No.

construction site compounds; 6 No. borrow pits from which most of the aggregate required will be won; forestry felling, hedgerow removal and reinstatement; excavation, storage and reinstatement of soils..

5.6.1.3.2. Upperchurch Windfarm: Construction & Operation

UWF Construction Phase: All elements of the whole UWF project will be constructed at the same time.

Construction of UWF is expected to commence 2018/2019 and will take approx. 12 months. Approximately 277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for the windfarm. Approximately 950 No. loads of concrete; 15 No. loads of reinforcing steel and 5 No. loads of general building materials and 212 No. loads of electrical plant and equipment (abnormal size loads) will be imported to the site by HGV. The abnormal turbine loads will be transported from Foynes Port.

UWF Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning of the wind turbines, whereupon there will then be an option to apply for continuance of use or decommission the plant and restore the site. There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management during the operational phase.

UWF use of Natural Resources: 56.3 hectares of land within the construction works site will reduced to 6.4 ha during the operational phase; Approx. 108,000m³ of excavated soils; 43,000m³ of aggregate mostly won on-site and otherwise imported from local quarry at Shanballyedmond, Rear Cross; small amounts of potable and non-potable water, sourced at an existing well at the windfarm site offices in Site Compound No. 2; felling of 4.4 hectares of conifers; 960m of hedgerow removed.

UWF Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage. There is no house within 200m of the construction works. During the **Operational Stage** there will be negligible dust, vehicle exhaust, vibration and light emitted. The turbines will emit noise during operation. Permitted noise emissions are prescribed by planning condition. The operational electrical plant will be a source of very low frequency (50Hz) electromagnetic fields but these will not be at levels to cause significant effects at the turbine locations, and no effects will occur at local residences.

UWF Waste: During construction, waste water from welfare facilities will be contained in self-contained units and emptied by a licenced facility or in the case of the Site Offices, will be treated in the existing septic tank. General and chemical waste will also arise from construction activities and processes. During operation, minimal general and chemical waste will arise on site. All waste will be stored in a designated and secure areas, for collection by an appropriately licenced operator. Any wastes which result from the construction, operation and decommissioning of the Windfarm will be managed under a specific Waste Management Plan.

5.6.1.4. Element 5: UWF Other Activities

Although UWF Other Activities do not require planning permission, they do form part of the whole UWF project and therefore are included in the cumulative evaluation. A description of these activities, along with **mapping and figures** is included in **Appendix 5.4: Description of the UWF Other Activities**.

An overview of UWF Other Activities is provided hereunder.

5.6.1.4.1. Location and Activities of UWF Other Activities

The **Haul Route Activities** will facilitate the transportation of turbine components to the Upperchurch Windfarm site and are located at various points on the national and regional road network along the UWF turbine component haul route between Foynes Port in County Limerick and junction of the R503 and R497 Regional Roads in Knockmaroe townland, County Limerick. Activities comprise the laying of matting over verges at up to 5 No. locations, removal and replacement of street furniture (mainly signposts) at 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations.

The **Upperchurch Hen Harrier Scheme** will enhance and protect habitat for hen harrier in the vicinity of Upperchurch Windfarm, in order to fulfil planning condition No.18, attaching to the windfarm. The Upperchurch Hen Harrier Scheme is located in Knockcurraghbola Commons, Coumnageeha, Foilnaman, Knockmaroe and Grousehall townlands on 128ha of agricultural lands between the Slievefelim to Silvermines SPA and the Upperchurch Windfarm. Activities associated with the Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas; and the fencing off of watercourses and newly planted trees and shrubs. The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others. Nine local landowners are signed-up to the Scheme. Implementation involves a mix of initial once-off activities which will both create new habitat and protect and enhance existing habitat; and on-going farming practices which will result in the long term maintenance of hen harrier habitat.

Monitoring Activities will monitor the Whole UWF Project for compliance with the environmental protection measures and mitigation measures detailed in the UWF 2013 EIS and 2013 RFI (including the Construction Environmental Management Plan for Upperchurch Windfarm and the Ecological Management Plan for Upperchurch Windfarm); Planning Conditions attaching to the already consented UWF; and measures in the 2018 UWF Grid Connection EIA Report, the 2018 UWF Related Works EIA Report and the 2018 UWF Replacement Forestry EIA Report and associated UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plans. Monitoring will also involve the supervision and recording of key construction activities, and monitoring of progress of land reinstatement.

Overhead Line Activities include re-sagging activities and fibre wrapping activities. The purpose of the re-sagging activities is to correct the tension of the existing overhead line, following the installation of the UWF Grid Connection End Masts, so that the lines are held within predefined tension parameters. The purpose of fibre wrapping is to provide a communication link to the newly installed Mountphilips Substation. The tension will be corrected on 2 no. Sections - i) between ESNB Angle Mast Structure No. 79 (c.200m south of Mountphilips substation) to New Mountphilips End Mast No. 1 and ii) between New Mountphilips End Mast No. 2 and ESNB Angle Mast Structure No. 90 (2.3 km north of Mountphilips substation). Wrapping the overhead line with fibre optic cable from Killonan ESNB substation (just east of Limerick City) to Mountphilips substation. The Overhead Line Activities will be carried out according to

industry standard method statements, including standard health & safety and environmental management systems.

5.6.1.4.2. UWF Other Activities: Construction & Operation

Timing: The **Haul Route Activities** will occur prior to commencement of turbine component haulage and reinstatement will occur immediately after the passage of all components. The initial once-off activities associated with the **Upperchurch Hen Harrier Scheme** such as permanent planting and fencing of newly planted areas and watercourses will be carried out during the same period as the construction of UWF and UWF Related Works. There will be pre-construction **Monitoring Activities** before UWF and UWF Related Works commence. **Overhead Line Activities** will take place at the same time as the construction of Mountphilips substation.

UWF Other Activities Construction Phase: Approximately 50 persons will be engaged in UWF Other Activities including haul route activities, landowners involved in the hen harrier scheme, environmental experts engaged in the monitoring schemes and ESB Crews involved in overhead line activities. There will be very little materials delivered to the activity sites, these will include deliveries of geotextile matting, trees and shrubs, fencing materials and specialist ESB equipment.

UWF Other Activities Operational Phase: The same **Haul Route Activities** as for the construction phase, will be required in the occasional event of a large component delivery to UWF, if required, during the operational phase. The farming practices required under the **Upperchurch Hen Harrier Scheme** will continue throughout the lifetime of UWF. **Monitoring** of the success of Upperchurch Hen Harrier Scheme will be carried out during the operational lifetime of UWF. Monitoring will also include operational planning conditions and Ecological Management Plan compliance.

Use of Natural Resources: No land use changes required. No water or welfare facilities required. No mechanical excavations required; all planting will be carried out by hand. For haul route activities, up to 960m of roadside boundary hedges/treelines will be trimmed, outside of the general bird breeding season. For the Hen Harrier Scheme, 2.2ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow will be enhanced or created during initial activities. In total 128 hectares of agricultural lands will be management for the benefit of hen harrier.

There will be negligible **Emissions** from vehicles transporting personnel and any general **Waste** arising on-site will be removed by the crew themselves during the **construction** and **operational phase** of these Other Activities.

5.6.2. Cumulative Locational Context of all the Elements

The vast majority of the whole UWF project is located in County Tipperary with some minor activities along the Upperchurch Windfarm turbine component haul route and on the Killonan to Nenagh 110kV overhead line, in County Limerick (these activities are part of Element 5: UWF Other Activities).

The vast majority of the interaction of the Elements is in and around the consented Upperchurch Windfarm.

The UWF Replacement Forestry is located adjacent to Other Elements of the Whole UWF Project, in particular:

- the UWF Other Activities (Upperchurch Hen Harrier Scheme)
- the consented Upperchurch Windfarm
- the UWF Related Works – Internal Windfarm Cabling

Relevant Volume C3 EIAR Figures:

Figure CE 1.2: UWF Related Works and the Other Elements of the Whole UWF Project in the Upperchurch Windfarm area.

5.6.3. Secondary Projects

The development of the UWF Replacement Forestry is not expected to result in any secondary or consequential development.

In relation to the Other Elements of the Whole UWF Project, the addition of Mountphilips Substation (UWF Grid Connection) will add a new high voltage electrical substation in the Newport area. This may facilitate new connections to the Mountphilips substation in the future. There are no new connections planned at present.

5.6.4. Description of Other Projects and Activities

A cumulative evaluation of the effects of the subject development together with the Other Elements of the Whole UWF Project and Other Projects or Activities is presented in the Environmental Factor topic chapters.

Other Projects or Activities in the area were scoped using geographical and time-frame boundaries and conceptual site model exercises, see [Appendix 2.3: Scoping of Other Projects or Activities](#). The results of this scoping exercise is presented in Table 5-12, where Other Projects or Activities which have been scoped in for cumulative evaluation are listed in the left hand column of the matrix table, and the relevant Environmental Factor topic is identified in grey shading in the matrix.

Table 5-9: List of Other Projects or Activities included in the Environmental Factor Cumulative Evaluation

Project (These projects are identified on Figure CE 2.1: Other Projects or Activities Scoped In for Evaluation in the Environmental Factor Topic Chapters)	Population	Human Health	Biodiversity	Land	Soils	Water	Air	Climate	Built Services	Roads & Traffic	Cultural Heritage	Landscape
Existing Killonan to Nenagh 110kV Overhead Line									-			
Existing Shannonbridge – Killonan 220kV Overhead Line												
Consented Bunkimalta Windfarm												
Consented Castlewaller Windfarm												
Existing Milestone Windfarm (includes permitted turbine at Inchivara) currently under construction												
Operational Windfarms in the Republic of Ireland												
Existing Communication Structures - Foilnahan Mast - Cummermore Communications Pole												
Consented Project – Newport Distributor Road, Newport												
Consented Project - Industrial warehouse Units at Thurles												
Existing/consented Project - Thurles Regional Water Treatment Works												
Consented Gortnahalla Turbine												
Killuragh Digester Plant												
Housing Development in Doon and Annacotty												
Agricultural Developments - Milk Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, Slatted Shed in Gortussa.												
Activity – Forestry												
Activity – Agriculture												
Activity –Turf-cutting												

A brief overview of each of the above listed projects is provided below. The location of each project in relation to the elements of the Whole UWF Project is identified on [Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters](#).

5.6.4.1 Existing Killonan to Nenagh 110kV Overhead Line

A high voltage (110kV) overhead line which runs between Killonan Station and Nenagh ESB substation (County Tipperary). The existing line is located to the west of the UWF Grid Connection and does not pass over the route of the 110kV UGC. The new Mountphilips Substation will be connected to this line via two new End Masts in farmland, west of the substation compound.

5.6.4.2 Existing Shannonbridge – Killonan 220kV Overhead Line

A high voltage (220kV) overhead line which runs between Shannonbridge ESB substation in County Offaly and Killonan ESB substation in County Limerick. A section of the line passes close to the UWF Grid Connection 110kV UGC in the townlands of Coole and Mountphilips.

5.6.4.3 Consented Bunkimalta Windfarm

The Bunkimalta Windfarm is a consented 16-turbine windfarm, located on Coillte lands, c.2.5km to the north of the UWF Grid Connection at Bunkimalta, Bauraglanna, Lackabrack, Knockfune and Foilduff at, Keeper Hill, Co. Tipperary.

Bunkimalta Windfarm will comprise 16 wind turbines, each having a rated electrical output of approximately 2,500 - 3,000 kilowatts, access tracks, a fenced Electrical Transformer Station comprising a single-storey Control Building and Substation, an effluent treatment system, three anemometer masts, repository areas, borrow pits and all associated site works, above and below ground. Each wind turbine will comprise a tower up to a maximum of 100 metres high, with a diameter of about 4 metres at the base. Three blades, up to a maximum of 50 metres in length, will be attached.

The Bunkimalta Windfarm will connect to the National Grid via an already consented underground grid connection to the existing Nenagh Substation, on the outskirts of Nenagh town.

The Bunkimalta Windfarm could be constructed during the same period as the UWF Grid Connection and the Whole UWF Project. Bunkimalta Windfarm, when built, will be operational during the operational stage of the Whole UWF Project.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 13510035.

5.6.4.4 Consented Castlewaller Windfarm

The Castlewaller Windfarm is a 16-turbine windfarm, comprising 16 wind turbine generators (each with a maximum hub height of 100m, maximum rotor diameter of 90m, and with a total tip height of 145m), one permanent meteorological mast, 2 borrow pits, a sub-station including a control building, new internal access roads, upgrading of existing internal access roads, expansion of drainage system, turbine hardstands, wastewater holding tank, underground cables and ancillary works which is located along part of the 110kV UGC route in Castlewaller townland.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 11/51/0251 for Castlewaller Windfarm.

Castlewaller Windfarm has not as yet secured a grid connection offer to connect to the National Grid from either Eirgrid or E.S.B Networks and therefore is not likely to be in construction at the same time as the construction of the Whole UWF Project.

5.6.4.5 Existing Milestone Windfarm

Milestone Windfarm is a consented 6-turbine windfarm located adjacent to the southwest of the consented Upperchurch Windfarm with 5 No. turbines consented under planning ref: 12510385 at Knockcurraghbola Commons, Knockcurraghbola Crownlands, Graniera, Shevry and 1 No. turbine consented

under planning ref: 1410 at Inchivara and Knockduff. When constructed, Milestone Windfarm will comprise of wind turbines each with a maximum tip height of 126m, along with new access tracks, and electrical substation, a borrow pit and associated works. The grid connection associated with the Milestone Windfarm is towards the south at ESBN Cauteen Station, to be cabled along the public road network. An Environmental Impact Statement accompanied the planning applications for Milestone Windfarm – Ref: 12510385 & 1410.

Milestone Windfarm is currently under construction with construction works expected to be completed before the commencement of the construction of the subject development or any of the other elements of the Whole UWF Project. Therefore there will be no overlap of construction periods.

Part of the landholding associated with the Milestone Windfarm occurs within one of the landholdings associated with the 110kV UGC element of the UWF Grid Connection, in Knockcurraghbola Commons townland.

5.6.4.6 Operational Windfarms in the Republic of Ireland

The Republic of Ireland has a generating capacity of 2,909.66 MW based on 233 windfarms.

5.6.4.7 Existing Communication Structures

Foilnaman Mast: An existing communications mast comprising a 30m steel lattice mast structure at Knockmaroe townland, in the vicinity of the UWF Related Works/Upperchurch Windfarm site.

Cummermore Communications Pole: An existing communications structure comprising a 20m support pole, c.2km to the southwest of the Upperchurch Windfarm, and within 4km of the UWF Related Works (Telecom Relay Pole). This existing pole carries radio aerials and a communications dish, together with associated equipment, cabling, gantry pole, GPS timing antenna, cabinet and fencing. Planning Ref: 14600313

5.6.4.8 Consented Project – Newport Distributor Road, Newport

Consented public road development at Newport, County Tipperary, comprising the demolition of two habitable dwellings and the provision of a distributor road between the R503 and local county road (Murroe Road) and associated site works including footpaths, lighting, cycle tracks and drainage, at Tullow, Newport County Tipperary. The road development is within the Newport River catchment and also located upstream of the Lower River Shannon SAC. Planning Ref: 07511157.

5.6.4.9 Consented Project – Industrial Warehouse Units at Thurles

The construction of 1 No. Light Industrial/Warehousing building (gross floor area 2360.6sq.m.) at Bawntameena, Nenagh Road, Thurles, along with a roundabout and access Road from Nenagh Road (R498) complete with necessary improvement works and road markings, a car park and loading areas and ancillary works; in addition the construction of a foul water pumping station and all associated works. Planning ref: 16600037.

5.6.4.10 Consented Project - Thurles Regional Water Treatment Works

The construction of a water treatment plant at Bohernacrusha, Killeenyarda, Holycross and outfall to the River Suir. The water treatment plant will consist of a water treatment and administration building, sludge dewatering building, ESB sub-station, generator & oil tank enclosure, raw water balancing tank, clear water tanks, sludge balancing tank, sludge thickening and sludge holding tank, washwater tank, sludge skip and emergency sludge storage area, chemical storage tanks, washwater storage tank and all associated site development and site excavation works above and below ground. Planning Ref: 16600877.

5.6.4.11 Consented Gortnahalla Turbine

Single wind generator with a maximum output set at 500kw, hub height 65m at Gortnahalla, near Upperchurch, Co Tipperary. Planning Ref: 12510368.

5.6.4.12 Killuragh Digester Plant

Development of a digester plant, associated ABP building and associated site works to process farm slurry and other organic material to provide renewable energy and fertilizer, in Killuragh, Pallasgreen, Co Limerick. Planning Ref: 111066.

5.6.4.13 Housing Development in Doon and Annacotty

Two housing developments: Construction of 25 no. houses consisting of 5 no. 4 bed detached dwellings, 20 no. 3 bed semi-detached dwellings, a bored well, entrance and roads together with associated site works and services at Bottle Hill, Doon, Co Limerick, Planning Ref: 16530; and Construction of 48 dwellings at Annacotty & construction of 240 dwellings in three areas/lots at Walkers Road, Annacotty, Co Limerick, Planning Ref: 137026 and 137094.

5.6.4.14 Agricultural Developments

Agricultural developments include a milk Milking Parlour in Cappamore, Co Limerick (Planning Ref: 15255), a Milking Parlour in Lisnagry, Co Limerick (Planning Ref: 15194), Slatted Sheds and Stores in Pallasgreen, Co Limerick (Planning Ref: 17133), and a Slatted Shed in Gortussa, Dundrum Co Tipperary (Planning Ref: 14600343).

5.6.4.15 Activities – Forestry, Agriculture

Agriculture and forestry are the predominant land uses in the area of the Whole UWF Project.

5.6.4.16 Activity – Turf-Cutting

Turbary (rights to cut turf) exists at Bleanbeg Bog immediately to the north of the UWF Grid Connection (110kV UGC) in the Castlewaller area.

The above projects and activities are included in the cumulative evaluations in the Environmental Topic chapters – Chapters 6 to 17. The relevant Environmental Factor topic is identified on Table 5-9.

UWF Replacement Forestry EIA Report

Volume C2: EIAR Main Report

Chapter 6: Population

Topic Chapter Authors:



EIAR Coordinator:



Topic	Population

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

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Appendix 6.1	Central Statistics Office Data

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

Glossary of Terms

Term	Definition
Electoral Districts (EDs)	Defined by the CSO as the smallest legally defined administrative areas in the State for which Small Area Population Statistics (SAPS) are published from the Census. There are 3,440 legally defined in the State.
National Economy	The economy of the Republic of Ireland. It encompasses the value of all goods and services manufactured within the country.
Local Economy	The economic system and range of economic activity in a local area that serves a local population.
Gross Domestic Product (GDP)	The measure of total output of an economy in a given period
Gross Value Added (GVA)	The measure of the values of goods and services produced in an area, industry or sector of an economy
Induced Spending	Induced spending is the portion of consumption that varies with disposable income - people are prone to spend the income they have. If they have more income, then they are inclined (that is, induced) to spend more. If they have less income, then they spend less.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Project Design Measure	Measures for environmental protection, incorporated into the design of the project.

List of Abbreviations

Abbreviation	Full Term
BPM	Ecopower Best Practice Measure developed by members of the EIAR Team
UGC	Underground Cables
UWF	Upperchurch Windfarm

Population
Topic

6 Environmental Factor: Population

6.1 Introduction to the Population Chapter

6.1.1 What is Population?

Population relates to the people living in the area, and includes the demographic makeup, economic activity and social functioning of local communities.

6.1.2 Overview of Population in the Local Environment

UWF Replacement Forestry is located in County Tipperary. The surrounding area is largely rural, running through agricultural grassland, commercial forestry plantations, private roads and public roads. Isolated residences and farmsteads are also scattered throughout the area. Nearby settlements include the villages of Upperchurch and Kilcommon. The location of the UWF Replacement Forestry is illustrated on OSI Mapping on [Figure RF 6.1: Location of the UWF Replacement Forestry](#).

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

6.1.3 Sensitive Aspects of the Population 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 Aspect is included in this topic chapter as it could be potentially impacted:

Sensitive Aspect No. 1	Local Economy	Section 6.2

The above listed Sensitive Aspect is evaluated in Section 6.2 of this Chapter.

To help readers navigate, the colour code for the Sensitive Aspect used above is also used in the Sensitive Aspect Section 6.2. The colour-code has been applied to the section headings, tables and on side-tabs on the edge of the pages.

6.1.4 Sensitive Aspects excluded from further evaluation

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

National Economy	Rationale for exclusion: Neutral effects The National economy relates to economic activity and employment over the territory of the entire State. In 2016 national Gross Domestic Product (GDP) amounted to €275.5 billion, while Gross National Product (GNP), which nets out the profits of foreign-owned companies, amounted to 225.8 billion. ¹ At a national level, the financial transactions (positive impact) associated with the construction and operation of the UWF Grid Connection, UWF Related Works, UWF Replacement Forestry cumulatively with the Other Elements Whole UWF Project will be very low, representing approximately 0.04 and 0.002 per cent, respectively, of the national economy and therefore will have a neutral effect on the national economy.
Settlement Patterns	Rationale for exclusion: impacts will be Neutral The financial transactions (positive) and business disruption impacts (negative) during the Construction, Operational and Decommissioning Stages of the UWF Grid Connection, UWF Related Works or UWF Replacement Forestry, or the consented Upperchurch Windfarm or UWF Other Activities, will not be of a nature as to impact on local settlement patterns i.e. it will not require or result in the temporary or permanent relocation of business or population. ²
Land Users	Rationale for exclusion: Evaluated in Chapter 9: Land
Local Residents & Community,	Rationale for exclusion: Evaluated in Chapters 7: Human Health; Chapter 12: Air; Chapter 17: Landscape.
Transient People	Rationale for exclusion: Evaluated in Chapters 7: Human Health; Chapter 12: Air; Chapter 17: Landscape.
End users of Built Services	Rationale for exclusion: Evaluated in Chapter 14: Material Assets - Built Services
Road Users	Rationale for exclusion: Evaluated in Chapter 15: Material Assets - Roads

¹ <http://www.cso.ie/en/releasesandpublications/er/nie/niear2016/>

² As per the Tipperary Wind Strategy Policy (2016), 'By their nature, wind farm developments are typically located on more elevated, isolated locations which coincide with lower population densities...' See <http://www.tipperarycoco.ie/sites/default/files/Tipperary%20Wind%20Energy%20Strategy%202016.pdf>

6.1.5 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 6-1: Subject Development –UWF Replacement Forestry

Project ID	The Subject Development	Composition of the Subject Development
Element 3	The Subject Development 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.

6.1.6 The Authors of the Population Chapter

This report has been written by John Lawlor (M. Econ. Sc. Hons), Director at EY-DKM Economic Advisory Services (EY-DKM) and Ciara Morley (Ph.D. Finance), Senior Consultant with EY-DKM. John has over 20 years' experience of economic analysis with EY-DKM, and prior to that worked in the Environmental Policy Research Centre of the ESRI. Ciara works on issues in the Irish and global economy and in the areas of urban economics, transport, construction and tourism, and also previously worked in the ESRI. EY-DKM Economic Advisory Services was recently formed following the acquisition of DKM Economic Consultants by EY (Ernest and Young, Financial Consultants).

6.1.7 Sources of Baseline Information

The information sources outlined in Table 6-2 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 6-2: Sources of Baseline Information for Population

Type	Source
Consultation	Feedback was received from - Fáilte Ireland - Members of the public during the Public Consultation and Information Day See Chapter 3: The Scoping Consultations, and Appendices for further details.
Desktop	- Census of Population 2016 and 2011, various volumes published by the CSO. - North Tipperary County Development Plan 2010 (as varied in 2016). - South Tipperary County Development Plan 2009 (as varied in 2016). - Limerick County Development Plan 2010-2016. - Newport Local Area Plan 2010-2016. - GeoDirectory database of business and residential premises. - Ecopower Developments Ltd. (2013) Upperchurch Windfarm Environmental Impact

Type	Source
	Statement 13510003 • Ecopower Developments Ltd. (2013) Upperchurch Windfarm Response to Further Information 13510003 • Chapter 12: Air • Chapter 15: Material Assets - Roads • Chapter 17: Landscape
Fieldwork	• Site Visit to assess extent of local businesses

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

6.1.7.1 Certainty and Sufficiency of Information Provided

A clear documentary trail is provided throughout this chapter and chapter appendix 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 data and reports supplied by reports and documentation from various county development plans, including for North and South Tipperary, and Limerick, along with the Newport local area plan. Data was sourced from the Central Statistic Offices Census 2011 and Census 2016 and from GeoDirectory. In all cases the most recent data and reports are relied on. All data and reports used are included in **Appendix 6-1** of **Volume C4: EIA Report Appendices**.

6.1.8 Methodology for Evaluating Effects

There is no specific guidance on the production of a Population chapter of an EIA Report, with respect to Economic Activity and Employment. However, extensive experience with EIA and planning systems together with the EPA guidance on EIS preparation (2002 & draft 2017) has informed the production of this Population appraisal reports.

6.2 Sensitive Aspect No.1: Local Economy

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

6.2.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

6.2.1.1 Baseline Characteristics of Local Economy in relation to UWF Replacement Forestry

UWF Replacement Forestry is located in Foilnaman Electoral Division, which has a population of 333 people in 2016 (CSO). The size of the Local Economy is based on the Gross Value Added (GVA) per person, GVA is the measure of the values of goods and services produced in an area, industry or sector of an economy. In 2014 regional GVA per person for the Mid-West Region stood at €28,900. Based on a population of 333 persons, the Local Economy of Foilnaman ED is estimated to have a GVA of €9.6 million.

Key data from the Census of Population and GeoDirectory is described in detail in [Appendix 6.1 of Volume C4: EIA Report Appendices](#) (see Volume C4: EIAR Appendices).

6.2.1.2 Evaluation of UWF Replacement Forestry

UWF Replacement Forestry was evaluated for its potential to cause impacts to Local Economy.

It was evaluated by the topic authors that **impacts to Local Economy will be Neutral** due to the development of the UWF Replacement Forestry, for the following reasons:

- The trees required for the UWF Replacement Forestry will be sourced from a nursery located outside the Foilnaman Electoral District and outside the wider Cumulative Evaluation Study Area for the Whole UWF Project.
- At a local scale, the financial transactions (positive impact) associated with the Replacement Forestry will be very low. Capital expenditure will be greatest during the planting stage and will represent less than 1% of the GVA for Foilnaman ED.

6.2.1.3 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 not cause Neutral impacts to Local Economy by itself, and therefore 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 evaluations for the Other Elements of the Whole UWF Project are included in Section 6.2.2 to Section 6.2.4 and included in the summary table in Section 6.2.8 in order to show the totality of the project.

6.2.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

6.2.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Local Economy 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 6.2.2.2.1](#) below.

The evaluation of cumulative impacts to Local Economy 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 Local Economy 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 \(Section A2.3.1 and Section A2.3.6\)](#).

The results of this scoping exercise are that: no other projects or activities will cause cumulative effects to Local Economy with UWF Replacement Forestry however in order to present the totality of the project – Bunkimalta Windfarm has been scoped in for evaluation of cumulative effects relating to the Other Elements.

6.2.2.2 Cumulative Evaluation Study Area

The study area for the evaluation of cumulative effects is described in Table 6-3.

Table 6-3: Cumulative Evaluation Study Area for Local Economy

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Slieve Felim to Silvermines Uplands Area comprising the Electoral Divisions (EDs) of Kilcomenty, Newport, Killoscully, Kilnarath, Abington3, Foilnahan, Upperchurch, Gortakelly Dolla, Templeberry, Borrisoleigh, Glengar, Curraheen, Cappagh, Donohill, Clonoulty West, Clogher, Moyaliff, Greenhall/ Lackagh and Kilmore in County Tipperary and Glenstal, Doon West, Cappamore and Bilboa in County Limerick	Electoral Districts comprising the general extent of the Slievefelim to Silvermines uplands area.
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Project or Activity: Bunkimalta Windfarm (consented)		
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.		

³ Abington is located in both Counties Tipperary and Limerick

6.2.2.2.1 Potential for Impacts to Local Economy

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 Local Economy. The results of this evaluation are included in Table 6-4.

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 6.2: Local Economy within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 6-4: 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 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: Impacts will be Neutral due to:</u> At a local scale, the financial transactions (positive impact) associated with the UWF Other Activities (Haul Route Activities, Overhead Line Activities, Monitoring Activities and the Upperchurch Hen Harrier Scheme) will be very low in the context of the size of the local economy. Specifically in relation to the Haul Route Activities, no business disruption is likely given the location of these Activities on the verges of regional and national roads, the small extent and momentary to temporary duration of the activities.
Other Projects or Activities	
Bunkimalta Windfarm (consented)	<u>Yes, included for the evaluation of cumulative effects</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 Replacement Forestry.

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6.2.2.3 Cumulative Information: Baseline Characteristics – Context & Character

All of the EDs listed for the Cumulative Evaluation Study Area, are included in the Mid-West region, which accounted for approximately 10 per cent of the national population of 4.6 million people. With the exception of Newport, the area is typical of a rural upland area in Ireland and is sparsely populated, with a population density below the State average. The population of the Cumulative Evaluation Study Area was 15,323 in 2016.

Gross Value Added: GDP data at a regional level is available up to 2014, but is not available at county or sub-county level.⁴ Tipperary North and Limerick, which contain all of the EDs listed above, make up the Mid-West region, along with County Clare.⁵ The Mid-West region accounted for approximately 7 per cent of

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⁴ <http://www.cso.ie/en/releasesandpublications/er/cirgdp/countyincomesandregionalgdp2014/>

⁵ The former North Tipperary forms part of the Mid-West NUTS III area while the former South Tipperary is in the South-East NUTS III area. The unified county is fully incorporated in Southern Assembly region. Arising from the strong linkage between the northern part of the county and Limerick and between the southern part and Waterford, the 3 Tipperary assembly members will be members of both the Mid-West and South-East Strategic Planning Areas (SPAs). Source: <http://www.southernassembly.ie/regional-planning/mid-west-spa>

total national GDP (€181 billion) in 2014. In 2014 regional GVA per person stood at €28,900. The value of the Local Economy in the Cumulative Evaluation Study Area is €443 million.

Since 2011, labour market conditions have improved greatly with the unemployment rate falling substantially. The numbers on the Live Register at the local Social Welfare offices have also fallen substantially in the past five years which points to improvements in the local economy.

In 2014, disposable income per person was approximately 5 per cent lower in Tipperary North and 6 per cent higher in Limerick, compared to the State average of €19,178.⁶ Limerick is one of only four counties in the State that record disposable income levels above the national average (along with Dublin, Cork and Kildare).

Agriculture and forestry are important sectors in the Cumulative Evaluation Study Area, accounting for 65 per cent of business premises (see **Table 12 in Appendix 6.1**), with 10 per cent of the workforce engaged in Agriculture, Forestry & Fishing in 2016, higher than the State average of 4 per cent⁷ (see **Table 6 in Appendix 6.1**). Despite the reliance of the study area on agriculture and to a lesser extent, forestry, there is evidence that the level of income generated from farming has declined marginally in the area between 2013 and 2014 (as well as at a national level) which may impact the relative strength of the farming sector.⁸

Tourism is relatively strong in Tipperary County however much of this is driven by South Tipperary, with only 17 per cent of tourists to the county in 2015 travelling to North Tipperary, where the County Tipperary EDs comprising the study area are located. Available data for Tipperary County indicates the revenue generated by overseas visitors to North Tipperary in 2015 was 64 per cent lower than that generated in South Tipperary⁹. The level of tourism revenue generated in North Tipperary accounts for only 28 per cent of the total tourism revenue generated in the county.

Walking and hiking are popular tourism pursuits in Ireland. Fáilte Ireland's *Tourism Facts 2015*¹⁰ indicates that walking/cross country hiking was by some margin the most cited activity by international tourists in Ireland, while for domestic holidaymakers it was the second most cited activity. The importance of walking/hiking to Tipperary's tourist product is highlighted in the Tipperary *Strategic Tourism Marketing, Experience & Destination Development Plan 2016-2021*.¹¹ The Strategy refers to the village of Upperchurch as "a gateway to the Slieve Felim Mountains and environs as a walking destination. The location of the village is very lovely and although not far from Thurles in miles, feels like a million miles away." It designates the village as a "priority Level 2 village with strategic potential".

6.2.2.3.1 Element 1: UWF Grid Connection

The UWF Grid Connection is located in five separate EDs in County Tipperary – Kilcomenty, Killoscully, Kilnarath, Abington and Foilnahan, which include the villages of Birdhill, Rear Cross, and Kilcommon. The town of Newport, and the villages of Murroe, Cappamore, Borrisoleigh, Dolla and Upperchurch are located in the adjacent EDs of Newport, Templederry, Upperchurch, Borrisoleigh, Dolla, Glenstal, Doon West, Cappamore and Bilboa in Counties Tipperary and Limerick.

In Census 2016, the population of the UWF Grid Connection Study Area was 10,344 persons. The population has been growing steadily (in line with the State average) over the previous 20 years.

⁶ <http://www.cso.ie/en/releasesandpublications/er/cirgdp/countyincomesandregionalgdp2014/>

⁷ CSO Census of Population 2016.

⁸ <http://www.revenue.ie/en/corporate/information-about-revenue/statistics/other-datasets/farming-sector.aspx>

⁹ http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/2_Regional_SurveysReports/Regional-tourism-performance-in-2014-Final-February-2016.pdf?ext=.pdf

¹⁰ http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/3_General_SurveysReports/Failte-Ireland-s-tourism-facts-2015.pdf?ext=.pdf

¹¹ <http://www.tipperarycoco.ie/sites/default/files/Publications/Tipperary%20Tourism%20Development%20Strategy%202016%20-%202021.pdf>

Based on the population of the UWF Grid Connection Study Area (10,344 persons), the Local Economy is estimated to have a GVA of €298 million.

Agriculture and forestry are important sectors in the study area, accounting for 60 per cent of business premises (see [Table 12 in Appendix 6.1](#)). Across the study area some 8 per cent of the workforce was engaged in Agriculture, Forestry & Fishing, higher than the State average of 4 per cent¹² (see [Table 6 in Appendix 6.1](#)).

As indicated on [Figure CE 6.2.1: Tourism Products within the Cumulative Evaluation Study Area](#), outside of Newport town which has a number of food and accommodation premises, there are 5 No. B&Bs located within the UWF Grid Connection Study Area.

The Slievefelim Way, Kilcommon Pilgrimage Loop and Ormond Way Cycle route are located within the UWF Grid Connection Study Area.

6.2.2.3.2 Element 2: UWF Related Works

The UWF Related Works are located in two EDs – Upperchurch and Foilnahan, which include the village of Kilcommon. Upperchurch village lies immediately adjacent to Upperchurch ED in the ED of Gortakelly. Due to its proximity, Gortakelly is also included in the UWF Related Works Study Area.

In Census 2016, the population of the UWF Related Works Study Area was 1,176 persons. Over the previous 20 years, population increases of between 13% and 20% have occurred in Foilnahan and Gortakelly EDs, while a population decrease of 9% has occurred in Upperchurch ED. Overall the population has increased by 9.5% in the UWF Related Works Study Area.

Based on the population of the UWF Related Works Study Area (1,176 persons), and a GVA per person of €28,900, the Local Economy is estimated to have a GVA of €36.5 million.

Agriculture and forestry are important sectors in the study area, accounting for 78 per cent of business premises (see [Table 12 in Appendix 6.1](#)). Across the study area some 17 per cent of the workforce was engaged in Agriculture, Forestry & Fishing, higher than the State average of 4 per cent¹³ (see [Table 6 in Appendix 6.1](#)).

As indicated on [Figure CE 6.2.1: Tourism Products within the Cumulative Evaluation Study Area](#), there are 4 B&Bs within the UWF Related Works Study Area (*The Cumulative Study area is described in Section 6.2.2.2 above*).

The Eamonn an Chnoic Loop, Ormond Way Walk (currently under development), and the Ormond Way Cycle route are located within the UWF Related Works Study Area.

6.2.2.3.3 Element 4: Already Consented Upperchurch Windfarm

The Upperchurch Windfarm is located in two EDs – Upperchurch and Foilnahan, which include the village of Kilcommon. Upperchurch village lies immediately adjacent to Upperchurch ED in the ED of Gortakelly. The villages of Rear Cross and Borrisoleigh are located in the surrounding EDs of Abington and Borrisoleigh (both County Tipperary).

The baseline characteristics of the UWF Related Works area above, also relates to the Upperchurch Windfarm.

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¹² CSO Census of Population 2016.

¹³ CSO Census of Population 2016.

6.2.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 6.2.2.2.1

6.2.2.3.5 Other Projects or Activities

Bunkimalta Windfarm will consist of approximately 17 wind turbines, 5 turbines fewer than Upperchurch Windfarm. The consented Bunkimalta Windfarm is located in the EDs of Greenhall/Lackagh, Kilnarath and Abington. In Census 2016, the population of these EDs was 1,297 persons, this equates to a GVA of the local economy of €37.5 million.

6.2.2.4 Cumulative Information Baseline Characteristics - Importance of Local Economy

The local economy is key to Population well-being, and sustains and underpins the structures of society. Through economic activity and employment, the local economy generates incomes for the population, which enables individuals and families to prosper and achieve their social aspirations, all of which is important in creating sustainable local communities. These issues are particularly important at a local level for a predominantly rural area, where the range of economic opportunities is limited compared to larger more urban areas.

Census data from 2016 indicates that a significant proportion of the local workforce commutes to work, and that the key employment sectors in the study area are Commerce & Trade and Professional Services. So it is likely that they are accessing employment opportunities in the nearby urban areas, notably Limerick, Thurles and Nenagh.

6.2.2.5 Cumulative Information Baseline Characteristics - Sensitivity of Local Economy

Within the study area, four EDs in the Cumulative Evaluation Study Area have experienced falling population in the past 20 years; with Templederry in particular experiencing a population decline of 39 per cent between 1996 and 2016 (see [Table 1 in Appendix 6.1](#)). This may be an indication of limited economic opportunities in these areas.

Brexit also represents a particular sensitivity. According to a recent paper by the Irish Farmers Association (IFA)¹⁴, 40 per cent of food exports from Ireland go to the UK. Potential impacts from Brexit are therefore likely to be particularly felt by the agriculture sector, and given the reliance on agriculture in a number of the EDs in the cumulative study area, it is likely that these impacts will be felt in the area. The IFA paper further indicates that agri-food exports were estimated to be €570 million less than they otherwise would have been in 2016, due mainly to weakening sterling in the wake of the Brexit referendum vote. Beef farmers in particular took a hit of €150 million alone. The forestry sector also has a high reliance on the UK market, and has experienced major growth in exports to the UK in recent years.

Broadly speaking, tourism is also sensitive to global uncertainties. The most immediate impact facing tourism in Ireland is the threat of euro-sterling parity which could see a large drop in the number of tourists visiting Ireland from the UK.

In relation to tourism at a local level, research by Fáilte Ireland¹⁵ in 2012 found that 48 per cent of tourists to Ireland declared that viewing a wind farm did not impact on their sightseeing and a further 32 per cent

¹⁴ See <https://www.ifa.ie/wp-content/uploads/2017/03/763773Brexit-imperatives-policy-paper55629.pdf>

¹⁵ [http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/WindFarm-VAS-\(FINAL\)-\(2\).pdf?ext=.pdf](http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/WindFarm-VAS-(FINAL)-(2).pdf?ext=.pdf)

reported the viewing of a windfarm to have a positive impact on sightseeing. In the same report, when asked what impact the likelihood of further windfarms have on their decision to visit Ireland again 43 per cent said it would have 'no impact/it depends' with a further 28 per cent saying it would have a positive impact.

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

There is limited data on trends in the Local Economy. In terms of population in the area, data from the past 10 years of Censuses suggests that population growth peaked in the decade to 2016, with a notable slowdown in population growth in the last five years recorded in Census 2016.

In terms of the labour force, since 2011, labour market conditions have improved greatly with the unemployment rate in the mid-west falling from 15.8 per cent in Q1 2011 to 6.8 per cent in Q1 2017. For the Mid-West region, which contains all the above EDs in the Cumulative Evaluation Study Area, the unemployment rate has fallen from 16.1 per cent to 6.8 per cent (lower than the State average).¹⁶ In the period since the 2016 Census, the numbers on the Live Register at the local Social Welfare offices have fallen substantially, as indicated in **Graph 1 in Appendix 6.1**, which points to improvements in the Local Economy. Census data points to a falling number of persons engaged in the Agriculture, Forestry & Forestry sector locally in recent years.

Fáilte Ireland's *Tourism Facts* for recent years point to very strong growth in both international and domestic tourist numbers in Ireland. The statistics confirm that walking and hiking have maintained their strong popularity for tourists as overall numbers have grown, pointing to growing opportunities for locations and business catering for these activities, such as the EDs in the Cumulative Evaluation Study Area.

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

In relation to operational impacts, the UWF Grid Connection will be operated on a permanent basis, while the UWF Related Works will coexist with the Upperchurch Windfarm, which is permitted to operate for 25 years.

While forecasting the level of economic change that will occur over this timeframe is beyond the scope of this appraisal, it can be expected that the local economy will change substantially over this period. It is assumed in this EIAR that the area will remain predominantly rural, and as such agriculture and forestry are likely to remain important.

Under moderate assumptions, the CSO projects that the State population will increase by 19% from 4.7 million people in 2016 to 5.6 million by 2046.¹⁷ Should local populations grow in tandem, the populations of the Cumulative Evaluation Study Area will grow from 15,323 to c.18,177 persons by 2046.

¹⁶ CSO QNHS <http://www.cso.ie/px/pxeirestat/Statire/SelectVarVal/Define.asp?maintable=QNQ22&PLanguage=0>

¹⁷ For further details please see

http://www.cso.ie/en/media/csoie/releasespublications/documents/population/2013/poplabfor2016_2046.pdf

6.2.3 Cumulative Information: PROJECT DESIGN MEASURES for Local Economy

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 design of the UWF Grid Connection, UWF Related Works and UWF Other Activities and into the consented design of the Upperchurch Windfarm.

There are no Project Design Mitigation Measures specific to Local Economy.

6.2.4 Cumulative Information: EVALUATION OF IMPACTS to Local Economy

It was evaluated that **Impacts to Local Economy will be Neutral** due to the development of the UWF Replacement Forestry, see Section 6.2.1.

This Section evaluates the likely cumulative effects of the Other Elements of the Whole UWF Project. The cumulative effects of the Other Elements with Other Projects or Activities is also presented.

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) - Local Economy.

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

Table 6-5: List of all Impacts included and excluded from the Impact Evaluation Table sections

<u>Impacts Included</u> (Evaluated in the Impact Evaluation Table sections)	<u>Impacts Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Gross Value Added to Businesses & Employment Opportunities (construction stage)	<i>Business disruption (construction stage)</i>
	<i>Reduction in tourism revenue (construction stage)</i>
	<i>Gross Value Added to Businesses & Employment Opportunities (operational stage)</i>
	<i>Reduction in tourism revenue (operational stage)</i>

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Table in the next section.

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

The Impact Evaluation Table is presented in the following section 6.2.4.1.

6.2.4.1 Impact Evaluation Table: Gross Value Added to Businesses & Employment Opportunities

Evaluation of UWF Replacement Forestry Excluded: Due to the small scale of expenditure in the Local Economy, the Neutral effects are expected to business or employment as a consequence of the UWF Replacement Forestry, and consequently this project 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 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
<u>Impact Source:</u> n/a <u>Cumulative Impact Source:</u> Construction contracts, purchasing of material and services, landowner payments <u>Impact Pathway:</u> Financial transactions	
<u>Impact Description:</u> An increase in gross value added to business and employment opportunities in the study area due to the purchase of goods, materials and services, employment, and payments to landowners, which will also result in secondary induced spending in the local economy.	
<u>Impact Quality:</u> Positive	

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

Element 1: UWF Grid Connection
<u>Impact Magnitude:</u> - c.100 persons working directly on the project, most of them on-site, over the course of the construction phase - c.€900,000 to be spent regionally on Stone & Concrete from Rear Cross Quarry (Holycross) and Roadstone (Bunratty). - c.€3.5 million to local landowners, in the form of wayleave agreements and land purchases - c.€500,000 induced expenditure on locally sourced goods and services
<u>Significance of the Impact:</u> Imperceptible (positive)
<u>Rationale for Impact Evaluation:</u> - the additional GVA generated, €4.9 million, is equivalent to approximately 1% per cent of the overall size of the Local Economy in the Cumulative Evaluation Study Area, in the year of construction - Temporary duration of the construction stage.
Element 2: UWF Related Works
<u>Impact Magnitude:</u> - c.5 persons working directly on the project during construction - c.€100,000 in landowner payments - c.€500,000 induced expenditure on locally sourced goods and services
<u>Significance of the Impact:</u> Imperceptible (positive)

Local Economy	Sensitive Aspect	<u>Rationale</u> for Impact Evaluation: - the additional GVA generated, €600,000, is 2% of the GVA of the Local Economy in the UWF Related Works Study Area - temporary duration of the construction stage
		Element 4: Consented Upperchurch Windfarm
		<u>Impact Magnitude</u>: - c.100 persons working directly on the project, most of them on-site, over the course of the construction phase - c.€120,000 to local landowners in the form of option payments and wayleave agreements. - c.€1.7 million to be spent regionally on Stone & Concrete from Rear Cross Quarry (Holycross) and Roadstone (Bunratty). - c.€500,000 induced expenditure on locally sourced goods and services
		<u>Significance of the Impact</u>: Slight (positive)
Population	Topic	<u>Rationale</u> for Impact Evaluation: - the value of the Local Economy (Kilnarath, Abington and Greenall/Lackagh EDs) is €37.5m, the population of these EDs was 1297 in 2016, - the additional local GVA generated, €2.75 million, is equivalent to approximately 7% per cent of the Local Economy in the year of construction, - Temporary duration of the construction stage
		Element 5: UWF Other Activities – <i>N/A, evaluated as excluded, see Section 6.2.2.2.1</i>
		Cumulative Information: Individual Evaluations of Other Projects or Activities <i>(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.)</i>
		Other Project: Bunkimalta Windfarm (consented)
Population	Topic	<u>Impact Magnitude</u>: Bunkimalta Windfarm will consist of approximately 17 wind turbines, 5 turbines fewer than Upperchurch Windfarm. Bunkimalta Windfarm (including its grid connection) has potential to be constructed during the same period as the Whole UWF Project. - It is estimated, based on employment levels for the Upperchurch project, that c.130 people will be employed during the construction phase - It is estimated, based on the Upperchurch Project that c.€2 million could be spend locally on stone & concrete, if sourced locally. - It is estimated, based on induced spending for the Upperchurch Project, that there will be c.€750,000 of induced expenditure on locally sourced goods and services
		<u>Significance of the Impact</u>: Slight (positive)
		<u>Rationale</u> for Impact Evaluation: - the additional local GVA generated, €2.75 million, is equivalent to approximately 11% per cent of the Local Economy (Kilnarath, Abington and Greenall/Lackagh EDs), in the year of construction, - Temporary duration of the construction stage.

Evaluation of Cumulative Impacts – Gross Value Added to Businesses & Employment Opportunities	
All Elements of the Whole UWF Project	
Cumulative Impact <u>Magnitude</u>: - c.200 persons working directly on the project, most of them on-site, over the course of the construction phase - c.€3.7 million to local landowners in the form of wayleave agreements, option payments and land purchases. - c.€2.6 million to be spent regionally on Stone & Concrete from Rear Cross Quarry (Holycross) and Roadstone (Bunratty). - c.€1 million induced expenditure on locally sourced goods and services. The value of the Local Economy in the Cumulative Evaluation Study Area is €443 million.	
Significance of the Cumulative Impact: Imperceptible (positive)	
<u>Rationale</u> for Cumulative Impact Evaluation: - the cumulative GVA generated, €7.8 million, will be equivalent to approximately 2% per cent of the overall size of the Local Economy in the Cumulative Evaluation Study Area, in the year of construction, - Temporary duration of the construction stage,	
All Elements of the Whole UWF Project with Other Projects or Activities	
<u>Cumulative Impact Magnitude</u>: Both Upperchurch and Bunkimalta Windfarms potentially could be constructed at the same time. Both windfarms are of similar scale. Cumulative local impacts include: - c.330 persons working directly on the projects, most of them on-site, over the course of the construction phase - c.€3.7 million to local landowners in the form of wayleave agreements, option payments and land purchases. - Between c.€2.6 and c.€4.6 million to be spent regionally on Stone & Concrete from Rear Cross Quarry (Holycross) and Roadstone (Bunratty) - C.€1.75 million induced expenditure on locally sourced goods and services The value of the Local Economy in the Cumulative Evaluation Study Area is €443 million.	
Significance of the Cumulative Impact: Imperceptible (positive)	
<u>Rationale</u> for Cumulative Impact Evaluation: - the cumulative additional local GVA generated, of between c.€8.5 and €10.5 million, will be equivalent to approximately 2% per cent of the overall size of the Local Economy in the Cumulative Evaluation Study Area, in the year of construction, - Temporary duration of the construction stage	

Local Economy

Sensitive Aspect

Population

Topic

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.

6.2.4.2 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 6-6 below.

Table 6-6: Description and Rationale for Excluded Impacts to Local Economy

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

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Traffic Management Measures Increased Traffic Volumes	1, 2, 4	Roads	Business disruption	Rationale for Excluding: Based on the evaluations in Chapter 15: Material Assets - Roads, it is considered that any business disruption caused by interrupted/disrupted access will have a neutral effect on the local economy. <u>Chapter 15: Material Assets - Roads</u> assess the impact of construction works i.e. traffic management works on increased journey times and interruption or disruption of access to property. This chapter concludes that in the case of journey times, the effect of the Whole UWF Project construction works will be negative and imperceptible due to short duration of the works and the restricted and lightly trafficked nature of the roads upon which the works will take place.
Construction activities	1, 2, 4	Air, Visibility	Reduction in tourism revenue	Rationale for Excluding: Based on the evaluations in Chapter 12: Air and Chapter 17: Landscape, it is considered that any increased dust and noise levels or a reduction in rural tranquillity during construction works will have a neutral effect on tourism revenue or the local economy. <u>Chapter 12: Air (Air Quality)</u> assesses the effects of dust soiling on transient people. In this Chapter it is determined that at the construction stage there will be a negative effect of imperceptible significance due in part to the fact that users of any trails in the area will be present in the areas affected by dust emissions for no longer than minutes at a time and the reversibility of the impact. In addition <u>Chapter 12: Air (Noise)</u> assesses the impact of increases in ambient noise levels on transient people. At the construction stage it is found that the effect will be negative but of slight significance due to the low number of total receptors (see Chapter 12 Air), the temporary duration of the effects and the compliance with guidelines. <u>Chapter 17: Landscape</u> deals with the impact of the construction phase of Whole UWF Project in causing a reduction in rural tranquillity. It is found that the negative impact will be of slight significance due to the modest scale and extent of construction activities and the temporary and short-term duration of construction activity and reversibility of effects.

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Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Operational Stage				
Contracts Purchase of Materials and services, Landowner agreements	1, 2, 4	Financial Transactions	Gross Value Added to Businesses & Employment Opportunities	Rationale for Excluding: The financial transactions (positive) during the operational Stage of the Whole UWF Project will be low, representing approximately 1 per cent of the local economy on an annual basis. As such the operational phase will have a neutral effect on the local economy.
Operating turbines Operating substations Operating telecoms relay pole	4	Air, Visibility	Reduction in tourism revenue	Rationale for Excluding: Based on the evaluations in Chapter 12: Air and Chapter 17: Landscape, it is considered that any reduction in air quality due to maintenance activities or an increase in ambient noise or vibration levels or a reduction in rural tranquillity due to the operational turbines during the operational stage will have a neutral effect on tourism revenue or the local economy. As per <u>Chapter 12: Air (Air Quality)</u>, all parts of the operational stage of the Whole UWF Project has been scoped out due to the fact that air quality impacts resulting from maintenance vehicle emissions will be very minimal and will have a Neutral impact on the air quality. As per <u>Chapter 12: Air (Noise and Vibration)</u> the effect of an increase in ambient noise levels from either the operational Mountphilips Substation or the Consented UWF Substation will not be audible at a distance beyond 200m. Since there are no trails within this distance there is <i>no potential for impacts to transient people</i>. In relation to the operational turbines, the Ormond Way and Eamonn a Chnoic Loop are routed in close proximity to turbines, however it is considered that while the noise emitted by the turbines will be heard in close proximity, this noise will not be intrusive – the levels will not cause any change in behaviour, such as having to speak more loudly as a conversation can be carried out normally while standing underneath a turbine. In the context of the momentary/brief duration of any effects, it is considered that the noise emitted by the Consented UWF Turbines will have a neutral effect on any walkers that may be on these two walks. In relation to vibration; emissions from operational plant/vehicles using site access roads will be almost impossible to detect and therefore there will be no potential for impacts. <u>Chapter 17: Landscape</u> deals with the impact of the operational phase of Whole UWF Project in causing a reduction in rural tranquillity. These impacts are found to be negative but of imperceptible significance due to the very limited visible expression of almost all elements of the Whole UWF Project cumulatively and in combination with the Upperchurch Windfarm. In relation to the Upperchurch Windfarm, as per the ABP Inspectors

Local Economy

Sensitive Aspect

Population

Topic

Sensitive Aspect	Local Economy	Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
						Report (2014, Section 2), “In overall terms the principle of locating windfarm development in the area which is the subject of this appeal is <i>reasonable</i> ” In addition, research by Fáilte Ireland ¹⁸ in 2012 found that 48 per cent of tourists to Ireland declared that viewing a wind farm did not impact on their sightseeing and a further 32 per cent reported the viewing of a windfarm to have a positive impact on sightseeing. In the same report, when asked what impact the likelihood of further windfarms have on their decision to visit Ireland again 43 per cent said it would have no impact/it depends with a further 28 per cent saying it would have a positive impact.
Decommissioning Stage						
Rationale for Excluding: The UWF Grid Connection will not be decommissioned, therefore no impacts will occur. UWF Related Works & Upperchurch Windfarm: The financial transactions (positive) associated with the decommissioning of the these elements will be very low, representing 0.0007 per cent of the total capital costs of the project and relates to 0.0003 per cent of the local economy. No business disruption is likely given the temporary duration and very low traffic volumes which will be associated with decommissioning activities.						

Population
Topic

¹⁸[http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/WindFarm-VAS-\(FINAL\)-\(2\).pdf?ext=.pdf](http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/WindFarm-VAS-(FINAL)-(2).pdf?ext=.pdf)

6.2.5 Mitigation Measures for Impacts to Local Economy

No additional mitigation measures are required as the topic authors conclude that UWF Replacement Forestry will cause **neutral impacts to the Local Economy** as a consequence of the UWF Replacement Forestry.

6.2.6 Evaluation of Residual Impacts to Local Economy

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures were required, and thus the Residual Impact is the same as the Impact set out in Section 6.2.1: Evaluation of UWF Replacement Forestry above – i.e. **impacts will be Neutral**.

6.2.7 Application of Best Practice and the EMP for Local Economy

No UWF Replacement Forestry Best Practice Measures have been developed specifically for Local Economy.

6.2.8 Summary of Impacts to Local Economy

The topic authors conclude that impacts to Local Economy as a result of the UWF Replacement Forestry will be Neutral.

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 6-7: Summary of the impacts to Local Economy

Impact to Local Economy:	Gross Value Added to Businesses & Employment Opportunities
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Section 6.2.4.1</i>
Project Life-Cycle Stage (for Other Elements only)	Construction Stage
<u>UWF Replacement Forestry</u>	Neutral Evaluated as Excluded - see Section 6.2.1
Element 1: UWF Grid Connection	Imperceptible (positive)
Element 2: UWF Related Works	Neutral Impact
Element 4: Upperchurch Windfarm	Imperceptible (positive)
Element 5: UWF Other Activities	Neutral - Evaluated as Excluded, see Section 6.2.2.2.1
<u>Cumulative Impact: (Other Elements only)</u>	
All <u>Other Elements</u> of the Whole UWF Project	Imperceptible (positive)
All <u>Other Elements</u> of the Whole UWF Project <u>cumulatively with</u> Other Projects or Activities Bunkimalta Windfarm	Imperceptible (positive)

(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).

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6.3 Policy Context

6.3.1 National Policy

A joint submission of behalf of Limerick City & County Council, Tipperary County Council and Clare County Council to the National Planning Framework 2040¹⁹ recognises the importance of retaining and sustaining communities within rural Ireland and acknowledges that, where possible, future growth should take place in the nearest towns and villages.

The joint submission also highlighted the need to identify locations with immediate capacity for growth in maximising natural resources and renewable energy which will provide the greatest return on capital investment made.

6.3.2 Regional Policy

These Guidelines²⁰ do not set precise requirements for the provision of renewable energy in the Mid-West Region. However, under planning and economic development it is highlighted that development plans should make provision for new uses of agricultural land including afforestation and alternative energy, where suitable.

It also states that one of the key investment priorities required to support the development of the Region is the strengthening of the electricity transmission grid in the Region.

6.3.3 North Tipperary County Development Plan 2010 (as varied):

The UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and consented UWF are wholly within the former North Tipperary County Council administrative area. The Development Plan acknowledges that the rural economy also extends beyond the traditional sector of agriculture with industries developed to harness the natural resources of the county, including mining, quarrying, forestry, peat extraction and renewable energy. These industries provide economic resources which contribute to sustaining their local communities.

Rural areas provide opportunities for development in expanding economic sectors such as bio-energy and rural tourism. The Plan (as varied) supports the sustainable diversification of the rural economy and seeks to use the natural resources of the county for new employment opportunities.

¹⁹ <https://www.limerick.ie/sites/default/files/media/documents/2017-03/Ireland%202040.PDF>

²⁰ http://www.southernassembly.ie/uploads/general-files/http---www.southernassembly_.ie-images-uploads-MW_RPGs_.pdf

6.4 Best Practice Measures

No UWF Replacement Forestry Best Practice Measures have been developed specifically for Population.

6.5 Summary of the Population Chapter

UWF Replacement Forestry is located in Foilnahan, County Tipperary. The surrounding area is rural with isolated residences and farmsteads scattered throughout the area. Nearby settlements include the villages of Upperchurch and Kilcommon.

The Sensitive Aspect of Population which was evaluated in this topic chapter is the Local Economy.

UWF Replacement Forestry was evaluated for potential to cause impacts to Population as a result of spending and job demand in the Local Economy.

6.5.1 Summary of UWF Replacement Forestry Impacts

- Positive impacts to the Local Economy will be Neutral, due to the very small scale of spend, small number of personnel, and the fact that trees for the new woodland will be purchased outside the area.

6.5.2 Summary of Cumulative Impacts of the 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 of the Other Elements, in particular Upperchurch Windfarm and UWF Grid Connection, was also examined.

- In summary, cumulative effects to the Local Economy due to combined spending and jobs in the local economy, will be positive and imperceptible.

6.5.3 Summary of Cumulative Impacts with Other Projects or Activities

Bunkimalta Windfarm, was also evaluated for cumulative effects in this topic chapter as it is both at a sufficient scale to contribute to cumulative impacts and it also has potential to be constructed during the same period as the Whole UWF Project.

- Positive Cumulative effects to the Local Economy due to the combined spend and labour demand of all of the Elements of the Whole UWF Project together with the Bunkimalta Windfarm, will be Imperceptible, when considered in the context of the value of the Local Economy.

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UWF Replacement Forestry EIA Report

Volume C2: EIAR Main Report

Chapter 7: Human Health

Topic Chapter Authors:



RPS Group

EIAR Coordinator:



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Figure CE 7.3	Kilcommon National School within the Cumulative Evaluation Study Area
Figures for Transient People	See Figures and Mapping associated with Chapter 12: Air (Figure CE 12.3) Chapter 15: Material Assets (Roads) (Figure CE 15.3).

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

Glossary of Terms

Term	Definition
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Project Design Measure	Measures for environmental protection, incorporated into the design of the project.

List of Abbreviations

Abbreviation	Full Term
AA	Appropriate Assessment
COMEAP	Committee on the Medical Effects of Air Pollutants
CSO	Central Statistics Office
dB	Decibel
DECC	Department for Energy and Climate Change
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMF	Electro-magnetic Fields
EPA	Environmental Protection Agency
EU	European Union
HDPE	High-density polyethylene
IAQM	Institute of Air Quality Management
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IFA	Irish Farmers' Association
IPH	Institute of Public Health in Ireland
PD	Ecopower Project Design Environmental Protection Measure developed by members of the EIAR Team
PM	Particulate Matter
WHO	World Health Organisation
UGC	Underground Cables
UWF	Upperchurch Windfarm

7 Environmental Factor: Human Health

7.1 Introduction to the Human Health Chapter

7.1.1 What is Human Health?

The World Health Organisation (WHO) defines health as ‘a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity’. Health is determined not only by access to quality healthcare services and lifestyle choices but also by the social and economic conditions in which people live (IPH, 2009)

7.1.2 Overview of Human Health in the Local Environment

The UWF Replacement Forestry is located in the Mid-West region within North Tipperary. North Tipperary performs marginally worse than the national average for the majority of health status indicators. However, mental health indicators such as “deliberate self-harm”, those diagnosed with a “psychological or emotional condition”, and “deaths from respiratory disease” all perform better in North Tipperary compared to the national average.

The location of the UWF Replacement Forestry is illustrated on OSI Mapping on **Figure RF 7.1: Location of the UWF Replacement Forestry**.

Figures and mapping referenced in this topic chapter can be found in Volume C3 EIAR Figures.

7.1.3 Sensitive Aspects of the Human Health 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	Local Residents & Community	Section 7.2
Sensitive Aspect No. 2	Kilcommon National School	Section 7.3
Sensitive Aspect No. 3	Transient People (walkers, road users, farm workers etc)	Section 7.4

Each of the above listed Sensitive Aspects are evaluated individually in Sections 7.2 to 7.4 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 7.2 to 7.4. The colour-codes have been applied to section headings, tables and on side-tabs on the edge of the pages.

7.1.4 Sensitive Aspects excluded from further evaluation

No Sensitive Aspects are excluded from this topic chapter.

7.1.5 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 7-1: 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

7.1.6 The Authors of the Human Health Chapter

The RPS Health and Social Impact Assessments (HIA) team is a market leader for robust planning focussed HIA services, with an unrivalled catalogue of major HIA examples, and an unmatched level of proven HIA expertise and experience.

This report was written by Dr. Andrew Buroni (PhD, MSc, BSc (Hons)), Fellow of the Royal Society of Medicine, Fellow of the Royal Society of Public Health), who has over 18 years of experience as a Health and Social Impact Assessment practitioner within the energy, oil and gas, waste management, transport, civil aviation, spatial planning, regeneration and sustainable development sectors.

Tara Barratt (MSc, DIC, BSc (Hons), AIEMA) assisted in the composition of this report. Tara has a Master of Science in Environmental Technology with a focus in environmental epidemiology, following a Bachelor of Science in Geography. Tara has a range of HIA experience which includes windfarms and their grid connections, major transport infrastructure projects and new nuclear power stations.

7.1.7 Sources of Baseline Information

The information sources outlined in Table 7-2 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 7-2: Sources of Baseline Information for Human Health

<u>Type</u>	<u>Source</u>
Consultation	Feedback was received from - Health Services Executive - Members of the public during the Public Consultation and Information Day See Chapter 3: The Scoping Consultations, and Appendices for further details.

Type	Source
Guidelines	- Institute of Public Health in Ireland. (2009). Health Impact assessment Guidance (http://publichealth.ie/files/file/IPH%20HIA.pdf); - DECC, "Power Lines: Demonstrating compliance with EMF public exposure guidelines. A voluntary Code of Practice," Department of Energy and Climate Change, 2012 (UK); - The Committee on Medical Effects for Air Pollution (COMEAP) quantitative exposure response functions for changes in air quality; - International Commission on Non-ionizing Radiation Protection., "ICNIRP guidelines for Limiting Exposure to Time Varying Electric and Magnetic Fields (1 Hz 0 100 kHz)," Health Physics, vol. 99, no. 6, pp. 818-836, 2010; and - EirGrid (2014) Study 1: EMF Literature review of electromagnetic fields (EMF) and human health, and an evidence base of EMF measurements from the Irish Transmission System
Desktop	- Available Census of Population data published by the CSO; - Committee on Medical Effects for Air Pollution (COMEAP); - EirGrid (2014) Study 1: EMF Literature review of electromagnetic fields (EMF) and human health, and an evidence base of EMF measurements from the Irish Transmission System; - Public health and hospital admissions data from the Health Well; - EIAR Chapter 6: Population, Chapter 11: Water, Chapter 12: Air, Chapter 14: Material Assets (Built Services) & Chapter 15: Material Assets (Roads) - Ecopower Developments Ltd. (2013) Upperchurch Windfarm Environmental Impact Statement 13510003 - Ecopower Developments Ltd. (2013) Upperchurch Windfarm Response to Further Information 13510003 - An Bord Pleanála (2014) Inspectors Report for Upperchurch Windfarm PL22.243040 - An Bord Pleanála (2014) Grant of Permission for Upperchurch Windfarm PL22.243040
Fieldwork	- Site Visit - Attendance at public information and consultation event

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

7.1.7.1 Certainty and Sufficiency of Information Provided

As per the EPA Guidelines (EPA, 2015), the Human Health chapter investigates and assesses the likelihood of significant effects directly attributable to what is proposed, and sets out analysis used to form the conclusions.

7.1.8 Methodology for Evaluating Effects

The Human Health section follows the approach recommended by the Institute of Public Health in Ireland (IPH, 2009). Such an approach provides the flexibility to investigate, remove and address potential environmental health issues, while also providing a framework to explore wider determinants of health and community requirements important to good health and wellbeing.

The Human Health section draws from and builds upon the wider EIA technical disciplines, most notably Chapter 6: Population, Chapter 11: Water (in particular Local Wells & Springs), Chapter 12: Air (air quality, noise, vibration, and electromagnetic fields), Chapter 14: Material Assets (Built Services) and Chapter 15 Material Assets (Roads).

7.2 Sensitive Aspect No.1: Local Residents & Community

This Section provides a description and evaluation of the Sensitive Aspect - Local Residents & Community.

7.2.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

7.2.1.1 Baseline Characteristics of Local Residents & Community in relation to UWF Replacement Forestry

The surrounding area of UWF Replacement Forestry is sparsely populated due to its rural nature.

7.2.1.2 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 7-3 are relevant to **Local Residents & Community**.

Table 7-3: UWF Replacement Forestry Project Design Measures relevant to Local Residents & Community

PD ID	Project Design Environmental Protection Measure (PD)
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

7.2.1.3 Evaluation of UWF Replacement Forestry

UWF Replacement Forestry was evaluated for its potential to cause impacts to Local Residents & Community.

It was evaluated by the topic authors that UWF Replacement Forestry has **no potential to cause any adverse health impacts to Local Residents & Community**, as there will be:

- Neutral impacts to the local economy: as per **Chapter 6: Population, Section 6.2.1**, trees are likely to be sourced from Dundrum or further afield, which is located just outside the larger cumulative evaluation study area. At a local scale, the financial transactions (positive impact) associated with the UWF Replacement Forestry will be relatively low. Capital expenditure will be greatest during the planting stage and will represent less than 1% of the Local Economy. On this basis, health impacts to local populations will be Neutral.
- No impact to water quality in local wells & springs: as per **Chapter 11: Water, Section 11.2.4**, due to Project Design Measures any impacts to local surface water bodies will be no greater than Imperceptible, additionally no springs or wells were identified within 50m of the UWF Replacement Forestry (**Chapter 11: Water, Section 11.4.2.2.1**). On this basis, there is no potential for any impact on local water quality or water availability sufficient to impact upon local health.
- No likely impacts to public water supply: as per **Chapter 14: Material Assets (Built Services), Section 14.2.4**, due to Project Design measures. On this basis there is no potential for any health impacts due to contaminated water or disruption of supply.
- No material adverse impacts on air quality, noise or vibration: As per **Chapter 12: Air, Section 12.2.2.2.1**, planting of the new woodland will have Neutral impact on air quality as works will be carried out by hand using spades, with use of vehicles limited to personnel vehicles. No mechanical noise or vibration sources

during planting stage, as planting will be carried out by hand in grassland fields, therefore no noise or vibration impact will occur. During the growth stage, chainsaws may be used during thinning activities, however this type of activity will be infrequent, brief in nature and at a distance from local residents. Potential community exposure to environmental health pathways are therefore not of a magnitude, timing or duration to quantify adverse impacts to local community health during any planting activities or thinning activities.

- No EMF emissions: In relation to electromagnetic fields, there are no electrical or radio-communication parts associated with the UWF Replacement Forestry. Therefore, the UWF Replacement Forestry will not influence local EMF or result in any change in exposure, with no potential for impacts to health.
- Neutral impact on traffic volumes: As per **Chapter 15: Material Assets (Roads), Section 15.3.2.2.1**, the planting programme will generate extremely low traffic volumes, with 1-2 vehicles movements per day over a one month period. As a comparative example this level of traffic is substantially less than the daily level of traffic generated by a single residential dwelling. During the growth stage, traffic will be in the region of 2 to 4 vehicle movements per year. Due to the extremely low traffic volumes associated with the UWF Replacement Forestry, it is considered that Neutral effects will occur to Road Users on the local roads in the vicinity, with Neutral impact on local health.
- No decommissioning effects, as UWF Replacement Forestry will be permanent woodland.

7.2.1.4 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 Local Residents & Community by itself, and therefore 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 evaluations for the Other Elements of the Whole UWF Project are included in Section 7.2.2 to Section 7.2.4 and included in the summary table in Section 7.2.8 in order to show the totality of the project.

7.2.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics**7.2.2.1 Overview of Other Elements, Other Projects or Activities**

The evaluation of cumulative impacts to Local Residents & Community 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 7.2.2.2.1** below.

The evaluation of cumulative impacts to Local Residents & Community 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 Local Residents & Community 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 A2.3.7)**.

The results of this scoping exercise are that: no other projects or activities will cause cumulative effects to Local Residents & Community with UWF Replacement Forestry however in order to present the totality of the project – Bunkimalta Windfarm has been scoped in for evaluation of cumulative effects relating to the Other Elements.

7.2.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area is described in Table 7-4.

Table 7-4: Cumulative Evaluation Study Area for Local Residents & Community

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	In order to evaluate cross-factor cumulative effects, the same geographical boundaries were used for Human Health as those used for Chapter 6: Population (Local Economy), Chapter 11: Water (Local Wells & Springs), Chapter 12: Air (Local Residents & Community), Chapter 14: Material Assets (Built Services) and Chapter 15: Material Assets - Roads (Road Users).	The geographic boundaries are consistent with Chapter 6: Population (Local Economy), Chapter 11: Water (Local Wells & Springs), Chapter 12: Air (Local Residents & Community), and Chapter 15: Material Assets - Roads (Road Users) thereby enabling the Human Health section to appraise the potential cumulative change in socio-economic determinants of health, drinking water quality, cumulative changes in air quality, and ambient levels of noise, vibration or EMF, and in-combination effects to road safety.
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Project or Activity: Bunkimalta Windfarm 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.		

7.2.2.2.1 Potential for Impacts to Local Residents & Community

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 Local Residents & Community. The results of this evaluation are included in Table 7-5.

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 the Figures and Mapping associated with Chapters 6: Population (Figure CE 6.2), Chapter 11: Water (Figure CE 11.4); Chapter 12: Air (Figure CE 12.2.1 and Figure 12.2.2; Chapter 14: Material Assets (Built Services) (Figure CE 14.2) and Chapter 15: Material Assets (Roads) (Figure CE 15.3), all in Volume C3 EIAR Figures.

Table 7-5: 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 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 to cause any adverse health impacts to Local Residents & Community, as there will be: Neutral impacts to the local economy: as per Chapter 6: Population, Section 6.2.2.2.1, at a local scale, the financial transactions (positive impact) associated with the UWF Other Activities will be relatively low and will not cause any measurable effect to the local economy. Specifically in relation to the Haul Route Activities, no business disruption is likely given the location of these activities on the verges of regional and national roads, the small extent and momentary to temporary duration of the activities. On this basis, there is no material risk to health. Neutral impacts to water quality: as per Chapter 11: Water, Section 11.4.2.2.1, no likely effects to water quality as a result of Haul Route Activities, Overhead Line Activities or Monitoring Activities, no major excavations required for Upperchurch Hen Harrier Scheme, therefore any effects to water quality will be neutral. On this basis, health effects caused by contaminated water are also not likely to occur. No likely impacts to public water supply as per Chapter 14: Material Assets (Built Services), Section 14.2.2.2.1. Neutral impacts to Air: as per Chapter 12: Air, Section 12.2.2.2.1, any vehicle and equipment use will be of a short duration, transient in nature, and the relative change in concentration and community exposure will be orders of magnitude lower than is required to quantify any material impact on health. Any noise or vibration emitted by machinery or vehicles used to carry out the UWF Other Activities, will be in the context of background noise and vibration from regional or national roads, or will not be noticeable in the context of local traffic and farming activity. Equipment which will be used includes a hedge cutter and tractor and hand tools. Activities will take between 15 minutes and 2 days to complete at the various locations. Given that any change will be temporary and transient in nature, of a short duration and low magnitude with limited opportunity for community exposure, there is Neutral risk to health. In relation to electromagnetic fields, there are no electrical or radio-communication parts associated with the UWF Other Activities. On this basis, there is no potential for changes in exposure to EMF, and Neutral risk to health. Neutral impacts to Road Users, as per Chapter 15: Roads & Road Users, Section 15.3.2.2.1, the traffic increases as a result of the Haul Route Activities (tree

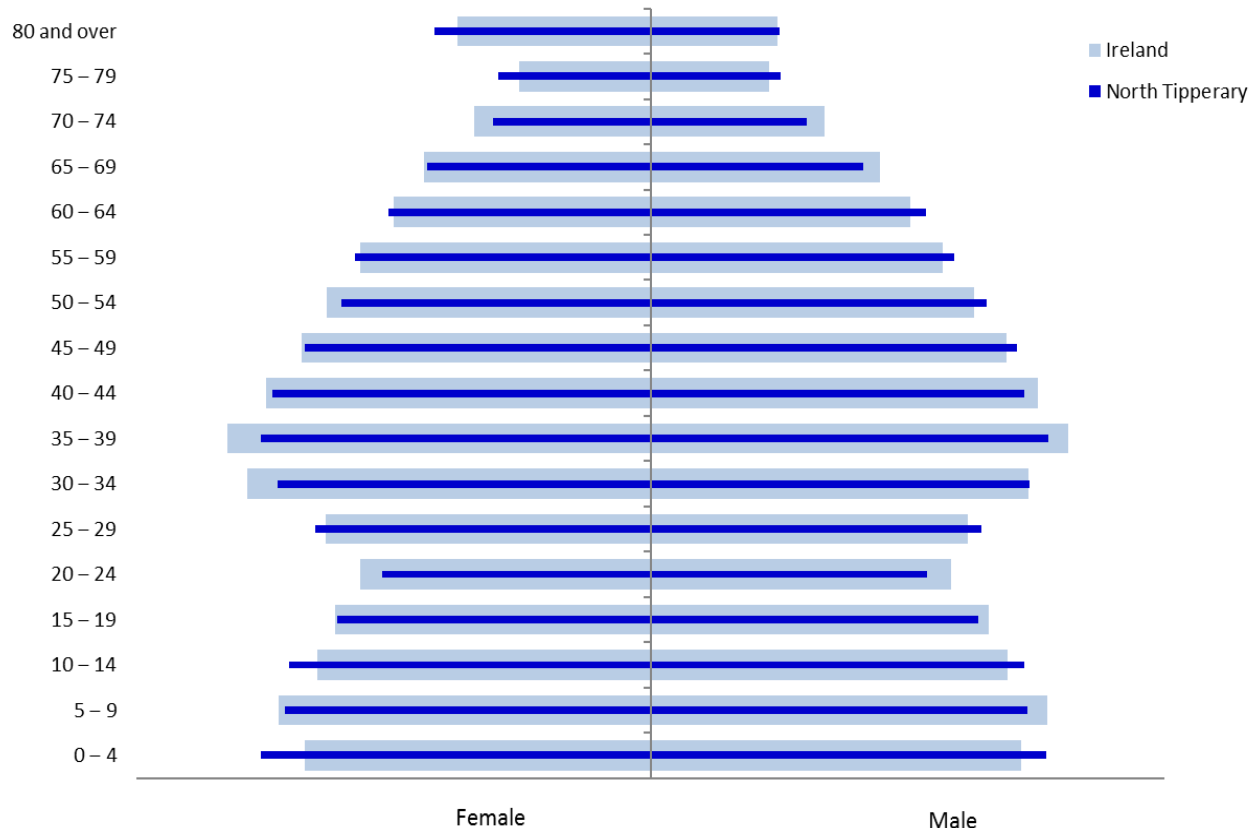
	trimming, laying of matting, street furniture removal), will be in all cases considerably less than 1% of the current traffic volumes on these roads. Given that the normal day-to-day variation in traffic conditions can be as much as 10%, the relative change is not of a level to quantify any impact on health. In addition, no works to the road network or road boundaries form part of the Overhead Line Activities, or Upperchurch Hen Harrier Scheme or Monitoring Activities, and taking into consideration the extremely low volumes of traffic associated with these activities, and the brief duration of any public road use, no effects to Road Users are likely. No decommissioning effects, as any activities consequent of Upperchurch Windfarm decommissioning will be minimal, brief and reversible.
Other Projects or Activities	
Bunkimalta Windfarm	Yes, <u>included</u> for the evaluation of cumulative effects 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.

7.2.2.3 Cumulative Information: Baseline Characteristics – Context & Character

It is assumed in this chapter that the population structure of the Cumulative Evaluation Study Area is similar to the North Tipperary Data provided in Graph 7-1.

Graph 7-1: Population Structure of North Tipperary Compared to Ireland

Source: (CSO, 2016)



As shown in Graph 7-1, local residents and communities in North Tipperary are generally of a similar demographic to the national average. The most significant differences can be seen in the youngest and oldest age categories where there is a higher proportion of those aged 0-4, 10-14, and 75-80+ in North Tipperary compared to the national average.

Physical, mental and social health status of the populations in North Tipperary, in which the UWF Grid Connection, UWF Related Works and consented Upperchurch Windfarm are located, is summarised and compared to the national average in Table 7-6.

The Cumulative Evaluation Study Area also extends into South County Tipperary and County Limerick to reflect the entire Slievefelim to Silvermine Upland Area for the evaluation of indirect Population effects. The physical, mental and social health status of the population in South Tipperary and County Limerick is outlined in Table 7-7.

Cells highlighted in green indicate a better health status than the national average, while red highlighted cells represent a worse health status compared to the national average.

Table 7-6: North Tipperary Health Baseline Compared to the Ireland Average

<u>Indicator</u>	<u>North Tipperary</u>	<u>Ireland Average</u>
<u>Limiting Long-Term Illness (2011)</u>		
Total persons with a disability	13.7%	13.0%
Condition that limits basic physical activities	43.8%	41.1%
<u>Mental Health</u>		
Psychological or emotional condition (2011)	14.6%	16.1%
Suicide per 100,000 (2007-2013)	12.8	11.3
Deliberate self-harm per 100,000 (2012)	417.8	423.1
<u>5 Year Standardised Mortality Rates</u>		
All deaths – all ages	669.7	563.6
Deaths heart disease and stroke – all ages (2008-2012)	252.6	182.8
Deaths cancer – all ages (2008-2012)	204.6	175.6
Deaths respiratory disease – all ages (2008-2012)	57.4	64.9

Sources: (IPH, n.d.) (Lenus, 2015)

Table 7-7: South Tipperary and County Limerick Health Baseline

<u>Indicator</u>	<u>South Tipperary</u>	<u>County Limerick</u>
<u>Limiting Long-Term Illness (2011)</u>		
Total persons with a disability	14.7%	12.6%
Condition that limits basic physical activities	44.2%	42.2%
<u>Mental Health</u>		
Psychological or emotional condition (2011)	15.6%	15.1%
Suicide per 100,000 (2007-2013)	14.5	11.6
Deliberate self-harm per 100,000 (2012)	401.1	314.7
<u>5 Year Standardised Mortality Rates</u>		
All deaths – all ages	536.1	643.1
Deaths heart disease and stroke – all ages (2008-2012)	180.4	215.5
Deaths cancer – all ages (2008-2012)	166.9	188.6
Deaths respiratory disease – all ages (2008-2012)	51.8	81.6

Sources: (IPH, n.d.) (Lenus, 2015) (Lenus, 2015)

Local Residents & Community

Sensitive Aspect

Human Health

Topic

7.2.2.4

7.2.2.5 Cumulative Information Baseline Characteristics - Importance of Local Residents & Community

In the absence of good physical, mental and social health and wellbeing, individuals and communities become limited in achieving their full potential. Therefore, achieving and maintaining good health and wellbeing through prevention techniques rather than treatment is of utmost importance. In addition to the clear benefits of good health on an individual and community scale, healthy lifestyles and behaviours contribute to relieving any unnecessary burden on healthcare services across Ireland to maintain good quality, access, value, standards of care and patient outcomes.

7.2.2.6 Cumulative Information Baseline Characteristics - Sensitivity of Local Residents & Community

Individuals are considered more sensitive if there is an existing burden of poor health within the area, or there is a dominantly older or younger demographic. The age structure presented in Graph 7-1 is generally very similar to the national average but shows the most significant differences in the youngest and oldest age categories, where there is a higher proportion of those aged 0-4, 10-14, and 75-80+ in North Tipperary compared to the national average. In addition, the health baseline presented in Table 7-8 shows a higher existing burden of poor health in comparison to the national average. Overall, this suggests that the community surrounding the UWF Replacement Forestry are marginally more sensitive to changes to environmental and socio-economic health pathways than the average population in Ireland, potentially resulting in disproportionate health effects. This spatial sensitivity taken into account within the health assessment.

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

Between 2011 and 2016, population growth in County Tipperary (North and South) has been only 0.5% which is lower than the national average of 3.8% (CSO, 2016). Following this trend, in a do-nothing scenario it would be expected that levels of population growth would be minimal by the commencement of construction or operation.

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

The trends identified will not significantly change by the time the construction or operation phases commence. Therefore, it is assumed in this report that the baseline environment identified above will be the receiving environment.

7.2.3 Cumulative Information: PROJECT DESIGN MEASURES for Local Residents & Community

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 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**.

7.2.4 Cumulative Information: EVALUATION OF IMPACTS to Local Residents & Community

It is evaluated that **UWF Replacement Forestry has no potential to cause impacts to Local Residents & Community**, see Section 7.2.1.

This Section evaluates the likely cumulative effects of the Other Elements of the Whole UWF Project and of Other Projects or Activities.

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) - Local Residents & Community.

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

Table 7-8: List of all Impacts included and excluded from the Impact Evaluation Table sections

<u>Impacts Included</u> (Evaluated in the Impact Evaluation Table sections)	<u>Impacts Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Increased employment which is a wider determinant of health (construction stage)	Potential impact on health as a result of contamination of well water supplies (construction stage)
	Potential impact upon cardiovascular and respiratory health from changes to air quality (construction stage)
	Potential impact upon mental health (from stress, annoyance and sleep disturbance) and as a consequence, impact on cardiovascular health associated with exposure to noise and vibration (construction stage)
	Increased risk of injury from road traffic accidents (construction stage)
	Increased employment which is a wider determinant of health (operational stage)
	Potential impact upon mental health (from stress, annoyance and sleep disturbance) and as a consequence, impact on cardiovascular health associated with exposure to noise and vibration (operational stage)
	Potential impact on health as a result of exposure to EMF (operational stage)
	Increased risk of injury from road traffic accidents (operational stage)

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Table in the next section. **The Impact Evaluation Table is presented in the following Section 7.2.4.1.**

The source-pathway-receptor links and the rationale for impacts excluded are described in the section directly after the Impact Evaluation Table section, in Section 7.2.4.2

7.2.4.1 Impact Evaluation Table: Increased Employment

Evaluation of UWF Replacement Forestry Excluded: As impacts to the local employment will be Neutral, any indirect human health effects as a result of local employment associated with the UWF Replacement Forestry will be neutral, and consequently this project 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 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: Construction contracts

Impact Pathway: Financial transactions

Impact Description: An increase in direct employment within the study area which is associated with individual financial welfare, and also results in secondary induced spending in the local economy.

Impact Quality: Positive

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

Element 1: UWF Grid Connection

Impact Magnitude: There will be approximately 100 people working directly on the UWF Grid Connection element of the project over the course of the construction phase

Significance of the Impact: Slight positive

Rationale for Impact Evaluation:

- Income and employment are key determinants of health. In this instance, the direct employment opportunities offered during the construction phase are temporary but still represent a minor positive effect on health from direct income and employment, with residual indirect and diffuse benefits at the regional and local level.

Element 2: UWF Related Works

Impact Magnitude: There will be approximately 5 people working directly on the UWF Related Works element of the project over the course of the construction phase.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- Income and employment are key determinants of health. In this instance, the direct employment opportunities offered during the construction phase are minor temporary, but still represent a health benefit at the individual level, with residual indirect and diffuse socio-economic health benefits.

Element 4: Consented Upperchurch Windfarm

Impact Magnitude: There will be approximately 100 people working directly on the Upperchurch Windfarm element of the project over the course of the construction phase.

Local Residents & Community	Sensitive Aspect	Significance of the Impact: Slight positive
		<u>Rationale for Impact Evaluation:</u> Income and employment are key determinants of health. In this instance, the direct employment opportunities offered during the construction phase are temporary but still represent a minor positive effect on health from direct income and employment, with residual indirect and diffuse benefits at the regional and local level.
		Element 5: UWF Other Activities – <i>N/A, evaluated as excluded, see Section 7.2.2.2.1</i>
		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. <u>There is no potential for cumulative effects with the UWF Replacement Forestry</u>).
		Bunkimalta Windfarm (consented)
		Impact <u>Magnitude</u> : As per Chapter 6 Population: it is estimated that there will be approximately 130 people working directly on the Bunkimalta Windfarm project (including the grid connection) over the course of its construction period.
		Significance of the Impact: Slight positive
		<u>Rationale for Impact Evaluation:</u> Income and employment are key determinants of health. In this instance, the direct employment opportunities offered during the construction phase are temporary but still represent a minor positive effect on health from direct income and employment, with residual indirect and diffuse benefits at the regional and local level.
		Evaluation of Cumulative Impacts – Increased Employment
Human Health	Topic	All Elements of the Whole UWF Project
		<u>Cumulative Impact Magnitude:</u> Overall, there will be approximately 200 people working directly on the UWF Grid Connection and the UWF Related Works and the Upperchurch Windfarm over the course of the construction phase.
		Significance of the Cumulative Impact: Slight Positive
		<u>Rationale for Cumulative Impact Evaluation:</u> Income and employment are key determinants of health. The cumulative direct employment opportunities offered during the construction phase are temporary but support job security; and represent a minor positive effect on health from direct income and employment, with residual indirect and diffuse benefits at the regional and local level.
		All Elements of the Whole UWF Project with Other Projects or Activities
		<u>Cumulative Impact Magnitude:</u> Overall, there will be approximately 330 people working directly on the Whole UWF Project and the Bunkimalta Windfarm project during their construction periods.
		Significance of the Cumulative Impact: Imperceptible Positive
		<u>Rationale for Cumulative Impact Evaluation:</u> The temporary duration of the construction stage, in the context of the larger Cumulative Evaluation Study Area.

7.2.4.2 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 7-9 below.

Table 7-9: Description and Rationale for Excluded Impacts to Local Residents & Community

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</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
Construction Stage				
Contamination of water supply	1, 2, 4	Water	Potential impact on health as a result of contamination of well water supplies	Rationale for Excluding: No likely health impacts As stated in Chapter 11 (Water) there are small volumes of potential contamination sources on-site (stored fuels and oils). In addition, appropriate project design measures will be put in place during the construction phase and it was considered by the authors of Ch.11 Water that effects to water supply are not likely to occur. As a result, health effects caused by contaminated water are also not likely to occur.
Air quality impacts from vehicle emissions and dust (PM ₁₀ and PM _{2.5})	1, 2, 4	Air	Potential impact upon cardiovascular and respiratory health	Rationale for Excluding: Neutral health impacts According to IAQM guidelines, the sensitivity of the surrounding area to human health impacts is Low and the majority of residential properties are greater than 50m away from construction works or construction haul routes. In addition, background levels of pollutants are significantly below relevant EU limit values set for the protection of human health. As a result, any impact to air quality during the construction phase will be temporary, intermittent and not of a concentration or exposure to quantify any adverse health outcome to local residents or members of the community.
Noise impacts from machinery	1, 2, 4	Air	Potential impact upon mental health (from stress, annoyance and sleep disturbance) and as a consequence, impact on cardiovascular health	Rationale for Excluding: Neutral health impacts, The nature of construction noise will be temporary and intermittent. Noise generated from construction activities (measured at the façade of dwellings) has potential to exceed the NRA threshold limits over a period of 2-3 days at a small number of houses, the threshold limits will not be exceeded at other house locations, and any increases in noise will be temporary. Noise level impacts will be reduced through project design measures such as limiting working hours to daytime hours only (07:00-19:00hrs Monday to Friday and 08:00-16:30hrs on Saturday), along with the control of sequencing of works in the Knockmaroe/Knockcurraghbola to ensure only one Element is being constructed at any one time within 350m of a residence. Although not planned, any construction works that take place between 19:00 and 22:00 (Monday to Friday), 08:00 to 16:30 (Sunday and bank holidays), or at any other time, will require

Local Residents & Community	Sensitive Aspect	Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
						the explicit permission of the relevant local authority unless in an emergency and will be limited to 60 LAeq _(1 hour) dB. As a result, noise generated during the construction phase presents limited opportunity for any risk of annoyance or sleep disturbance, and when considered in the context of the very short duration of works within close proximity to any property. It is considered that there will be Neutral health effects to local residents or community.
Human Health	Topic	Construction traffic and road works along haul routes	1, 2, 4	Roads	Increased risk of injury from road traffic accidents	Rationale for Excluding: No likely health impacts As per Chapter 15: Material Assets (Roads), the local and regional roads in the study area are very lightly trafficked, with no records of serious traffic accidents on any of the roads. The speeds recorded during traffic counts were well below to allowable limits (80km) on most of the roads in the area. Construction traffic will not add substantial volumes of traffic, and in excess of 95% of road capacity will remain available. In addition, road safety has been designed into the project through the use of appropriate advance warning signage, flagmen and traffic management measures. As a result and in summary, any changes to traffic flows as a result of the construction phase will be temporary, appropriately managed and as a result the increased risk of injury from road traffic accidents will be Neutral.
		Operational Stage				
		Employment opportunities	1, 2, 4	Financial transactions		Rationale for Excluding: Neutral health impacts Employment levels during the operational phase are very low for the UWF Grid Connection (c. 17 man days per year), UWF Related Works (c. 3 man days per year) and Upperchurch Windfarm (8 permanent jobs). Consequently, there will be a positive impact to financial prosperity important to socio-economic health and wellbeing, albeit not of a magnitude sufficient to assess at a population level.
		Noise impacts from the Mountphilips Substation, the Consented UWF Substation, and the Consented UWF Turbines	1, 2, 4	Air	Potential impact upon mental health (from stress, annoyance and sleep disturbance) and as a consequence, impact on cardiovascular health	Rationale for Excluding: No likely health impacts <u>UWF Grid Connection:</u> There are 6 local residences within 400m of the Mountphilips Substation; the nearest of these is 385m to the east of the substation along the L2166-0 local road. A noise level of 60dB(A) was measured at 5m away from a representative substation, which has been calculated to result in a worst case noise level of 22dB(A) at 385m; this is below the background noise threshold of 35dB(A) for low background noise locations. The WHO states that "Guideline values for annoyance have been set at 50-55dB(A), representing daytime levels below which a majority of the adult population will be protected

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				from becoming moderately or seriously annoyed, respectively". As the worst case noise level at 385m will be well below the 50dB(A) WHO guideline, it is expected that there will be no annoyance or consequential health impact as a result of the operation of the existing Mountphilips Substation. <u>UWF Related Works:</u> No noise will be omitted by the operational Telecom Relay Pole or by any other part of the UWF Related Works. <u>Upperchurch Windfarm:</u> The consented UWF Substation will emit a similar level of noise as the Mountphilips Substation. The nearest residence to the UWF Substation is similarly just less than 400m away and is the only residence within 400m from the Consented UWF Substation. In relation to the operational turbines, as stated in the RFI 2013, there are approximately 93 dwellings within 900m of the cConsented UWF Turbines. Despite an increase in ambient noise levels as a result of the operational Consented UWF Turbines, the level of increase will remain within permitted levels for the most part, and in any case will be lower than WHO guideline values for annoyance, even in a worst case scenario. The Grant of Permission explicitly states that "subject to compliance with the conditions set out below, the proposed development would not seriously injure the amenities of the area or of property in the vicinity, would not be prejudicial to public health and would be acceptable in terms of traffic safety and convenience". It is also considered that there is no potential for cumulative effects from all individual project elements as the noise emissions from the UWF Grid Connection (Mountphilips Substation) will not be heard in the same places as noise emissions from the Upperchurch Windfarm.
Operational transmission of electricity	1, 2, 4	Air		Rationale for Excluding: Neutral health impacts There will be some increase in magnetic field levels at the 37 No. local residences and 1 No. community facility (shop) which are within 100m of the 110kV UGC. The worst case increase in levels of magnetic fields at local residences and community facilities within 100m ranged from 0.01μT to 1.79μT. The upper limit would apply where the houses are closest to the UWF Grid Connection in Kilcommon. There are 5 No. local residences which are within 100m of both the 110kV UGC and the Internal Windfarm Cabling in the Knockmaroe and Knockcurraghboola Commons area. At these residences the cumulative, worst case increase in magnetic fields will be 0.182μT, which will increase ambient magnetic fields at the closest local residences to 0.382μT.

Local Residents & Community

Sensitive Aspect

Human Health

Topic

Local Residents & Community

Sensitive Aspect

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				The worst case in-combination ambient magnetic field levels due to both the UWF Grid Connection and the existing overhead line network relates to 1 No. local residence in Coole which is within 100m of both the existing 220kV and the 110kV UGC, worst case EMF would be 0.99μT. All of these worst case levels remain significantly below the more conservative International Commission on Non-Ionizing Radiation Protection (ICNIRP) magnetic field reference level of 100μT (ICNIRP, 1998). As a result, it is expected that there will be a Neutral impact to human health.
Operational traffic and road works along haul routes	1, 2, 4	Roads	Increased risk of injury from road traffic accidents	Rationale for Excluding: No likely health impacts As per Chapter 15: Material Assets (Roads), the local and regional roads in the study are very lightly trafficked, with no records of serious traffic accidents on any of the roads. The speeds recorded during traffic counts were well below to allowable limits (80km) on most of the roads in the area. Operational traffic associated with the UWF Grid Connection, UWF Related Works and the Upperchurch Windfarm will add negligible volumes of traffic to the local road network (either individually or cumulatively). In addition, the vast majority of vehicle journeys will be by van or four wheel drive vehicle. As a result and in summary, any changes to traffic flows as a result of the operation phase will cause no effect on the risk of injury from road traffic accidents.
Decommissioning Stage				
Rationale for Excluding: Neutral impacts No decommissioning of the UWF Grid Connection. Decommissioning activities associated with the UWF Related Works or the Upperchurch Windfarm will be minimal, temporary, intermittent, and will only be taking place during the day time, no health impacts are expected.				

Human Health

Topic

7.2.5 Mitigation Measures for Impacts to Local Residents & Community

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 adverse health impacts** to occur to Local Residents & Community as a consequence of the UWF Replacement Forestry.

7.2.6 Evaluation of Residual Impacts to Local Residents & Community

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 7.2.1), i.e. **no potential for adverse health impacts**.

7.2.7 Application of Best Practice and the EMP for Local Residents & Community

No UWF Replacement Forestry Best Practice Measures have been developed specifically for Local Residents & Community.

7.2.8 Summary of Impacts to Local Residents & Community

The topic authors conclude that there is no potential for UWF Replacement Forestry to cause impacts to Local Residents & Community.

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 7-10: Summary of the impacts to Local Residents & Community

Impact to Local Residents & Community:	Increased Employment
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Section 7.2.4.1</i>
<i>Project Life-Cycle Stage (for Other Elements only)</i>	<i>Construction Stage</i>
<u>UWF Replacement Forestry</u>	No Potential for Impact - Evaluated as Excluded, see Section 7.2.1
Element 1: UWF Grid Connection	Slight (positive)
Element 2: UWF Related Works	Imperceptible (positive)
Element 4: Upperchurch Windfarm	Slight (positive)
Element 5: UWF Other Activities	No Potential for Impact - Evaluated as Excluded, see Section 7.2.2.1
<u>Cumulative Impact:</u> (Other Elements only)	
All <u>Other Elements</u> of the Whole UWF Project	Slight (positive)
All <u>Other Elements</u> of the Whole UWF Project <u>and</u> Other Projects or Activities Bunkimalta Windfarm	Imperceptible (positive)

(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.

7.3 Sensitive Aspect No.2: Kilcommon National School

This Section provides a description and evaluation of the Sensitive Aspect - Kilcommon National School.

7.3.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

7.3.1.1 Baseline Characteristics of Kilcommon National School in relation to UWF Replacement Forestry

Kilcommon National School is located within the village of Kilcommon and ED of Foilnahan. Kilcommon National School is a small 2-teacher school with currently 43 pupils. Children range from Junior Infants up to 6th Class.

7.3.1.2 Evaluation of UWF Replacement Forestry

UWF Replacement Forestry was evaluated for its potential to cause impacts to Kilcommon National School.

It was evaluated by the topic authors that UWF Replacement Forestry has no potential to cause impacts to **Kilcommon National School**, for the following reasons:

- Due to the separation distance between the UWF Replacement Forestry planting areas and Kilcommon National School and the absence of heavy-vehicle delivery traffic associated with the UWF Replacement Forestry.

7.3.1.3 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 Kilcommon National School by itself, and therefore 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 evaluations for the Other Elements of the Whole UWF Project are included in Section 7.3.2 to Section 7.3.4 and included in the summary table in Section 7.3.8 in order to show the totality of the project.

7.3.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

7.3.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Kilcommon National School 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 7.3.2.2.1** below.

The evaluation of cumulative impacts to Kilcommon National School 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 Kilcommon National School 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 A2.3.7)**.

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 Kilcommon National School.

7.3.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area is described in Table 7-11.

Table 7-11: Cumulative Evaluation Study Area for Kilcommon National School

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	In order to evaluate cross-factor effects, the same geographical boundaries were used for Human Health as those used for Chapter 12: Air (Local Residents & Community), Chapter 14: Material Assets – Built Services (Local Residents & Community) and Chapter 15: Material Assets - Roads (Road Users) thereby enabling the Human Health section to appraise the potential cumulative changes in air quality, ambient noise, vibration or EMF levels, and any combination effects to built services or cumulative effects to road safety.	
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities	Not Relevant – No Other Projects or Activities were scoped in for evaluation of cumulative effects.	

7.3.2.2.1 Potential for Impacts to Kilcommon National School

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 Kilcommon National School. The results of this evaluation are included in Table 7-12.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on **Figure CE 7.3: Kilcommon National School within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 7-12: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Elements 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>Evaluated as excluded</u> : No potential for effects due to the separation distance between the UWF Related Works areas and Kilcommon National School, additionally no traffic associated with the UWF Related Works will pass by the school
Element 4: Upperchurch Windfarm (UWF)	<u>Evaluated as excluded</u> : No potential for effects due to the separation distance (more than 2km) between the Upperchurch Windfarm turbines, substation and works areas and Kilcommon National School, additionally no heavy-vehicle traffic associated with the Upperchurch Windfarm will pass by the school.
Element 5: UWF Other Activities	<u>Evaluated as excluded</u> : No potential for effects due to Neutral effects to Population, Water, Air and Road Users as a consequence of the UWF Other Activities, and due to the separation distance between the UWF Other Activity locations and Kilcommon National School, and the absence of heavy-vehicle delivery traffic.

7.3.2.3 Cumulative Information: Baseline Characteristics – Context & Character**7.3.2.3.1 Element 1: UWF Grid Connection**

Kilcommon National School is a small 2-teacher school with currently 43 pupils. Children range from Junior Infants up to 6th Class.

Kilcommon National School is located within the village of Kilcommon and ED of Foilnaman. The UWF Grid Connection passes approximately 150m away from the school, materials delivering concrete and aggregate to the UWF Grid Connection works areas in the Kilcommon area will pass by the school on the L2266-11 local road.

The location of Kilcommon National School is identified on Figure GC 7.3: Kilcommon National School within the UWF Grid Connection Study Area. **Figure GC 7.3** is part of the EIA Report for the UWF Grid Connection, and is included in **Volume E: Reference Documents** with this planning application.

7.3.2.3.2 Element 2: UWF Related Works

Not applicable – Element evaluated as excluded. See Section 7.3.2.2.1.

7.3.2.3.3 Element 4: Already Consented Upperchurch Windfarm

Not applicable – Element evaluated as excluded. See Section 7.3.2.2.1

7.3.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 7.3.2.2.1

Kilcommon National School Sensitive Aspect	7.3.2.3.5 Other Projects or Activities
	Not applicable – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 7.3.2.1.
	7.3.2.4 Cumulative Information Baseline Characteristics - Importance of Kilcommon National School
	Staying healthy while growing up is particularly important. Resilience is imperative to help deal with the stress and pressure of life as a child all the way up to becoming a young adult. In addition, any healthy behaviours adopted when young, will help to stay in good health later in life while unhealthy behaviours will achieve the opposite.
	7.3.2.5 Cumulative Information Baseline Characteristics - Sensitivity of Kilcommon National School
Human Health Topic	As Kilcommon National School largely consists of a younger demographic, it is considered more sensitive. In addition, if the school is located within an area where there is an existing burden of poor health, this can contribute to the children’s susceptibility to adverse health consequences as a result of change. The health baseline presented in Table 7-7 shows a slight existing burden of poor health in comparison to the national average. Overall, this suggests that Kilcommon National School is marginally more sensitive to changes in the environment than the average population in Ireland, potentially resulting in disproportionate health effects.
	7.3.2.6 Cumulative Information Baseline Characteristics - Trends in the Baseline Environment (the ‘Do-Nothing’ scenario)
	Consultation with the school Principal, indicates that the number of children attending the school should continue at the current level over the next 5 years. Therefore, in a do-nothing scenario, it is expected that there would be no change in the number of children attending at Kilcommon National School.
	7.3.2.7 Cumulative Information Baseline Characteristics - Receiving Environment (the Baseline + Trends)
	Any changes to the baseline environment are anticipated to occur slowly. Therefore, it is assumed that the baseline environment identified above will be the receiving environment of the commencement of the construction or operational phases of the UWF Grid Connection.

7.3.3 Cumulative Information: PROJECT DESIGN MEASURES for Kilcommon National School

Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project (in particular 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 be found in this EIA Report in **Appendices 5.3 in Volume C4: EIA Appendices**.

7.3.4 Cumulative Information: EVALUATION OF IMPACTS to Kilcommon National School

It is evaluated that **UWF Replacement Forestry has no potential to cause impacts to Kilcommon National School**, see Section 7.3.1.

This Section evaluates the likely cumulative 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) - Kilcommon National School.

As a result of the exercise, no impacts were included for evaluation – all impacts were excluded from further evaluation.

Table 7-13: 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 for Further Evaluation	<i>Potential impact on health as a result of contamination of well water supplies (construction stage)</i>
	<i>Potential impact upon cardiovascular and respiratory health from changes to air quality (construction stage)</i>
	<i>Potential impact upon mental health (from stress, annoyance and sleep disturbance) and as a consequence, impact on cardiovascular health associated with exposure to noise and vibration (construction stage)</i>
	<i>Increased risk of injury from road traffic accidents (construction stage)</i>
	<i>Potential impact upon mental health (from stress, annoyance and sleep disturbance) and as a consequence, impact on cardiovascular health associated with exposure to noise and vibration (operational stage)</i>
	<i>Increased risk of injury from road traffic accidents (operational stage)</i>
	<i>Potential impact on health as a result of exposure to EMF (operational stage)</i>

The source-pathway-receptor links and the rationale for excluded impacts are described in Section 7.3.4.1.

7.3.4.1 Cumulative Information: Description and Rationale for Excluding(scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 7-14 below.

Table 7-14: Description and Rationale for Excluded Impacts to Kilcommon National School

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) Impacts
Construction Stage				
Contamination of water supply	1	Water	Potential impact on health as a result of contamination of public water supplies	Rationale for Excluding: No potential for health impacts The Kilcommon National School water supply is via the piped Irish Water public supply, as stated in Chapter 14: Material Assets (Built Services - Water Supply) due to UWF Grid Connection project design measures there is no likelihood of any impacts to this water supply. As a result, health effects caused by contaminated water are also not likely to occur.
Air quality impacts from vehicle emissions and dust (PM10 and PM2.5)	1	Air	Potential impact upon cardiovascular and respiratory health	Rationale for Excluding: No potential for health impacts According to IAQM guidelines, the sensitivity of the surrounding area to human health impacts is Low and, although the school is located along a construction material haul route for UWF Grid Connection, the school is greater than 50m away from construction works. In addition, background levels of pollutants are significantly below relevant EU limit values set for the protection of human health. As a result, any impact to air quality during the construction phase will be temporary, intermittent and not of a concentration or exposure to quantify any measurable health outcome to children or teachers at the school.
Noise impacts from machinery	1	Air	Potential impact upon mental health (from stress and annoyance) and as a consequence, impact on cardiovascular health	Rationale for Excluding: Neutral health impacts Noise generated during the construction phase presents limited opportunity for any risk of annoyance, and when considered in the context of the intervening distance of 130m between the school and the construction works, it is considered that health effects to children and teachers at Kilcommon National School will be neutral.
Construction traffic and road works along haul routes	1	Roads	Increased risk of injury from road traffic accidents	Rationale for Excluding: No likely health impacts As per Chapter 15: Material Assets (Roads), the local roads in the study are very lightly trafficked, with no records of serious traffic accidents on any of the

				roads. The speeds recorded during traffic counts were well below to allowable limits (80km) on most of the roads in the area. Construction traffic will not add substantial volumes of traffic, and in excess of 95% of road capacity in the vicinity of Kilcommon National School will remain available. In addition, road safety has been designed into the project through scheduling of deliveries past the school to take place outside of school drop-off/pick-up times. As a result and in summary, any changes to traffic flows as a result of the construction phase will be temporary, appropriately managed and as a result does not represent any increased risk of injury to school children or teachers at Kilcommon National School from road traffic accidents.
Operational Stage				
Noise impacts from the Mountphilips Substation, the Consented UWF Substation, and the Consented UWF Turbines	1	Air	Potential impact upon mental health (from stress or annoyance) and as a consequence, impact on cardiovascular health	Rationale for Excluding: No potential for health impacts Kilcommon National School is not located within 400m of the Mountphilips Substation, and is located greater than 2km from Upperchurch Windfarm. As a result, there will be no increase in noise levels due to these parts at Kilcommon National School, and therefore there is no potential for health impacts to children or teachers at this school.
Operational traffic and road works along haul routes	1	Roads	Increased risk of injury from road traffic accidents	Rationale for Excluding: No likely health impacts As per Chapter 15: Material Assets (Roads), operational traffic associated with the UWF Grid Connection will add negligible volumes of traffic to the local road network (either individually). In addition, the vast majority of vehicle journeys will be by van or four wheel drive vehicle. As a result and in summary, any changes to traffic flows as a result of the operation phase will cause no effect on the risk of injury to children or teachers at Kilcommon National School from road traffic accidents.
Operational transmission of electricity	1	Air	Potential impact on health as a result of exposure to EMF	Rationale for Excluding: No health impacts As per Chapter 12: Air, increases in EMF at distances beyond 100m from the 110kV UGC will be neutral. Kilcommon National School is greater than 130m from the 110kV UGC, as a result, it is expected that there will be no potential for impacts to human health.
Decommissioning Stage Effects				
There is no potential for decommissioning effects as the UWF Grid Connection will not be decommissioned.				

Kilcommon National School

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Kilcommon National School	7.3.5 Mitigation Measures for Impacts to Kilcommon National School	
	Mitigation measures are not relevant as there is no potential for UWF Replacement Forestry to cause impacts to Kilcommon National School.	
Sensitive Aspect	7.3.6 Evaluation of Residual Impacts to Kilcommon National School	
	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 7.3.1), i.e. no potential for impacts .	
Topic	7.3.7 Application of Best Practice and the EMP for Kilcommon National School	
	No UWF Replacement Forestry Best Practice Measures have been developed specifically for Kilcommon National School.	
Human Health		

7.3.8 Summary of Impacts to Kilcommon National School

The topic authors conclude that there is no potential for UWF Replacement Forestry to cause impacts to Kilcommon National School.

Table 7-15: Summary of the impacts to Kilcommon National School

Impact to Kilcommon National School:	-
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Section 7.3.4.1</i>
Project Life-Cycle Stage (for Other Elements only)	All
<u>UWF Replacement Forestry</u>	No Potential for Impacts Evaluated as Excluded - see Section 7.3.1
Element 1: UWF Grid Connection	Neutral
Element 2: UWF Related Works	No Potential for Impact - Evaluated as Excluded, see Section 7.3.2.2.1
Element 4: Upperchurch Windfarm	No Potential for Impact - Evaluated as Excluded, see Section 7.3.2.2.1
Element 5: UWF Other Activities	No Potential for Impact - Evaluated as Excluded, see Section 7.3.2.2.1
<u>Cumulative Impact:</u>	
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 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 were evaluated as having potential to cause cumulative effects to Kilcommon National School with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 7.3.2.1).

Kilcommon National School
Sensitive Aspect

Human Health
Topic

7.4 Sensitive Aspect No.3: Transient People

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

7.4.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

7.4.1.1 Baseline Characteristics of Transient People in relation to UWF Replacement Forestry

Transient people represent those who may work in or visit the area such as farm and forestry workers, road users, walkers and other recreational users.

The surrounding rural area of the UWF Replacement Forestry is comprised of agricultural land and countryside, with a number of minor roads and waymarked trails. Specifically, in relation to waymarked trails, the Ormond Way (cycle) is routed along the local public road, from which access will be gained to the UWF Replacement Forestry land.

7.4.1.2 Evaluation of UWF Replacement Forestry

UWF Replacement Forestry was evaluated for its potential to cause impacts to Transient People.

It was evaluated by the topic authors that UWF Replacement Forestry has no potential to cause **any adverse health impacts** to **Transient People**, as there will be:

- no material impact on air quality, noise or vibration: as per [Chapter 12: Air, Section 12.3.2.2.1](#), planting works associated with UWF Replacement Forestry will have a neutral impact on air quality as works will be carried out by hand using spades, with use of vehicles limited to personnel 4WD vehicles. There will be no mechanical noise or vibration sources during planting stage, as planting will be carried out by hand in grassland fields, therefore no noise or vibration impact will occur. During the growth stage, chainsaws may be used during thinning activities, however this type of activity will be infrequent, brief in nature and at a distance from Transient People. Potential exposure of Transient People to environmental health pathways are therefore not of a magnitude, timing or duration to cause impacts to local community health during any planting or thinning activities.
- no EMF emissions: there are no electrical or radio-communication parts associated with the UWF Replacement Forestry. Therefore, the UWF Replacement Forestry will not influence local EMF or result in any change in exposure, with no impact to health.
- extremely low traffic volumes: as per [Chapter 15: Roads & Road Users, Section 15.3.2.2.1](#), the planting programme will generate extremely low traffic volumes, with 1-2 vehicles movements per day over a one month period. As a comparative example this level of traffic is substantially less than the daily level of traffic generated by a single residential dwelling. During the growth stage, traffic will be in the region of 2 to 4 vehicle movements per year. Due to the extremely low traffic volumes associated with the UWF Replacement Forestry, it is considered that Neutral effects will occur to Road Users on the local roads in the vicinity, with no impacts to the health of any Transient People who may be using the roads.

Transient People	7.4.1.3 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 <u>no potential to cause impacts to Transient People</u> by itself, and therefore cannot have a cumulative effect. However, the Other Elements must be considered because UWF Replacement Forestry is part of a whole project. Therefore, the <u>cumulative information and evaluations for the Other Elements of the Whole UWF Project</u> are included in Section 7.4.2 to Section 7.4.4 and included in the summary table in Section 7.4.8 in order to <u>show the totality of the project</u>.
Sensitive Aspect	
Human Health	
Topic	

7.4.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics**7.4.2.1 Overview of Other Elements, Other Projects or Activities**

The evaluation of cumulative impacts to Transient People 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 7.4.2.2.1** below.

The evaluation of cumulative impacts to Transient People 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 Transient People 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. 7)**.

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative health effects to Transient People 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 Transient People.

7.4.2.2 Cumulative Evaluation Study Area

The Cumulative Evaluation Study Area is described in Table 7-16.

Table 7-16: Cumulative Evaluation Study Area for Transient People

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	In order to evaluate cross-factor cumulative effects, the same geographical boundaries were used for Human Health as those used for Chapter 12: Air (Transient People), and Chapter 15: Material Assets - Roads (Road Users).	The geographic boundaries are consistent with Chapter 12: Air (Local Residents & Community), and Chapter 15: Material Assets - Roads (Road Users) thereby enabling the Human Health section to appraise the potential cumulative changes in air quality, and ambient levels of noise, vibration or EMF, and in-combination effects to road safety.
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities	Not Relevant – No Other Projects or Activities were scoped in for evaluation of cumulative effects.	

7.4.2.2.1 Potential for Impacts to Transient People

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 Transient People. The results of this evaluation are included in Table 7-17.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on [Chapter 12: Air \(Figure CE 12.3\)](#), [Chapter 15: Material Assets \(Roads\) \(Figure CE 15.3\)](#). (Volume C3 EIAR Figures).

Table 7-17: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Elements 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	Evaluated as excluded: No potential for any adverse health impacts to Transient People, as there will be: no material impact on air quality, noise or vibration: as per Chapter 12: Air, Section 12.3.2.2.1, any emissions from vehicles and equipment used will be of a short duration, transient in nature, and the relative change in air quality will be orders of magnitude lower than is required to quantify any material impact on health, any noise or vibration emitted by machinery or vehicles used to carry out the UWF Other Activities, will be in the context of background noise and vibration from regional or national roads, or will not be noticeable in the context of local traffic and farming activity. Notwithstanding the very low magnitude and brief duration of UWF Other Activities, any exposure of Transient People to dust, noise or vibration will be of a momentary duration as a person passes in close proximity to works, and therefore no impacts to health are likely to occur. No EMF emissions: there are no electrical or radio-communication parts associated with the UWF Other Activities. On this basis, there is no potential for changes in exposure to EMF, and no risk to health. extremely low traffic volumes: as per Chapter 15: Material Assets (Roads), Section 15.3.2.2.1, the traffic increases as a result of the Haul Route Activities (tree trimming, laying of matting, street furniture removal), will be in all cases considerably less than 1% of the current traffic volumes on these roads. Given that the normal day-to-day variation in traffic conditions can be as much as 10%, the relative change is not of a level to quantify any impact on health. In addition, no works to the road network or road boundaries form part of the Overhead Line Activities or the Upperchurch Hen Harrier Scheme or Monitoring Activities, and taking into consideration the extremely low volumes of traffic associated with these activities, and the brief duration of any public road use, no effects to Road Users are likely, consequently there will be no impacts to the health of any Transient People who may be using the local roads.

7.4.2.3 Cumulative Information: Baseline Characteristics – Context & Character

Transient people represent those who may work in or visit the area such as farm and forestry workers, road users, walkers and other recreational users.

The surrounding rural area of the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm is comprised of agricultural land and countryside, with a number of minor roads and waymarked trails. Here, there is the potential for transient people to be present who are travelling, present for recreation purposes, or undertaking work on the land.

7.4.2.3.1 Element 1: UWF Grid Connection

Specifically, in relation to waymarked trails, the Slievefelim Way, Kilcommon Pilgrim Loop and Ormond Way (cycle) are routed through the UWF Grid Connection study area, see Figure GC 7.4: Transient People in the UWF Grid Connection Study Area. **Figure GC 7.4** is part of the EIA Report for the UWF Grid Connection, and is included in **Volume E: Reference Documents** with this planning application.

7.4.2.3.2 Element 2: UWF Related Works

Specifically, in relation to waymarked trails, the Eamonn a Chnoic Loop, Ormond Way (walking and cycle) are routed through the UWF Related Works study area, see Figure RW 7.4: Transient People in the UWF Related Works Study Area. **Figure RW 7.4** is part of the EIA Report for the UWF Grid Connection, and is included in **Volume E: Reference Documents** with this planning application.

7.4.2.3.3 Element 4: Already Consented Upperchurch Windfarm

Walkers may also be present on the Eamonn a Choic Loop or Ormond Way walking route, which is currently under development, where these walks are routed through the consented Upperchurch Windfarm.

7.4.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 7.4.2.2.1

7.4.2.3.5 Other Projects or Activities

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 7.4.2.1.

7.4.2.4 Cumulative Information Baseline Characteristics - Importance of Transient People

In the absence of good physical, mental and social health and wellbeing, individuals and communities become limited in achieving their full potential. Therefore, achieving and maintaining good health and wellbeing through prevention techniques rather than treatment is of utmost importance. In addition to the clear benefits of good health on an individual and community scale, healthy lifestyles and behaviours contribute to relieving any unnecessary burden on healthcare services across Ireland to maintain good quality, access, value, standards of care and patient outcomes

7.4.2.5 Cumulative Information Baseline Characteristics - Sensitivity of Transient People

It is difficult to obtain demographic and health status data for visitors classified as transient people as their origin is unknown. However, visitors to the area (for walking, bird watching etc.) will only be exposed to changes in the environment associated with the Whole UWF Project temporarily and as a result, are not considered particularly sensitive.

Individuals who live and work on the land, such as farmers, will also be temporarily exposed to changes in the environment associated with the Whole UWF Project. It should be noted that recent research suggests that farmers are 7 times more at risk to mortality from circulatory diseases than other occupation groups

(IFA, 2012) and as a result are considered marginally more sensitive to changes in the environment than the average population. However, due to the temporary nature of their exposure it persists that farmers are not considered particularly sensitive receptors.

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

As stated in Chapter 6: Population, Fáilte Ireland's Tourism Facts for recent years point to very strong growth in both international and domestic tourist numbers in Ireland. The statistics confirm that walking and hiking have maintained their strong popularity for tourists as overall numbers have grown, and it is likely that the number of walkers using the waymarked trails in the Slievefelim to Silvermines Upland Area will continue to increase slowly over time, notwithstanding that tourists and visitor favour tourism products in South Tipperary over those in North Tipperary.

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

Any changes to the baseline environment are anticipated to occur slowly. Therefore, it is assumed that the baseline environment identified above will be the receiving environment of the commencement of the construction or operational phases of the various Elements of the Whole UWF Project.

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7.4.3 Cumulative Information: PROJECT DESIGN MEASURES for Local Residents & Community

Cumulative Information: There are no Project Design Mitigation Measures specific to Transient People.

7.4.4 Cumulative Information: EVALUATION OF IMPACTS to Transient People

It is evaluated that **UWF Replacement Forestry has no potential to cause impacts to Transient People**, see Section 7.4.1.

This Section evaluates the likely cumulative 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) - Transient People.

As a result of the exercise, no impacts were included for evaluation – all impacts were excluded from further evaluation.

Table 7-18: List of all Impacts included and excluded from the Impact Evaluation Table sections

<u>Impacts Included</u> (Evaluated in the Impact Evaluation Table sections)	<u>Impacts Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
No Impacts were Included for Further Evaluation	<i>Potential impact on health as a result of contamination of well water supplies (construction stage)</i>
	<i>Potential impact upon cardiovascular and respiratory health from changes to air quality (construction stage)</i>
	<i>Potential impact upon mental health (from stress, annoyance and sleep disturbance) and as a consequence, impact on cardiovascular health associated with exposure to noise and vibration (construction stage)</i>
	<i>Increased risk of injury from road traffic accidents (construction stage)</i>
	<i>Increased employment which is a wider determinant of health (construction stage)</i>
	<i>Potential impact upon mental health (from stress, annoyance and sleep disturbance) and as a consequence, impact on cardiovascular health associated with exposure to noise and vibration (operational stage)</i>
	<i>Increased risk of injury from road traffic accidents (operational stage)</i>
	<i>Increased employment which is a wider determinant of health (operational stage)</i>
	<i>Potential impact on health as a result of exposure to EMF (operational stage)</i>

The source-pathway-receptor links and the rationale for excluded impacts are described in Section 7.4.4.1.

7.4.4.1 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 7-19 below.

Table 7-19: Description and Rationale for Excluded Impacts to Transient People

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</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
Construction Stage				
Air quality impacts from vehicle emissions and dust (PM10 and PM2.5)	1, 2, 4	Air	Potential impact upon cardiovascular and respiratory health	Rationale for Excluding: Neutral health impacts According to IAQM guidelines, the sensitivity of the surrounding area to human health impacts is Low and the majority of waymarked trails and agricultural/forestry lands (where workers may be present) are greater than 50m away from construction works or construction haul routes. In addition, background levels of pollutants are significantly below relevant EU limit values set for the protection of human health. As a result, any impact to air quality during the construction phase will be temporary, intermittent and not of a concentration or exposure to quantify adverse health impact to any nearby farm or forestry workers.
Noise impacts from machinery	1, 2, 4	Air	Potential impact upon mental health (from stress or annoyance) and as a consequence, impact on cardiovascular health	Rationale for Excluding: Neutral health impacts The nature of construction noise will be temporary and intermittent. As a result, noise generated during the construction phase presents limited opportunity for any risk of annoyance, and when considered in the context of the very short duration of works within close proximity to any waymarked walks and the linear nature of works in agricultural/forestry lands, it is considered that adverse health effects are not likely to occur to Transient People who may be working or walking close to construction works areas.
Construction traffic and road works along haul routes	1, 2, 4	Roads	Increased risk of injury from road traffic accidents	Rationale for Excluding: No likely health impacts As per Chapter 15: Material Assets (Roads), the local and regional roads in the study are very lightly trafficked, with no records of serious traffic accidents on any of the roads. The speeds recorded during traffic counts were well below to allowable limits (80km) on most of the roads in the area. Construction traffic will not add substantial volumes of traffic, and in excess of 95% of road capacity will remain available. In addition, road safety has been designed into the project through the use of appropriate advance warning signage, flagmen and traffic management measures. As a result and in summary, any changes to traffic flows as a result of the construction phase will be temporary, appropriately managed and as a result does not represent any measurable increased risk of injury to Transient People from road traffic accidents.

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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>
Operational Stage				
Noise impacts from the Mountphilips Substation, Consented UWF Substation, and Consented UWF Turbines	1, 2, 4	Air	Potential impact upon mental health (from stress or annoyance) and as a consequence, impact on cardiovascular health	Rationale for Excluding: Neutral health impacts There are no waymarked trails within 400m of the Mountphilips Substation or the Consented UWF Substation and as a result, there is no potential for health impacts to transient people. Noise will be emitted by the operational UWF Turbines; while turbines will be heard in close proximity by transient people, the noise will not be intrusive (either alone or cumulatively with neighbouring Milestone Windfarm turbines) and as a result there will be a Neutral impact to human health.
Operational traffic and road works along haul routes	1, 2, 4	Roads	Increased risk of injury from road traffic accidents	Rationale for Excluding: No likely health impacts As per Chapter 15: Material Assets (Roads), the local and regional roads in the study are very lightly trafficked, with no records of serious traffic accidents on any of the roads. The speeds recorded during traffic counts were well below to allowable limits (80km) on most of the roads in the area. Operational traffic associated with the UWF Grid Connection, UWF Related Works and the Upperchurch Windfarm will add negligible volumes of traffic to the local road network (either individually or cumulatively). In addition, the vast majority of vehicle journeys will be by van or four wheel drive vehicle. As a result and in summary, any changes to traffic flows as a result of the operation phase is not likely to cause health effects to Transient People from road traffic accidents.
Operational transmission of electricity	1, 2, 4	Air	Potential impact on health as a result of exposure to EMF	Rationale for Excluding: Neutral health impacts As per Chapter 12: Air, Section 12.3.4, the maximum level of EMF in relation to Transient People will be generated on the local road L-2264-50, where some agricultural and forestry lands and a short section of the Ormond Way cycle and walking routes will be within 100m of both the 110kV UGC and the Internal Windfarm Cabling in Knockmaroe/Knockcurraghbola townlands, where the Internal Windfarm Cabling is routed alongside the 110kV UGC. The worst case possible levels will be at public road crossing points or on lands which are directly over the two trenches, where levels will be 55.8 μ T. On the Upperchurch Windfarm site, farm and forestry workers and walkers on the Ormond Way and the Eamonn a Chnoic Loop will be within 100m of both the Internal Windfarm Cabling and the Consented UWF Turbines in close proximity to the turbines. The worst case possible cumulative increase in magnetic field levels will be beside the turbine towers and over Internal Windfarm Cabling, where worst case levels will be 7.8 μ T. The worst case in-combination ambient magnetic field levels due to both the UWF Grid Connection and the existing overhead line network relates farm or forestry

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Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				workers who are within 100m of both the 110kV UGC and the existing 110kV overhead line or within 100m of both the 110kV UGC and the existing 220kV overhead line in Mountphilips, where worst case EMF would be 69µT and 79.7µT respectively, at the points directly above the 110kV UGC and directly under the OHLs. On the consented Castlewaller Windfarm site, worst case EMF would be directly over the intersection of the 110kV UGC and the internal windfarm cables for Castlewaller Windfarm, where worst case EMF would be 56.4 µT. The worst case in-combination ambient magnetic field levels due to both the UWF Grid Connection and the existing overhead line network relates to 1 No. local residence in Coole which is within 100m of both the existing 220kV and the 110kV UGC, worst case EMF would be 0.99µT. These values remain significantly below the more conservative International Commission on Non-Ionizing Radiation Protection (ICNIRP) magnetic field reference level of 100µT (ICNIRP, 1998). As a result, it is expected that there will be no impact to human health.
Decommissioning Stage				
Rationale for Excluding: Neutral impact The UWF Grid Connection will not be decommissioned. Decommissioning activities will be minimal in relation to UWF Related Works and Upperchurch Windfarm and decommissioning activities will be temporary, intermittent, and will only be taking place during the day time.				

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7.4.5 Mitigation Measures for Impacts to Transient People

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 **impacts** to Transient People as a consequence of the UWF Replacement Forestry **will be neutral**.

7.4.6 Evaluation of Residual Impacts to Transient People

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 7.4.1), i.e. **neutral impacts**.

7.4.7 Application of Best Practice and the EMP for Transient People

No UWF Replacement Forestry Best Practice Measures have been developed specifically for Transient People.

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7.4.8 Summary of Impacts to Transient People

The topic authors conclude that no health impacts will occur to Transient People as a consequence of the development of the UWF Replacement Forestry.

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 7-20: Summary of the impacts to Transient People

Impact to Transient People:	-
<i>Impact Evaluation (for Other Elements only)</i>	<i>Section 7.4.4.1</i>
<i>Project Life-Cycle Stage (for Other Elements only)</i>	All
<u>UWF Replacement Forestry</u>	No Impacts Evaluated as Excluded - see Section 7.4.1
Element 1: UWF Grid Connection	Neutral Impacts
Element 2: UWF Related Works	Neutral Impacts
Element 4: Upperchurch Windfarm	Neutral Impacts
Element 5: UWF Other Activities	No Potential for Impact - Evaluated as Excluded, see Section 7.4.2.2.1
<u>Cumulative Impact:</u>	
All Elements of the Whole UWF Project	No Cumulative Impacts

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities were evaluated as having potential to cause cumulative health effects to Transient People with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 7.4.2.1).

7.5 Policy Context

7.5.1 National Policy

There is no specific national policy relating to the impacts of human health as a result of infrastructure development within Ireland

7.5.2 Regional Policy

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 Mid-West Regional Planning Guidelines 2010-2022 (MWRPG) state that to improve the health of the Irish population, a focus on health services alone is inadequate. In addition, potential health consequences must be considered in relation to a range of topics including housing, education, local economy, natural environment, built environment, water, sanitation and air quality.

7.5.3 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 document for the location of all the Project Elements at present.

There is no specific mention of protection of public health in relation to new infrastructure projects such as wind farms and their associated infrastructure within the North Tipperary County Development Plan 2010-2016.

Land use Zoning Objectives North Tipperary County Development Plan 2010 (as varied):

The Land use Zoning Objectives North Tipperary County Development Plan 2010 states that “Factors such as density, height, massing, traffic generation, public health, design criteria, visual amenity, and potential nuisance by way of noise, odour and pollution are also significant and relevant to the proper planning and development of the area.”

7.6 Best Practice Measures

No UWF Replacement Forestry Best Practice Measures have been developed specifically for Human Health.

7.7 Summary of the Human Health Chapter

Health is determined not only by access to quality healthcare services and lifestyle choices but also by the social and economic conditions in which people live. The Human Health chapter investigates and assesses the likelihood of significant effects directly attributable to the development and draws from and builds upon, the conclusions of the other chapters most notably Chapter 6: Population, Chapter 11: Water, Chapter 12: Air, Chapter 14: Material Assets (Built Services) and Chapter 15: Material Assets (Roads).

UWF Replacement Forestry is located in the Mid-West region within North Tipperary. North Tipperary performs marginally worse than the national average for the majority of health status indicators. However, mental health indicators such as “deliberate self-harm”, those diagnosed with a “psychological or emotional condition”, and “deaths from respiratory disease” all perform better in North Tipperary compared to the national average.

Sensitive Aspects evaluated in this topic chapter include Local Residents & Community, Transient People (walkers/cyclists, road users, farm/forestry workers etc.) and Kilcommon National School (only relevant to UWF Grid Connection).

7.7.1 Summary of UWF Replacement Forestry Impacts

- No negative or positive cross-factor health impacts are likely to occur to Local Residents & Community or Transient People, as a consequence of the development of UWF Replacement Forestry.
- There is no potential for impacts to Kilcommon National School, due to separation distances.

7.7.2 Summary of Cumulative Impacts to Human Health

As UWF Replacement Forestry is one element of the larger Whole Upperchurch Windfarm Project (Whole UWF Project), the cumulative effects of the Other Elements, in particular UWF Grid Connection, UWF Related Works and Upperchurch Windfarm is presented to show the totality of the project.

- UWF Replacement Forestry will not cause cumulative effects to Human Health.
- No cumulative negative health effects due to the Other Elements are expected.
- Cumulative positive effects to Local Residents & Community due to combined increased employment, are expected to be of Slight significance.

7.7.3 Summary of Cumulative Impacts with Other Projects or Activities

Bunkimalta Windfarm, was also evaluated for cumulative effects in this topic chapter as it is both at a sufficient scale to have measurable cumulative impacts and it also has potential to be constructed during the same period as the Whole UWF Project.

- Cumulative positive effects to Local Residents & Community, of the Other Elements of the Whole UWF Project (UWF Grid Connection, UWF Related Works and Upperchurch Windfarm) and the Bunkimalta Windfarm, are expected to be Imperceptible in the context of the size of the Population in the wider upland area.

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UWF Replacement Forestry EIA Report

Volume C2: EIAR Main Report

Chapter 8: Biodiversity

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Topic	Biodiversity

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

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

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.

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.

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
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

Biodiversity

Topic

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 (<i>Bufo (Epidalea) calamita</i>),	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 (<i>Anguis fragilis</i>)	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 Foilnahan

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	Feedback was received from • An Bord Pleanála • Tipperary County Council • Developments Application Unit • National Parks and Wildlife Service • Inland Fisheries Ireland • Irish Peatland Conservation Council See Chapter 3: The Scoping Consultations, and Appendices A3.1, A3.2.
Guidelines	<u>Ecological Evaluation</u> • 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, <i>Lampetra fluviatilis</i> (L.), <i>Lampetra planeri</i> (Bloch), and <i>Petromyzon marinus</i> (L.): A context for conservation and biodiversity considerations in Ireland. <i>Biology and the Environment</i>. 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, <i>Salmo salar</i> L., in relation to depth and gradient in an upland trout, <i>Salmo trutta</i> L., stream. <i>J. Fish. Biol.</i>, 29(2):199-214. • Greenberg, L.A. and Dahl, J. 1998. Effect of habitat type on growth and diet of brown trout (<i>Salmo trutta</i> L.) in stream enclosures. <i>Fisheries Management & Ecology</i> 5: 331-348. • Hatfield, T. & Bruce, J. (2000) Predicting Salmonid Habitat–Flow Relationships for Streams from Western North America. <i>North American Journal of Fisheries Management</i> 20:1005–1015, 2000 • O'Grady, M.F., Curtin, J (1993) The Enhancement of drained salmonid rivers in Ireland. A bioengineering perspective. <i>Hydroecol. Appl.</i>, 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 <u>Hen Harrier</u> • Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. (Scottish Natural Heritage, 2014).

Type	Source
	• Raptors: A Field Guide for surveys and Monitoring, third Edition (Hardey <i>et al.</i>, 2014). <u>Other Birds</u> • 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. <u>Terrestrial Habitats</u> • 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). <u>Bats</u> • 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 <u>Badgers</u> • 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). <u>Otters</u> • 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). <u>Aquatic Habitats & Species</u> • 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
	- 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). <u>Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008).</u>
Desktop	- 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 <u>In co-ordination with and by review of the other EIA Report Chapters as follows:</u> - Chapter 10: Soils - Chapter 11: Water - Chapter 12: Air <u>Consented Upperchurch Windfarm planning documents</u> - 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 <u>Other Projects planning documents</u> - 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

Type	Source
	- 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	- 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	• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (SPA). Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the coherence of the Natura 2000 Network. • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & The Biosphere Programme). Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • Biogenetic Reserve under the Council of Europe. European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	• Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); • 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	• Area of Special Amenity. • Area subject to a Tree Preservation Order.

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

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	Species is cited interest of SPA. Species present in Internationally important numbers.	International Importance.	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive	Species is cited interest of SPA. Species present in Internationally important numbers. 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
High	Other non-cited species which contribute to integrity of SPA. Ecologically sensitive species (<300 breeding pairs in UK) and less common birds of prey. Species listed on Annex 1 of the EU bird's directive. Regularly occurring relevant migratory species which are rare or vulnerable	National Importance	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list	Other non-cited species which contribute to integrity of SPA Ecologically sensitive species (<300 breeding pairs nationally) and less common birds of prey. Species listed on Annex 1 of the EU bird's directive. Regularly occurring relevant migratory species which are rare or vulnerable Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the

<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	Species present in regionally important numbers (>1% of regional population). Species occurring within SPA's but not crucial to the integrity of the site. Species listed as priority species in the UK BAP subject to special conservation measures	County Importance	Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; County important populations of species. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.	Species present in regionally important numbers (>1% of regional population). Species occurring within SPA's but not crucial to the integrity of the site. Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; County important populations of species. Species that are rare or are undergoing a decline in quality or extent at a national level.
Low	Species covered above which are present very infrequently or in very low numbers. Any other species of conservation interest not covered above, e.g. species listed on the red or amber lists of the BoCCI.	Local Importance (High Value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;	Locally important populations of priority species 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 protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.

<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.

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 SO _x and NO _x 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**.

Table 8-15: Summary of European Sites within the UWF Replacement Forestry Study Area

European Site	Distance from UWF Replacement Forestry
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

European Site	Features of Interest
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 (<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>)
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)

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>.

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.

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.

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.

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 Element 2: UWF Related Works Element 4: Upperchurch Windfarm (UWF) Element 5: UWF Other Activities	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)
<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.

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

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

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.

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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 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

8.2.2.3.5 Other Projects or Activities:
<u>Bunkimalta Windfarm</u>: 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. <u>Castlewaller Windfarm</u>: 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. <u>Gortnahalla Wind Turbine Development</u>: a consented single turbine development within the Clodiagh River catchment. The turbine development is also located upstream of the Lower River Suir cSAC. <u>Newport Distributor Road</u>: 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. <u>Killuragh Digester Plant</u>: a digester plant to process farm slurry and other organic material, located in the Lower River Shannon catchment area, near Pallasgreen, County Limerick. <u>Housing Developments in Doon and Annacotty</u>: construction of 25 No. houses at Doon, 288 no. houses in Annacotty, both developments located in the Lower River Shannon SAC catchment area. <u>Agricultural Developments</u>: 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. <u>Thurles Regional Water Treatment Works</u> comprise consented water treatment works abstracting from the Clodiagh River catchment. <u>Forestry/Agriculture/Turf-Cutting</u> occur within the Slievefelim to Silvermines SPA, and adjacent to, or in the case of <u>Turf cutting</u>, 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 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

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>)
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>)

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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)

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.

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.

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**.

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**.

National Sites	8.3.1.2 Evaluation of UWF Replacement Forestry It was evaluated by the topic authors that the UWF Replacement Forestry has <u>no potential to cause impacts to National Sites</u>, 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).
Sensitive Aspect	8.3.1.3 Cumulative Evaluation for the Other Elements of the Whole UWF Project <i>(grey background)</i> <u>UWF Replacement Forestry is part of a whole project</u> 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. <u>UWF Replacement Forestry has no potential to cause impacts to National Sites</u> 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, <u>the cumulative information and evaluations for the Other Elements of the Whole UWF Project</u> 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 <u>to show the totality of the project</u>.
Biodiversity Topic	

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 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 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.	

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	<u>Evaluated as excluded:</u> No potential for effects 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: • 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)	<u>Evaluated as excluded:</u> No potential for effects 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: • 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	<u>Evaluated as excluded:</u> No potential for effects/Neutral effects: 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.

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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.

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.

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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>

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 be 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

National Sites	Sensitive Aspect	Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Biodiversity	Topic	Cement Based Compounds	1	Soils Subsoil and Bedrock pore space	Blanket Bog Habitat degradation resulting from Surface and Groundwater Contamination	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. 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 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. 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
		Noise and Human Activity	1	Air and Visibility	Disturbance to species utilising the site	Rationale for Excluding: Neutral effects predicted as: 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. 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.
		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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National Sites	Sensitive Aspect	8.3.5 <u>UWF Replacement Forestry: Mitigation Measures for Impacts to National Sites</u>
		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 <u>UWF Replacement Forestry: Evaluation of Residual Impacts to National Sites</u>
		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 <u>UWF Replacement Forestry: Application of Best Practice Methods</u>
		<u>No</u> UWF Replacement Forestry Best Practice Measures have been developed specifically for National Sites.
Biodiversity		
Topic		

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>
Project Life-Cycle Stage (for Other Elements only)	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

PD ID	Project Design Environmental Protection Measure (PD)
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.

- 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.

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.

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 <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 Replacement Forestry.</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.

8.4.2.1.1 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	<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. • 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	<u>Yes, included</u> for the evaluation of cumulative effects relating to decreases in instream habitat quality. <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. 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>.

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 EIAR 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	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.
Sensitive Aspect	
Topic	Biodiversity

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: EIA 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.

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:
(for Other Elements only)

Construction stage

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).

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.

Aquatic Habitats & Species	Sensitive Aspect	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). <u>Significance of the Impact:</u> imperceptible to moderate in the local context <u>Rationale for Impact Evaluation:</u> • 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 <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 <u>Significance of the Impact:</u> imperceptible <u>Rationale for Impact Evaluation:</u> • 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 <u>no potential for cumulative effects with the UWF Replacement Forestry</u>)
Biodiversity	Topic	Other Project: Consented Bunkimalta Windfarm <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 <u>Significance of the Impact:</u> Not Significant residual effect

Rationale for Impact Evaluation: As per Bunkimalta WF EIS (2013)

- 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.

Other Project: Newport Distributor Road

Impact Magnitude: 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.

Significance of the Impact: No impact

Rationale for Impact Evaluation:

- As per planning conditions surface water controls will be in place

Evaluation of Cumulative Impacts – Decrease in instream aquatic habitat quality

All Elements of the Whole UWF Project

Cumulative Impact Magnitude: 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.

Significance of the Cumulative Impact: Imperceptible to moderate in the local context

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 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.

All Elements of the Whole UWF Project with Other Projects or Activities

Cumulative Impact Magnitude:

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.

Significance of the Cumulative Impact: Slight for the Clare River catchment, and Slight to Moderate for the Newport River catchment.

Rationale for Cumulative Impact Evaluation:

Clare River:

- 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	<u>Newport River</u> • 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
Sensitive Aspect	
Biodiversity Topic	

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:
(for Other Elements only)

Construction stage

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

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: SlightRationale 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 WorksImpact 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: SlightRationale 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.

Element 4: Upperchurch Windfarm	
<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.	
<u>Significance of the Impact:</u> Slight	
<u>Rationale for Impact Evaluation:</u> • 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	
<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.	
Significance of the Cumulative Impact Slight	
<u>Rationale for Cumulative Impact Evaluation:</u> • 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:
(for Other Elements only)

Construction stage

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;

- 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 2: UWF Related Works

Impact Magnitude:

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)).

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 (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.

Element 4: Upperchurch Windfarm

Impact Magnitude: 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.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- 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

Aquatic Habitats & Species	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
Sensitive Aspect	Evaluation of Cumulative Impacts – Disturbance or Displacement
	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> • 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).

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:
(for Other Elements only)

Construction stage

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

Aquatic Habitats & Species Sensitive Aspect	<u>Rationale for Impact Evaluation:</u> • 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 <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. 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. <u>Significance of the Impact:</u> slight to moderate <u>Rationale for Impact Evaluation:</u> • 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.
Biodiversity Topic	Element 4: Upperchurch Windfarm <u>Impact Magnitude:</u> 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. <u>Significance of the Impact:</u> imperceptible <u>Rationale for Impact Evaluation:</u> • 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

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:
(for Other Elements only)

Construction stage

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.

• In this respect, the spread of aquatic invasive species is evaluated as non-reversible.
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.
<u>Significance of the Impact:</u> Slight to Moderate
<u>Rationale for Impact Evaluation:</u> • 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
Element 5: UWF Other Activities – <i>N/A, evaluated as excluded, see Section 8.4.2.2.1</i>
Evaluation of Cumulative Impacts – Spread of Aquatic Invasive Species
All Elements of the Whole UWF Project
<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).
Significance of the Cumulative Impact: Slight to moderate
<u>Rationale for Cumulative Impact Evaluation:</u> • 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).

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.				

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**.

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 <i>(for Other Elements only)</i>	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><u>cumulatively with</u></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.

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.

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.	

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

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

8.5.2.3 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**

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 ($\leq 7\text{m}$).

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.

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.

8.5.2.4 Cumulative Information Baseline Characteristics - Importance of Terrestrial Habitats

Terrestrial Habitats

Sensitive Aspect

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 ActivitiesHaul 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.

Biodiversity

Topic

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.

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: EIAR 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)

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;

Terrestrial Habitats

Sensitive Aspect

Biodiversity

Topic

Terrestrial Habitats	• 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> • 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.
Sensitive Aspect	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
Biodiversity	<u>Impact Magnitude:</u> None
	<u>Significance of the Impact:</u> Neutral Effect
	<u>Rationale for Impact Evaluation:</u> • 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
Topic	<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

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.

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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 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

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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Element 2: UWF Related Works	
<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).
<u>Significance of the Impact:</u>	Not Significant
<u>Rationale for Impact Evaluation:</u>	• 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
Element 4: Upperchurch Windfarm	
<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.
<u>Significance of the Impact:</u>	Not Significant
<u>Rationale for Impact Evaluation:</u>	• “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.”
Element 5: UWF Other Activities	
<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.
<u>Significance of the Impact:</u>	Significant (positive)
<u>Rationale for Impact Evaluation:</u>	• 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	
All Elements of the Whole UWF Project	
<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.
	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.
<u>Significance of the Cumulative Impact:</u>	Not Significant
<u>Rationale for Cumulative Impact Evaluation:</u>	• The extent of Habitat Loss overall, with limited removal of trees and; • Individual severance locations will not result in any corridor fragmentation, and;

Terrestrial Habitats	• 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
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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

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

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.

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:

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Terrestrial Habitats	• 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
	<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.
	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> • 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
Sensitive Aspect	Element 5: UWF Other Activities
	<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.
	<u>Significance of the Impact:</u> Moderate (positive)
	<u>Rationale for Impact Evaluation:</u> • The extent of replanting of trees, and; • A significant contrast with baseline conditions is predicted. • The long-term duration, and; • Low reversibility.
Biodiversity	Evaluation of Cumulative Impacts – Loss of High Nature Value Trees
	All Elements of the Whole UWF Project
	<u>Cumulative Impact Magnitude:</u> 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)
Topic	<u>Rationale for Cumulative Impact Evaluation:</u> • 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

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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 Terrestrial Habitats with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

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 level Habitat fragmentation	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.

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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**.

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 Harrier	Hen Harriers are positively sensitive to the creation of or sympathetic management of foraging and nesting habitat within their traditional range (Forrest <i>et al.</i> , 2011).	
	8.6.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)	
Sensitive Aspect	Four national surveys have been undertaken to assess the conservation status of Hen Harrier in Ireland (Norriss <i>et al.</i> , 2002; Barton <i>et al.</i> , 2006; Ruddock <i>et al.</i> , 2012; Ruddock <i>et al.</i> , 2016). The most recent survey recorded 108 to 157 breeding pairs (Ruddock <i>et al.</i> , 2016). This was lower than the breeding population estimate for 2010 of 128 to 172 breeding pairs (Ruddock <i>et al.</i> , 2012), similar to the estimate of breeding pairs in 2005 of 132 to 153 (Barton <i>et al.</i> , 2006) and slightly higher than the results of the first national survey which estimated 102 to 129 breeding pairs (Norriss <i>et al.</i> , 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 <i>et al.</i> , 2016).	
Biodiversity	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 2 nd 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:	
Topic	"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 <i>forest foraging</i> resource within the SPA network shows an acute declining trend over the next 10 years ⁹ " (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.	

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

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

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 2: UWF Related Works	Construction works area boundary or activity location (plus 50m in all directions)	Published literature (e.g. Pearce-Higgins <i>et 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

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 (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

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 \(Section A8-1.2.4.3 Table 26\)](#).

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

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.

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.

Hen Harrier

Sensitive Aspect

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.

Biodiversity

Topic

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](#).

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.

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

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

Project Life Cycle Stage:	Planting/growth stage

Impact Source: afforestationCumulative 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 coverImpact 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.

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<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.	
<u>Significance of the Impact:</u> Moderate (negative)	
<u>Rationale for Impact Evaluation:</u> • 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	
<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.	
<u>Significance of the Impact:</u> Slight (negative)	
<u>Rationale for Impact Evaluation:</u> • 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	
<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	

Hen Harrier	Sensitive Aspect	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’).
		<u>Significance of the Impact:</u> Neutral Residual Impact
		<u>Rationale for Impact Evaluation:</u> • 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.
		Element 5: UWF Other Activities
		<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.
		<u>Significance of the Impact:</u> Very significant (positive)
		<u>Rationale for Impact Evaluation:</u> • 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.
Biodiversity	Topic	<u>Cumulative Information: Individual Evaluations of Other Projects or Activities</u>
		Other Project: Consented Castlewaller Windfarm
		<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.
		<u>Significance of the Impact:</u> Neutral residual effect
		<u>Rationale for Impact Evaluation:</u> • 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.
		Other Project: Consented Bunkimalta Windfarm
		<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. 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

¹⁰ Castlewaller Woodland Partnership (2007). Response to RFI from North Tipperary County Council prepared by Fehily Timoney and Company

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:

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“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;

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“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”

Significance of the Impact: Neutral residual effect

Rationale for Impact Evaluation:

- Based on an evaluation of “no net loss”

Activity: Forestry/Agriculture

Impact Magnitude: 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 *forest foraging* 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.

Significance of the Impact: **Significant (negative)**

Rationale for Impact Evaluation:

- precautionary basis

Other Project: Turf-cutting

Impact Magnitude: 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

Significance of the Impact: Neutral

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	Sensitive Aspect	<u>Rationale for Impact Evaluation:</u> • Restrictions on further turf cutting in intact areas/protected areas, and; • The limited extent of lands subject to turbary (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>.
		Evaluation of Cumulative Impacts – Reduction in or Loss of Suitable Foraging Habitat
Biodiversity	Topic	All Elements of the Whole UWF Project
		<u>Cumulative Impact Magnitude:</u> 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.
		Significance of the Cumulative Impact: Significant (positive)
		<u>Rationale for Cumulative Impact Evaluation:</u> • 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.
		All Elements of the Whole UWF Project with Other Projects or Activities
		<u>Cumulative Impact Magnitude:</u> 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.
		Significance of the Cumulative Impact: Neutral
		<u>Rationale for Cumulative Impact Evaluation:</u> • 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

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. <u>suitable</u> 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.

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

Topic	Biodiversity	Sensitive Aspect	Hen Harrier	Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
								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: 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 and no precedent in the literature for this structure as a collision risk (akin to telegraph pole). UWF Replacement Forestry: no potential for effects due to the absence of moving structures.
				Noise and human activity	1,2,3,4,5	Air and Visibility	Disturbance/displacement	Evaluated as Excluded: No potential for impacts/Neutral effect; 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. 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. 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. 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.
				Decommissioning Stage				
				Noise and human activity	5 (HA1-HA20)	Visibility	Disturbance /displacement	Evaluated as Excluded: UWF Grid Connection – will not be decommissioned. Neutral effect. UWF Replacement Forestry – permanent, will not be felled. Neutral effect.

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				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. 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.

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

Hen Harrier	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 <u>additional</u> mitigation measures are required.
Sensitive Aspect	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.
Biodiversity Topic	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 – <i>Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards (2015)</i>, <i>Environmental Requirements for Afforestation (2016)</i> and <i>Management Guidelines for Ireland Native Woodlands (2017)</i>.

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 <u>and</u> 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 EIAR 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	<i>Curlew</i> 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. <i>Kingfisher</i> 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'.
Sensitive Aspect	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.
Biodiversity	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 <i>et al.</i>, 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 <i>et al.</i>, 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.
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

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.

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

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
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.

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).

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

General Bird Species	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.
Sensitive Aspect	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	
Biodiversity	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
Topic	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).

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 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.

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).

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.

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.

8.7.4.1 Impact Evaluation Table: Golden Plover - Habitat Loss

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Impact Description	
Project Life Cycle Stage:	Planting/Growth Stages
Impact Source: afforestation	
Cumulative Impact Source: Construction Works; Excavation; Movement of Soils and Machinery	
Impact Pathway: Land Take	
<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. 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. <u>Impact Quality:</u> Negative	
Evaluation of the Subject Development Impact – Golden Plover: Habitat Loss	
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).	
Significance of the Impact: Slight	
<u>Rationale for Impact Evaluation:</u> • 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	
<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.	
<u>Significance of the Impact:</u> Slight	
<u>Rationale for Impact Evaluation:</u> • 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	

General Bird Species	Sensitive Aspect	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: • 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: • 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
Biodiversity	Topic	Rationale for Impact Evaluation: • 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: • 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).

Significance of the Cumulative Impact: SlightRationale for Cumulative Impact Evaluation:

- 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 ActivitiesCumulative Impact Magnitude: None**Significance of the Cumulative Impact: No Cumulative Impact**Rationale for Impact Evaluation:

- Neutral effects caused by Bunkimalta Windfarm.

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8.7.4.2 Impact Evaluation Table: Golden Plover - Disturbance/Displacement

Impact Description

Project Life Cycle Stage: Planting stage

Impact Source: during planting 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 on another Element work location.

Impact Quality: Negative

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

Element 3: UWF Replacement Forestry

Impact Magnitude: None

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- 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

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.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- 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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- 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;

Element 2: UWF Related WorksImpact 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.

Element 4: Upperchurch Windfarm

Impact Magnitude: None

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

- No Golden Plover were recorded in studies to inform the EIS for the Upperchurch Windfarm

Element 5: UWF Other Activities

Impact Magnitude: None

Impact Evaluation: Neutral effect

Rationale for Impact Evaluation:

- 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.

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: No Golden Plover Recorded in Baseline Studies to inform EIS.

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General Bird Species	Evaluation of Cumulative Impacts – Golden Plover: Disturbance/Displacement	
	All Elements of the Whole UWF Project	
Sensitive Aspect	<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.	
	Significance of the Cumulative Impact: Not Significant	
	<u>Rationale for Cumulative Impact Evaluation:</u> • 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	
	<u>Rationale for Impact Evaluation:</u> • Neutral effects caused by Bunkimalta Windfarm.	

8.7.4.3 Impact Evaluation Table: Meadow Pipit – Habitat Loss

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Impact Description	
Project Life Cycle Stage:	Planting/Growth Stages
Impact Source: Afforestation	
Cumulative Impact Source: Construction Works; Excavation; Movement of Soils and Machinery	
Impact Pathway: Land Cover	
<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. 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. 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. <u>Impact Quality:</u> Negative and positive	
Evaluation of the Subject Development Impact – Meadow Pipit: Habitat Loss	
Element 3: UWF Replacement Forestry	
<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.	
Significance of the Impact: Slight	
<u>Rationale for Impact Evaluation:</u> • 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	

General Bird Species	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
	Element 1: UWF Grid Connection	
	<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).	
	<u>Significance of the Impact:</u> Slight	
Sensitive Aspect	<u>Rationale for Impact Evaluation:</u> • 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	
	<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).	
	<u>Significance of the Impact:</u> Not Significant	
Biodiversity	<u>Rationale for Impact Evaluation:</u> • 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	
	<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).	
	<u>Significance of the Impact:</u> Slight	
Topic	<u>Rationale for Impact Evaluation:</u> • 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> • 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 purposes¹⁴.
<u>Significance of the Impact:</u> No significant effects
<u>Rationale for Impact Evaluation:</u> Inspectors report¹⁵: "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> • The medium sensitivity of the species, based on conservation status, and;

¹⁴ ESB Wind Development Ltd. and Coillte (2013) Bunkimalta Wind Energy Project Environmental Impact Statement

¹⁵ An Bord Pleanála (2013) Inspectors Report for Bunkimalta Wind Energy Project PL.22.241924.

General Bird Species	• 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	All Elements of the Whole UWF Project with Other Projects or Activities
	<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.
	Significance of the Cumulative Impact: Slight
	<u>Rationale for Cumulative Impact Evaluation:</u> • 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
<u>Impact Source:</u> Planting of Deciduous Trees <u>Cumulative Impact Source:</u> Reinstatement, Replanting, enhancement planting, maintenance of rush swards, <u>Impact Pathway:</u> Land use Change <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. <u>Impact Quality:</u> Positive	
Evaluation of the Subject Development Impact – General Birds: Habitat Enhancement	
Element 3: UWF Replacement Forestry	
<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.	
Significance of the Impact: Slight (positive)	
<u>Rationale for Impact Evaluation:</u> • 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	
<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.	
<u>Significance of the Impact:</u> Slight (positive)	

General Bird Species

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General Bird Species	<u>Rationale for Impact Evaluation:</u> • 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
	<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.
	<u>Significance of the Impact:</u> Imperceptible (positive)
Sensitive Aspect	<u>Rationale for Impact Evaluation:</u> • 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
	<u>Impact Magnitude:</u> 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.
	<u>Significance of the Impact:</u> Imperceptible (positive)
	<u>Rationale for Impact Evaluation:</u> • The benefit to bird diversity, and; • The low reversibility with proposed enhancement already incorporated into project design.
	Element 5: UWF Other Activities
	<u>Impact Magnitude:</u> 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.
	<u>Significance of the Impact:</u> Significant (positive)
Biodiversity	<u>Rationale for Impact Evaluation:</u> • 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
Topic	<u>Impact Magnitude:</u> 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

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

General Bird Species

Sensitive Aspect

Biodiversity

Topic

¹⁶ ESB Wind Development Ltd. and Coillte (2013) Bunkimalta Wind Energy Project Environmental Impact Statement prepared by ESB.

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)	General Bird Species
				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.	

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.)

General Bird Species	Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
	Decommissioning Stage				
Sensitive Aspect	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).
					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.
Biodiversity	Noise and human activity	1,2,3,4,5	Visibility	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.

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**.

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 <u>cumulatively with</u> 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.

General Bird Species

Sensitive Aspect

Biodiversity

Topic

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.

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	- 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	Not Relevant – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects.	

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’

Bats	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). <i>Survey Results</i> 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).
	<i>Roosts</i> 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.

Table 8-62: 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
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.

Bats

Sensitive Aspect

Biodiversity

Topic

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

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

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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Bats	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 <i>et al.</i>, 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 <i>et al.</i>, 2011). They may travel several kilometres from their roost, and may use different feeding areas on different nights.
Sensitive Aspect	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 <i>Nathusius’</i> 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 <i>et al.</i>, 2009), including the <i>Nathusius’</i> pipistrelle. <i>Leisler’s</i> 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 <i>et al.</i>, 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 <i>Natterer’s</i> 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: EIAR 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)	<u>Impacts 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

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: (for Other Elements only)	Construction stage
<u>Cumulative Impact Source:</u> Tree felling, Removal of mature trees, trimming and pruning of mature trees and hedgerows <u>Impact Pathway:</u> Landcover <u>Impact Description:</u> 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. <u>Impact Quality:</u> Negative	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 1: UWF Grid Connection	
<u>Impact Magnitude:</u> 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

Sensitive Aspect	Bats	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.
		<u>Significance of the Impact:</u> Imperceptible
		<u>Rationale for Impact Evaluation:</u> • 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.
Biodiversity		Element 2: UWF Related Works
		<u>Impact Magnitude:</u> There are no trees with bat roosting suitability within the study area.
		<u>Significance of the Impact:</u> None
		<u>Rationale for Impact Evaluation:</u> • no change in baseline conditions
		Element 4: Upperchurch Windfarm
		<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>”. 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.
		<u>Significance of the Impact:</u> Neutral effect
		<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
		Element 5: UWF Other Activities
		<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).
<u>Significance of the Impact:</u> Neutral effect.		

<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 • 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
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> • 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 Replacement Forestry 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

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: (for Other Elements only)	Construction stage/early operational stage

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
	<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.”
	<u>Significance of the Impact:</u> Not significant
	<u>Rationale for Impact Evaluation:</u> • 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
Sensitive Aspect	<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
	<u>Significance of the Impact:</u> Neutral Impact
	<u>Rationale for Impact Evaluation:</u> • 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
Biodiversity	<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).
	Significance of the Cumulative Impact: Not Significant
	<u>Rationale for Cumulative Impact Evaluation:</u> • 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;

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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).

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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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 4: Upperchurch Windfarm

Impact Magnitude:

All lighting within compounds will be cowed towards the centre of the compound.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- 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

Impact Magnitude:

No artificial lighting is proposed for this element of the project.

Significance of the Impact: Neutral impact

Rationale for Impact Evaluation:

- 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

Cumulative Impact Magnitude:

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

Rationale for Cumulative 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

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).

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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Source(s) of Impacts	Project Element	Pathway	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	No potential for effects as the UWF Grid Connection will not be decommissioned.

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Sensitive Aspect	Bats	<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.

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).

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.

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.

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	<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

8.9.2.2 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,

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 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 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

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.

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

	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.

Table 8-74: 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)

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

Impact Source: afforestationCumulative Impact Source: Excavations, construction of new access roads, compounds and hardstanding areasImpact 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)

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>

Non-Volant Mammals	Sensitive Aspect	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> • 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
		<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.
		<u>Significance of the Impact:</u> Neutral effect
		<u>Rationale for Impact Evaluation:</u> • 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
		<u>Impact Magnitude:</u> 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.
		<u>Significance of the Impact:</u> Not Significant
Biodiversity	Topic	<u>Rationale for Impact Evaluation:</u> • "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
		<u>Impact Magnitude:</u> No permanent land take of Badger foraging or breeding habitat.
		<u>Significance of the Impact:</u> Neutral effect
		<u>Rationale for Impact Evaluation:</u> • 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.

Evaluation of Cumulative Impacts – Badger: Habitat Loss	
All Elements of the Whole UWF Project	
<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. 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.	
Significance of the Cumulative Impact: Not Significant	
<u>Rationale for Cumulative Impact Evaluation:</u> • 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

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: 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.

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 3: UWF Replacement Forestry

Impact Magnitude: No impact

Significance of the Impact: No potential for impacts

Rationale for Impact Evaluation:

- 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

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.

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Element 2: UWF Related Works
<u>Impact Magnitude:</u> None
<u>Significance of the Impact:</u> No potential for impact
<u>Rationale for Impact Evaluation:</u> • 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'.
<u>Significance of the Impact:</u> not significant
<u>Rationale for Impact Evaluation:</u> • 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.
<u>Rationale for Impact Evaluation:</u> • 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> • 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

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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<u>Significance of the Impact:</u> Slight (residual impact – see UWF Grid Connection EIA Report)	Non-Volant Mammals
<u>Rationale for Impact Evaluation:</u> • 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	Sensitive Aspect
<u>Impact Magnitude:</u> Negligible	
<u>Significance of the Impact:</u> Neutral effect	
<u>Rationale for Impact Evaluation:</u> • 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	
<u>Impact Magnitude:</u> None	
<u>Significance of the Impact:</u> Neutral effects	
<u>Rationale for Impact Evaluation:</u> • No Otter were recorded and hence disturbance effects were not scoped in for evaluation.	
Element 5: UWF Other Activities	
<u>Impact Magnitude:</u> Negligible	
<u>Significance of the Impact:</u> Neutral effect	
<u>Rationale for Impact Evaluation:</u> • 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	Biodiversity
All Elements of the Whole UWF Project	
<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.	Topic

Non-Volant Mammals	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. 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.
	Significance of the Cumulative Impact: Slight <u>Rationale for Cumulative Impact Evaluation:</u> • 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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Topic

8.9.4.4 Impact Evaluation Table: Irish Hare, Pine Marten, Red Squirrel and Fallow Deer - Habitat Loss

Non-Volant Mammals

Sensitive Aspect

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Topic

Impact Description	
Project Life Cycle Stage:	Afforestation
<u>Impact Source:</u> afforestation <u>Cumulative Impact Source:</u> groundworks and vegetation clearance, new access roads and hardstanding areas <u>Impact Pathway:</u> Land cover <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). <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. <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. <u>Impact Quality:</u> Negative and positive	
Evaluation of the Subject Development Impact – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Habitat Loss	
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.	
Significance of the Impact: Not significant	
<u>Rationale for Impact Evaluation:</u> • 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.	

Non-Volant Mammals	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). 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> • 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	
Sensitive Aspect	<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). <u>Significance of the Impact:</u> Not Significant <u>Rationale for Impact Evaluation:</u> • 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	
	<u>Impact Magnitude:</u> 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. <u>Significance of the Impact:</u> Not significant <u>Rationale for Impact Evaluation:</u> • 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	
Biodiversity		
Topic		

Element 5: UWF Other Activities	Non-Volant Mammals
<u>Impact Magnitude:</u> Negligible	
<u>Significance of the Impact:</u> Neutral effects	
<u>Rationale for Impact Evaluation:</u> • 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	Sensitive Aspect
<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> • 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).

8.9.4.5 Impact Evaluation Table: Irish Hare, Pine Marten, Red Squirrel and Fallow Deer - Disturbance /Displacement

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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Non-Volant Mammals	Element 1: UWF Related Works	<u>Rationale for Impact Evaluation:</u> • 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.
		<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, 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.
	<u>Significance of the Impact:</u> Moderate	
	Element 2: UWF Related Works	<u>Rationale for Impact Evaluation:</u> • 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.
		<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.
	<u>Significance of the Impact:</u> Not Significant	
	Element 3: UWF Related Works	<u>Rationale for Impact Evaluation:</u> • 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.
		<u>Impact Magnitude:</u> 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.
	<u>Significance of the Impact:</u> Moderate	
	Element 4: Upperchurch Windfarm	<u>Rationale for Impact Evaluation:</u> • 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.
		<u>Impact Magnitude:</u> 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.

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Non-Volant Mammals	Evaluation of Cumulative Impacts – Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance /Displacement
	All Elements of the Whole UWF Project
Sensitive Aspect	<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.
	Significance of the Cumulative Impact: Moderate <u>Rationale for Cumulative Impact Evaluation:</u> • 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).

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).

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 (*Crocivura russula*) invasion in Ireland. PLoS One. 2014 Jun 23; 9(6):e100403. doi: 10.1371/journal.pone.0100403. eCollection 2014

Topic	Biodiversity	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.

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**.

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).

Non-Volant Mammals

Sensitive Aspect

Biodiversity

Topic

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).

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.

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

Table 3-10: Cumulative Evaluation Study Area for Implications of Response		
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.	

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.

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.

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.

Amphibians & Reptiles

Sensitive Aspect

Biodiversity

Topic

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: EIA Appendices**.

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 <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (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**

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.				

Amphibians & Reptiles

Sensitive Aspect

Biodiversity

Topic

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: EIAR 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).

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 (*Euphras 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.

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. There is no potential for cumulative effects with the UWF Replacement Forestry.	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).

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

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 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.
Other Projects or Activities	
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, Cummer 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**

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 Bealclave, 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 Bealclave 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 Bealclave.

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.

Marsh Fritillary

Sensitive Aspect

Biodiversity

Topic

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).

Marsh Fritillary	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.
Sensitive Aspect	
Biodiversity	

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: EIAR 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 Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (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.

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:
(for Other Elements only) Construction stage

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.

Marsh Fritillary

Sensitive Aspect

Biodiversity

Topic

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 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

Marsh Fritillary	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 <u>Rationale for Cumulative Impact Evaluation:</u> • 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.
Sensitive Aspect	All Elements of the Whole UWF Project with Other Projects or Activities <u>Cumulative Impact Magnitude:</u> 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. Significance of the Cumulative Impact: Moderate <u>Rationale for Cumulative Impact Evaluation:</u> • 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.

Biodiversity
Topic

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; •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: •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:

Marsh Fritillary	Sensitive Aspect	Source(s) Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
						•Only a single web is located within the 5m buffer zone of vehicular usage (at Bournadomeeny, with zero at Bealacave) •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. 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.
		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: 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. 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.
Decommissioning Stage						
Evaluated as Excluded: Neutral effects on General Invertebrates are considered likely due to the scale of works required.						

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.

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 <u>cumulatively with</u> Other Projects or Activities Forestry, Agriculture, Turf-Cutting	Moderate

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.

Marsh Fritillary

Sensitive Aspect

Biodiversity

Topic

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

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."

²⁴ Department of Agriculture, Food and the Marine (2017). Felling and Reforestation Policy.

8.13 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	• 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	
• 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	
• 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.	

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	• 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	• 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	
• 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	
• 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.	

Measures for white toothed shrew

- Consignments of organic materials, such as hedging material, will be inspected for presence of Greater White-toothed Shrew.

References

- <http://www.fisheriesireland.ie/Research/invasive-species.html>
- <http://www.nonnativespecies.org/checkcleandry/>

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	• 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.	
• 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	
• NRA (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority, Dublin.	

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.

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UWF Replacement Forestry EIA Report

Volume C2: EIAR Main Report

Chapter 9: Land

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ECOPOWER

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

List of Appendices

<u>Appendix No.</u>	<u>Appendix Title</u>
There are no appendices associated with this topic chapter.	

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
BPM	Ecopower Best Practice Measure developed by members of the EIAR Team
PD	Ecopower Project Design Environmental Protection Measure developed by members of the EIAR Team
UGC	Underground Cables
UWF	Upperchurch Windfarm

Glossary of Terms

Term	Definition
Afforestation	The planting of land with woody plants with a view to forest establishment.
Agriculture	The growing of crops and the rearing of animals for food, fibre or sporting purposes
Commercial Forestry	Trees that are managed for the production of saleable timber products.
Coniferous Trees	Species of trees normally bearing cones and usually evergreen.
Deciduous Trees	Species of trees which normally shed their leaves annually.
Low Intensity Farming	Lands which are lightly used and lightly stocked and subject to low levels of farming management.
Felling	The process of cutting down and extracting timber from a forest.
Grassland	Land which has been sown with productive grass species.
Improved grassland	Land which has been sown with particularly productive grass species and whose continued productivity is dependent on regular supplemental inputs of fertiliser and lime
Intensive farming	Lands which are farmed at a high level of commerciality and subject to high levels of farming management and inputs.
Landuse	The use to which land is put by human activity
Landholding	The land area operated by a farming entity, usually a farmer.
Marginal land	Land which is notably sub-optimal for normal farming activity.
Native Woodland Species	Wood bearing plant species considered native to the island of Ireland.
Natura 2000	Lands designated for wildlife on an EU wide basis and having legal standing. Includes SPA and SAC designated land.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Special Area of Conservation	Areas of land designated for the protection of certain species of wild animals, wild plants or habitat types under the EU Habitats Directive (Dir 92/43/EEC) and normally subject to certain landuse limitations.
Special Protection Area (SPA)	Areas of land designated for the protection of certain species of wild birds under the EU Birds Directive (Dir 79/409/EEC) and normally subject to certain landuse limitations.
Slievefelim to Silvermine Mountains Upland Area	The wider Slievefelim to Silvermines upland area south of Keeper Hill, Mother Mountain and Knockmaroe, between Newport and Upperchurch, County Tipperary. Much of the site is over 200 metres in altitude
Plantation Forestry	Forest sown by man, usually for commercial reasons and mostly of a small number of tree species.
Project Design Measure	Measures for environmental protection, incorporated into the design of the project.

9 Environmental Factor: Land

9.1 Introduction to the Land Chapter

9.1.1 What is Land?

Land is the portion of the earth's surface not covered by water. In this chapter land and landuse is addressed. Landuse relates to the various ways in which society uses land. Land take is the removal of productive land from agricultural or other beneficial uses. In the Irish context, land is used for agriculture, forestry, extractive uses, urbanisation, recreation, and infrastructure provision. Certain development undertakings can change current landuse to other landuse types.

9.1.2 Overview of Land in the Local Environment

From a land and landuse perspective the existing environment is rural countryside. The dominant usage is permanent agricultural grassland with a notable commercial plantation forestry component. Some small areas of low intensity farmed Natura 2000 designated land also occurs. Public roads, mostly single carriageway, county roads and private unsurfaced farm access roads serving domestic houses, farms and forest also feature in the existing land use pattern.

The location of the UWF Replacement Forestry is illustrated on OSI Mapping on **Figure RF 9.1: Location of the UWF Replacement Forestry Study Area**.

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

9.1.3 Sensitive Aspects of the Land 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	Agricultural Land	Section 9.2
Sensitive Aspect No. 2	Forestry Land	Section 9.3

Each of the above listed Sensitive Aspects are evaluated individually in Sections 9.2 to 9.3 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 9.2 to 9.3. The colour-codes have been applied to section headings, tables and on side-tabs on the edge of the pages.

9.1.4 Sensitive Aspects excluded from further evaluation

No Sensitive Aspects were excluded from this topic chapter:

9.1.5 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 9-1: Subject Development –UWF Replacement Forestry

<u>Project ID</u>	<u>The Subject Development</u>	<u>Composition of the Subject Development</u>
Element 3	The Subject Development 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.

9.1.6 The Author of the Land Chapter

This report has been written by Andy Dunne (B.Agr.Sc., M.Sc.(Agr.)) director of Environmental Agricultural Engineering Consultancy (EAEC), a firm of agricultural and engineering consultants. Andy has been involved in a great variety of land use and agricultural development activity for more than 20 years and he is familiar with national and EU regulation and policy in the area.

9.1.7 Sources of Baseline Information

The information sources outlined in Table 9-2 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 9-2: Sources of Baseline Information for Land

Type	Source
Consultation	No feedback was received from consultees with regard to land or land use. See Chapter 3: The Scoping Consultations, Chapter 3 Appendices for further details.
Desktop	- Department of Agriculture, Food and Forestry's Rural Development Programme 2014-2020 2016 State of the Environment Report - North Tipperary County Development Plan (2010) - Available online aerial imagery from National Parks and Wildlife Service, Bing and Google - Chapter 10: Soil - Chapter 11 Water - Ecopower Developments Ltd. (2013) Upperchurch Windfarm Environmental Impact Statement 13510003 - Ecopower Developments Ltd. (2013) Upperchurch Windfarm Response to Further Information 13510003
Fieldwork	Site Visit and field walking

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

9.1.7.1 Certainty and Sufficiency of Information Provided

A documentary trail is provided throughout this chapter to verify 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), with remit in the regulatory field, including the Department of Agriculture, Food and the Marine and North Tipperary County Development Plan 2010 (as varied). In all cases the most recent publications are relied on. All documentation used is referenced at the end of the chapter.

In respect of Land no significant limitations or difficulties were encountered.

9.1.8 Methodology for Evaluating Effects

There is no specific guidance on the production of a Landuse chapter of an EIA Report. However, extensive experience with EIA and agricultural and forestry management together with the EPA guidance on EIS preparation (2002 & 2017) will inform the production of the Landuse appraisal Reports.

Introduction, Authors, Sources, Methodology

Topic	Land

9.2 Sensitive Aspect No.1: Agricultural Land

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

9.2.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

9.2.1.1 STUDY AREA for Agricultural Land

UWF Replacement Forestry will be developed in rural countryside, on 2 No. agricultural landholdings in the townland of Foilnaman in County Tipperary,

All the farmed area is under permanent grassland. No tillage farming was observed. The quality of the grassland varies with some being well improved from a farming perspective to grassland which is noticeably less productive.

Livestock farming, dairying and beef cattle rearing, are the main activities carried out. Such farming practice is long established and although there has been notable production upscaling, restructuring of farm holdings, enlargement of field layouts and technological improvement over time, the use of the land for milk and livestock production in these districts stretches back to post-famine times.

9.2.1.2 Evaluation of UWF Replacement Forestry

UWF Replacement Forestry was evaluated for its potential to cause impacts to Agricultural Land.

It was evaluated by the topic authors that UWF Replacement Forestry **will not cause impacts to Agricultural Land**, for the following reasons:

- There will be no temporary loss of use of lands or loss of connectivity due to planting activities,
- Neutral impacts as a result of change of landuse - while 6ha of agricultural land (on a landholding area of 70ha) will change use to forestry at the UWF Replacement Forestry site, the use of land is changing from one productive use to another. In addition both of these landuses are the predominant landuses in this upland area.
- There will be no new or upgraded roads associated with the UWF Replacement Forestry.
- No potential for permanent loss of connectivity as the existing farm access road will continue to be used by the landowner to gain access to other lands.

9.2.1.3 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 not cause impacts to Agricultural Land by itself, and therefore 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 evaluations for the Other Elements of the Whole UWF Project are included in Section 9.2.2 to Section 9.2.4 and included in the summary table in Section 9.2.8 in order to show the totality of the project.

9.2.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

9.2.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Agricultural Land 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 9.2.2.2.1](#) below.

The evaluation of cumulative impacts to Agricultural Land 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 Agricultural Land 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 \(Section A2.3 .1 and Section A2.3. 9\)](#).

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 Agricultural Land.

9.2.2.2 Cumulative Evaluation Study Area

The study area for the evaluation of cumulative effects is described in Table 9-3.

Table 9-3: Cumulative Evaluation Study Area for Agricultural Land

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Boundary of works areas in general, and the individual landholdings where there is any potential to split parcels of land	Impacts limited to areas of physical disturbance and any restriction of access.
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities	Not Relevant – No Other Projects or Activities were scoped in for evaluation of cumulative effects.	

9.2.2.2.1 Potential for Impacts to Agricultural Land

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 Agricultural Land. The results of this evaluation are included in Table 9-4.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on [Figure CE 9.2: Agricultural Land within the Cumulative Evaluation Study Area](#) (Volume C3 EIAR Figures).

Table 9-4: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Elements 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	Evaluated as excluded: Neutral effect/No potential for effects due to: The Haul Route Activities are located entirely within the public road corridor and do not require any works to adjoining lands, therefore no impacts to agricultural land or landuse can occur. Monitoring Activities do not require any works to land or result in land use change, therefore no impacts can occur. Upperchurch Hen Harrier Scheme: Once off activities will take place initially, and comprise planting and fencing at hedgerows, watercourse boundaries and areas of scrub. These activities will generally take place on the periphery of fields and will not cause any impacts to landuse or connectivity. During the Operational Stage of the UWF, farming practices under the Upperchurch Hen Harrier Scheme will, to a certain extent, cause lands to revert back to wet grassland. It is considered that due to the current low productivity level on the lands, combined with the scheme payments that the landowners will receive, no impacts are expected to farm productivity levels. The Overhead Line Activities will involve access over agricultural lands using established access routes mainly along existing tracks. No works are required to lands, and activities are limited to in situ pole sets and angle masts and the existing overhead line, therefore there is no potential for effects to agricultural lands or landuse.

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9.2.2.3 Cumulative Information: Baseline Characteristics – Context & Character

9.2.2.3.1 Element 1: UWF Grid Connection

About half of the construction works area attributed to the UWF Grid Connection is situated on agricultural lands, with 18.9 hectares of land within construction works areas spread across 40 No. agricultural landholdings. These 40 No. landholdings together have an area of c.811 hectares.

The UWF Grid Connection is located within the Slievefelim to Silvermine uplands area, the highest points of which remain generally unenclosed and are only used for low intensity farming. Significant parts of these uplands are also designated a Special Protection Area (SPA 4165 – Slievefelim to Silvermines Mountain) under the Birds Directive principally because of the occurrence of the hen harrier (*Circus cyaneus*). The SPA designation effectively restricts farming usage to low impact grazing. Pasture improvement and land reclamation are not generally permitted within the SPA.

9.2.2.3.2 Element 2: UWF Related Works

Just over a half of UWF Related Works construction works areas relate to sections of Internal Windfarm Cabling which will be located within Consented UWF Roads. In relation to the remaining UWF Related Works areas, one third of the construction works areas will be located on agricultural lands, with 7.2 hectares of land within construction works areas spread across 41 no. agricultural landholdings. These 41 No. landholdings together have a total area of c.1133 hectares.

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	The footprint of the Upperchurch Windfarm will be 56.3ha of lands, 46.5ha of which are agricultural lands. In relation to landholdings, 23 No. agricultural landholdings, which together have a total area of c.1050 hectares, are associated with the Upperchurch Windfarm.
Sensitive Aspect	9.2.2.3.4 Element 5: UWF Other Activities
	Not applicable – Element evaluated as excluded. See Section 9.2.2.2.1
	9.2.2.3.5 Other Projects or Activities
	Not applicable – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 9.2.2.1.

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9.2.3 Cumulative Information: PROJECT DESIGN MEASURES for Agricultural Land

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 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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9.2.4 Cumulative Information: EVALUATION OF IMPACTS to Agricultural Land

It is evaluated that **UWF Replacement Forestry will not cause impacts to Agricultural Land**, see Section 9.2.1.

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) - Agricultural Land.

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

Table 9-5: List of all Impacts included and excluded from the Impact Evaluation Table sections

<u>Impacts Included</u> (Evaluated in the Impact Evaluation Table sections)	<u>Impacts Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Loss of Use and Connectivity of Landholdings (Construction stage/Early Operational Stage)	<i>Reduction in grass growth rates due to a change in the drainage regime (construction stage)</i>
	<i>Change of land use (operational stage)</i>
	<i>Improvement in infrastructure (operational stage)</i>
	<i>Loss of use and connectivity of land through the splitting of parcels of land (operational stage)</i>

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Table in the next section - **Section 9.2.4.1**.

The source-pathway-receptor links and the rationale for impacts excluded are described in the section directly after the Impact Evaluation Table in Section 9.2.4.2.

9.2.4.1 Impact Evaluation Table: Loss of Use and Connectivity of Landholdings

Evaluation of UWF Replacement Forestry Excluded: As there will be no lands subject to temporary exclusion and no planting on the existing access road, there is no potential for UWF Replacement Forestry to cause loss of use or connectivity effects to Agricultural Land by itself, and consequently this project 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 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 and early operational stage

Impact Source: n/a

Cumulative Impact Source: Construction works areas

Impact Pathway: Fences, presence of construction machinery

Impact Description: Agricultural Lands within the construction works areas will be fenced off and unavailable for farming use during construction and in the early operational stage until vegetation has re-established on reinstated land. Such fencing and access modification at times will prevent access to and the use of farmlands, which will result in plots of land becoming disconnected and potentially unavailable for farming use.

Impact Quality: Negative

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

Element 1: UWF Grid Connection

Impact Magnitude:

Construction works areas are located on 18.9 hectares of agricultural land spread over 40 No. agricultural landholdings, with a total landholding area of c.811 hectares. Works will generally take place through landholdings rather than on the periphery of holdings.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- the small scale (2%) of lands subject to works, in the context of the size of agricultural landholdings
- the temporary duration (up to 1 year maximum) of effects on individual landholdings,
- the reversibility of the impact with the restoration of lands, and
- the alternative access available on many landholdings

Element 2: UWF Related Works

Impact Magnitude:

The construction works areas are located on 7.2 hectares of agricultural land spread over 41 No. landholdings, with a total landholding area of c.1133 hectares. Works will generally take place through landholdings rather than on the periphery of holdings.

Significance of the Impact: Neutral effect

Rationale for Impact Evaluation:

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	Element 4: Upperchurch Windfarm
	<u>Impact Magnitude:</u> The footprint of the Upperchurch Windfarm comprises 56.3 hectares. Construction works will take place on 46.5 hectares of land over 23 No. landholdings, with a total landholding area of c.1,050 hectares.
	<u>Significance of the Impact: Imperceptible</u>
	<u>Rationale for Impact Evaluation:</u> - the small scale (4%) of lands subject works, in the context of the size of agricultural landholdings - the short-term duration (up to 1.5 years) - the alternative access available on many landholdings, and - the ease with which such alternative access can be provided.
Sensitive Aspect	Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 9.2.2.2.1
	Evaluation of Cumulative Impacts – Loss of Use and Connectivity of Landholdings
	All Elements of the Whole UWF Project
	<u>Cumulative Impact Magnitude:</u> In total 59.1 hectares of agricultural lands are located within construction works areas associated with the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm. These lands are spread over 72 No. landholdings, with a total landholding area of c.2,010 hectares. UWF Grid Connection, UWF Related Works and Upperchurch Windfarm works areas overlap in the Knockmaroe and Knockcurraghbola area, with works related to 2 or 3 of these elements occurring on 13.5 hectares of agricultural lands. The worst case cumulative effect will occur on 2 No. landholdings, where, altogether, construction works areas will take place on up to 5% of each landholding.
	<u>Significance of the Cumulative Impact: Imperceptible</u>
Land	<u>Rationale for Cumulative Impact Evaluation:</u> - the very small scale of land area subject to works, 3% of farmed area on average for all landholdings, - the location of the majority of Internal Windfarm Cables within Consented UWF Roads, - the temporary to short-term duration (up to 1.5 years), - the reversibility of the impact with the restoration of lands, and - the alternative access available on many landholdings.
Topic	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 were evaluated as having potential to cause cumulative effects to Agricultural Land with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 9.2.2.1).

9.2.4.2 Cumulative Information: Description and Rationale for Excluding (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 9-6 below.

Table 9-6: Description and Rationale for Excluded Impacts to Agricultural Land

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</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
Construction Stage				
Trench and Foundation excavations	1,2,4	Ground-water flow paths	Reduction in grass growth rates due to a change in the drainage regime	Rationale for Excluding: Neutral impact, As per Chapter 11: Water, due to the shallow nature of the trenches and excavations associated with the Individual Project Elements, the impact on groundwater will be of imperceptible significance within 30m and Neutral beyond this distance. Based on the evaluation contained in Chapter 11 Water, it is considered that any reduction in grass growth rates caused by a change in the drainage regime will have a Neutral effect on the productivity of land.
Operational Stage				
Forestry felling, presence of above ground structures	1,2,4	Land cover	Change of land use	Rationale for Excluding: Neutral impact, In relation to the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm, it is considered that due to the very small scale of land use change (less than 1% of the landholding area) that Neutral effect to agricultural lands will occur.
Construction of new access roads & upgrading of existing private roads	1,2,4	Private Roads	Improvement in infrastructure	In relation to the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm, although the upgrade of existing farm roads and the construction of some short lengths of new roads will be a positive effect on agricultural landholdings, the scale of road upgrading or construction will equate to less than 1% of the landholding areas. Therefore, it is considered that the upgrade/construction of roads will have a Neutral effect to the productivity or use of agricultural lands.
Operational activities	1,2,4	Work area boundaries	Loss of use and connectivity of land through the splitting of parcels of land	Maintenance activities will range from annual testing of the UWF Grid Connection, to monthly inspection of UWF Related Works, to weekly maintenance of the Upperchurch Windfarm. All of these activities will take place from hard-core areas, with the vast majority of activity taking place on the turbine hardstands, and there will be no requirement for a works area boundary to be erected. Therefore operational activities will have a Neutral effect on land use.
Decommissioning Stage				
Rationale for Excluding: No potential for impacts/Neutral impacts, UWF Grid Connection will remain part of the National Grid, therefore no impacts can occur.				

		<u>Source(s) of Impacts</u>	<u>Project Element</u>	<u>Pathway</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
Sensitive Aspect	Agricultural Land	UWF Related Works: The cables will be pulled from the Internal Windfarm Cabling ducts at the turbines or at the substation; the ducting, Realigned Windfarm Roads and Haul Route Works will remain in-situ; therefore no decommissioning works to lands are required. The Telecom Relay Pole will be removed, and the compound area reinstated and returned to agricultural use. Due to the very small size of the compound in the context of the land holding (less than 0.005%), Neutral impacts to the landholding will occur.				
		Upperchurch Windfarm: It is likely that the Consented UWF Substation will remain in-situ for use by ESBN and that the Consented UWF Roads will also remain in-situ for use by the landowner. Decommissioning works will be limited to the Consented UWF Turbines, hardstanding areas and associated drainage systems, along with the meteorological masts. All decommissioning works will take place from hard-core areas, with the vast majority of activity taking place on the turbine hardstands. Works area boundaries will not be required for decommissioning activities. Therefore, it is considered that decommissioning activities will have a Neutral effect on land use.				
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9.2.5 Mitigation Measures for Impacts to Agricultural Land

Mitigation measures are not relevant as **UWF Replacement Forestry will not cause impacts** to Agricultural Land.

9.2.6 Evaluation of Residual Impacts to Agricultural Land

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 9.2.1), i.e. **no impacts**.

9.2.7 Application of Best Practice and the EMP for Agricultural Land

No UWF Replacement Forestry Best Practice Measures have been developed specifically for Agricultural Land.

9.2.8 Summary of Impacts to Agricultural Land

The topic authors conclude that there is no potential for UWF Replacement Forestry to cause impacts to Agricultural Land.

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 9-7: Summary of the impacts to Agricultural Land

Impact to Agricultural Land:	Loss of Use and Connectivity of Landholdings
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Section 9.2.4.1</i>
<i>Project Life-Cycle Stage (for Other Elements only)</i>	<i>Construction/Early Operation</i>
<u>UWF Replacement Forestry Impact</u>	No Potential for Impacts Evaluated as Excluded - see Section 9.2.1
Element 1: UWF Grid Connection	Imperceptible
Element 2: UWF Related Works	Neutral Effect
Element 4: Upperchurch Windfarm	Imperceptible
Element 5: UWF Other Activities	No Potential for Impact - Evaluated as Excluded, see Section 9.2.2.2.1
<u>Cumulative Impact:</u>	
All Elements of the Whole UWF Project	Imperceptible

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities were evaluated as having potential to cause cumulative effects to Agricultural Land with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 9.2.2.1).

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9.3 Sensitive Aspect No.2: Forestry Land

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

9.3.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

9.3.1.1 Baseline Characteristics of Forestry Land in relation to UWF Replacement Forestry

Forest cover as a landuse in Ireland was very low at the time of the foundation of the state but since the 1930's there has been a gradual increase in the national forest estate and land cover under forest is now approaching 12%. Afforestation was solely in the hands of the state until the late 1980's but has largely become the domain of private landowners since then.

There is no forestry within the UWF Replacement Forestry lands at present.

A review of aerial imagery indicates a level of forest cover in wider Slievefelim to Silvermines uplands area is substantially greater than the national average, and is estimated to be 30 to 35% of the land cover.

9.3.1.2 Evaluation of UWF Replacement Forestry

UWF Replacement Forestry was evaluated for its potential to cause impacts to Forestry Land.

It was evaluated by the topic authors that UWF Replacement Forestry **will not cause impacts to Forestry Land**, for the following reasons

- No potential for loss of use or loss of connectivity impacts, as the land is currently set to grassland.
- Neutral positive land use change impacts - While 6ha of agricultural land will change use to forestry at the UWF Replacement Forestry site, it is considered that a Neutral effect to Land will occur as the use of land is changing from one productive use to another, and in addition, these two landuses (agriculture and forestry) are the predominant landuses in this upland area.
- No potential for improvements to forestry infrastructure, as there will be no new or upgraded roads associated with the UWF Replacement Forestry.
- No potential for effects during the growth stage, due to the very small scale of activities associated with site management, and the absence of any requirement to restrict access along the existing farm access road.
- No potential for harvesting related impacts, as the UWF Replacement Forestry will be permanent woodland and will not be harvested.

9.3.1.3 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 not cause impacts to Forestry Land by itself, and therefore 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 evaluations for the Other Elements of the Whole UWF Project are included in Section 9.3.2 to Section 9.3.4 and included in the summary table in Section 9.3.8 in order to show the totality of the project.

9.3.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

9.3.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Forestry Land 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 9.3.2.2.1](#) below.

The evaluation of cumulative impacts to Forestry Land 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 Forestry Land 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 \(Section A2.3 .1 and Section A2.3. 9\)](#).

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 Forestry Land.

9.3.2.2 Cumulative Evaluation Study Area

The study area for the evaluation of cumulative effects is described in Table 9-8.

Table 9-8: Cumulative Evaluation Study Area for Forestry Land

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Boundary of works areas in general, and the individual landholdings where there is any potential to split parcels of land	Impacts limited to areas of physical disturbance and any restriction of access.
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities	Not Relevant – No Other Projects or Activities were scoped in for evaluation of cumulative effects.	

9.3.2.2.1 Potential for Impacts to Forestry Land

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 Forestry Land. The results of this evaluation are included in Table 9-9.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on [Figure CE 9.3: Forestry Lands within the Cumulative Evaluation Study Area](#) (Volume C3 EIAR Figures).

Table 9-9: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Elements 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	Evaluated as excluded: Neutral effect/No potential for effects due to: The Haul Route Activities are located entirely within the public road corridor and do not require any works to adjoining lands, therefore no impacts to forestry land or landuse can occur. Monitoring Activities do not require any works to land or result in land use change, therefore no impacts can occur. Upperchurch Hen Harrier Scheme: no potential for impacts, as all activities and management practices will take place on agricultural lands. The Overhead Line Activities will involve access over forestry lands using established access routes mainly along existing tracks and along forestry firebreaks. No works are required to lands, and activities are limited to in situ pole sets and angle masts and the existing overhead line, therefore there is no potential for effects to forestry lands or landuse.

Forestry Land

Sensitive Aspect

9.3.2.3 Cumulative Information: Baseline Characteristics – Context & Character

In the Whole UWF Project context, forestry lands occurs within the landholdings the subject of the UWF Grid Connection (in particular the 110kV UGC), the Upperchurch Windfarm and the UWF Related Works.

9.3.2.3.1 Element 1: UWF Grid Connection

A review of aerial imagery indicates a level of forest cover in the Slievefelim to Silvermines uplands area which is substantially greater than the national average, and is estimated to be 30 to 35% of the land cover.

About 46% of the UWF Grid Connection area is located on forestry lands, with 18.3 hectares of land within construction works areas spread across 5 No. forestry landholdings. These 5 No. landholdings together have an area of c.1310 hectares.

The UWF Grid Connection is located within the Slievefelim to Silvermine uplands area, the highest points of which remain generally unenclosed and are only used for low intensity farming. Significant parts of these uplands are also designated a Special Protection Area (SPA 4165 – Slievefelim to Silvermines Mountain) under the Birds Directive principally because of the occurrence of the hen harrier (*Circus cyaneus*). The SPA designation effectively restricts forestry usage and afforestation is not generally permitted within the SPA.

9.3.2.3.2 Element 2: UWF Related Works

Just over a half of UWF Related Works construction works areas relate to sections of Internal Windfarm Cabling which will be located within Consented UWF Roads. In relation to the remaining UWF Related Works areas, a small proportion (6%) will be located on forestry lands with 1.3 hectares of land within construction works areas spread across 6 no. forestry landholdings. These 6 No. landholdings together have a total area of c.112 hectares. 5 of the 6 No. forestry landholdings will also contain Upperchurch Windfarm works areas.

9.3.2.3.3 Element 4: Upperchurch Windfarm

Land

Topic

Forestry Land	The footprint of the Upperchurch Windfarm will be 56.3 hectares of lands, 9.8 hectares of which are forestry lands. In relation to landholdings, 4 No. forestry landholdings, which together have a total area of c.104 hectares, are associated with the Upperchurch Windfarm.	
	9.3.2.3.4 Element 5: UWF Other Activities	Not applicable – Element evaluated as excluded. See Section 9.3.2.2.1
	9.3.2.3.5 Other Projects or Activities	Not applicable – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 9.3.2.1.
	9.3.2.4 Cumulative Information Baseline Characteristics - Importance of Forestry Land	
Sensitive Aspect	The Cumulative Evaluation Study Area is within the Slievefelim and Silvermine uplands, which have long been the focus of afforestation. This is apparent on the aerial mapping on Figure CE 9.3 where, as mentioned above, a high proportion of the land in the district (c.30 - 35%) is under forestry, considerably higher than the national average cover of just under 12%. All of the forest within the study area is managed commercially and it is therefore important as a landuse in the local context with plantations being in both public and private ownership.	
	9.3.2.5 Cumulative Information Baseline Characteristics - Sensitivity of Forestry Land	
	While forestry it is somewhat vulnerable to natural processes like fire, windblow and disease, forestry is resilient and, given time and positive management, it will recover from virtually all natural and human impacts. Like agricultural landuse, forestry operates at scale in this district. It is a robust use of land and is not considered to be sensitive.	
Land	9.3.2.6 Cumulative Information Baseline Characteristics - Trends in the Baseline Environment (the 'Do-Nothing' scenario)	
	Nationally, forest area levels are stable and are rising slightly on foot of statutory regulation and various incentives emanating from the already noted government policy objectives. In this general area afforestation will most likely increase as a landuse as cattle farming gradually declines on the more marginal farming areas. However, lands designated as SPA are not currently permitted to be afforested. This is likely to keep forest cover at current levels within the Slievefelim to Silvermines SPA boundary.	
	9.3.2.7 Cumulative Information Baseline Characteristics - Receiving Environment (the Baseline + Trends)	
Topic	Rates of afforestation are relatively low in general and will be maintained thus by the restrictions imposed by SPA designation. Therefore it is assumed in this report that the baseline environment identified above will be the receiving environment.	

9.3.3 Cumulative Information: PROJECT DESIGN MEASURES for Forestry Land

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 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.**

Forestry Land

Sensitive Aspect

Land

Topic

9.3.4 Cumulative Information: EVALUATION OF IMPACTS to Forestry Land

It is evaluated that **UWF Replacement Forestry has no potential to cause impacts to Forestry Land**, see Section 9.3.1.

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) - Forestry Land.

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

Table 9-10: List of all Impacts included and excluded from the Impact Evaluation Table sections

<u>Impacts Included</u> (Evaluated in the Impact Evaluation Table sections)	<u>Impacts Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Loss of Use and Connectivity of Landholdings (Construction stage)	Reduction in forest growth rates due to a change in the drainage regime (construction stage)
	Change of land use (operational stage)
	Improvement in infrastructure (operational stage)
	Loss of use and connectivity of land through the splitting of parcels of land (operational stage)

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Table in the next section - **Section 9.3.4.1**.

The source-pathway-receptor links and the rationale for impacts excluded are described in the section directly after the Impact Evaluation Table, in Section 9.3.4.2.

9.3.4.1 Impact Evaluation Table: Loss of Use and Connectivity of Landholdings

Evaluation of UWF Replacement Forestry Excluded: As the lands are currently set to agricultural grassland, there is no potential for UWF Replacement Forestry to cause loss of use or connectivity effects to Forestry Land by itself, and consequently this project 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 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 & Early Operational Stage

Impact Source: n/a

Cumulative Impact Source: Construction works areas, haul routes on forestry roads

Impact Pathway: Forestry roads, presence of construction/delivery machinery

Impact Description: Forestry lands (not forestry roads) within the construction works areas will be fenced off and unavailable for forestry use during construction and in the early operational stage until vegetation has re-established on construction works areas. Construction machinery and construction works will also be present on some sections of forestry roads.

Impact Quality: Negative

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

Element 1: UWF Grid Connection

Impact Magnitude:

The construction works areas are located on 18.3 hectares of forestry lands spread over 5 No. landholdings, with a total forestry landholding area of c.1,310 hectares. Haul routes are located on 5.7 km of the existing forestry road network.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- the small scale (1%) of lands subject to works, in the context of the size of forestry landholdings
- the temporary duration (up to 1 year),
- the reversibility of the impact with the completion of the works, and
- the alternative access available on forestry landholdings

Element 2: UWF Related Works

Impact Magnitude:

The construction works areas are located on 1.3 hectares of forestry land spread over 6 No. landholdings, with a total forestry landholding area of c.112 hectares. Haul routes are located on 0.9 km of the existing forestry road network.

Significance of the Impact: Imperceptible

Forestry Land	<u>Rationale for Impact Evaluation:</u> - the small scale (1%) of lands subject to works, in the context of the size of forestry landholdings - the temporary duration (up to 1 year), - the reversibility of the impact with the completion of the works, and - the alternative access available on forestry landholdings.
	Element 4: Upperchurch Windfarm
	<u>Impact Magnitude:</u> The footprint of the Upperchurch Windfarm comprises 56.3 hectares. Construction works will take place on 9.8 hectares of forestry land over 5 No. landholdings, with a total landholding area of c.104 hectares.
	<u>Significance of the Impact:</u> Slight
Sensitive Aspect	<u>Rationale for Impact Evaluation:</u> - the small scale (9%) of lands subject to works, in the context of the size of forestry landholdings, - the temporary to short-term duration (up to 1.5 years), and, - the alternative access available on forestry landholdings.
	Element 5: UWF Other Activities – <i>N/A, evaluated as excluded, see Section 9.3.2.2.1</i>
	Evaluation of Cumulative Impacts – Loss of Use and Connectivity of Landholdings
	All Elements of the Whole UWF Project
	<u>Cumulative Impact Magnitude:</u> In total, construction works are located on 29.4 hectares of forestry lands, spread over 17 No. landholdings, with a total landholding area of c.1,396 hectares. In total 6.6 km of existing forestry roads will be used as haulage access roads during construction.
	<u>Significance of the Cumulative Impact:</u> Imperceptible
	<u>Rationale</u> for Cumulative Impact Evaluation: - the small scale (2%) of lands subject to works, in the context of the size of forestry landholdings, - the temporary duration - the reversibility of the impact with the completion of the works, and, - the alternative access available on forestry landholdings.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities were evaluated as having potential to cause cumulative effects to Forestry Land with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 9.3.2.1).

9.3.4.2 Cumulative Information: Description and Rationale for Excluding (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 9-11 below.

Table 9-11: Description and Rationale for Excluded Impacts to Forestry Land

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</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
Construction Stage				
Trench and Foundation excavations	1,2,4	Ground-water flow paths	Reduction in forestry growth rates due to a change in the drainage regime	Rationale for Excluding: Neutral impact, As per Chapter 11: Water, due to the shallow nature of the trenches and excavations associated with the Individual Project Elements, the impact on groundwater will be of imperceptible significance within 30m and Neutral beyond this distance. Based on the evaluation contained in Chapter 11 Water, it is considered that any reduction in forest growth rates caused by a change in the drainage regime will have a Neutral effect on the productivity of land.
Operational Stage				
Forestry felling, afforestation, presence of above ground structures	1,2,4	Land cover	Change of land use	Rationale for Excluding: Neutral impact, in relation to the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm, it is considered that due to the very small scale of land use change (less than 1% of the landholding area) that a Neutral effect to forestry lands will occur.
Construction of new access roads & upgrading of existing private roads	1,2,4	Private Roads	Improvement in infrastructure	Rationale for Excluding: Neutral impact, in relation to the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm, although the upgrade of forestry roads and the construction of some short lengths of new roads will be a positive effect on forestry landholdings, the scale of road upgrading or construction will equate to less than 1% of the landholding areas. Therefore, it is considered that the upgrade/construction of roads will have a Neutral effect to the productivity or use of forestry lands.
Operational activities	1,2,4	Work area boundaries	Loss of use and connectivity of land through the splitting of parcels of land	Rationale for Excluding: Neutral impact, maintenance activities will range from annual testing of the UWF Grid Connection, to monthly inspection of UWF Related Works, to weekly maintenance of the Upperchurch Windfarm. All of these activities will take place from hard-core areas, with the vast majority of activity taking place on the turbine hardstands, and there will be no requirement for a works area boundary to be erected. Therefore operational activities will have a Neutral effect on land use.
Decommissioning Stage				
Rationale for Excluding: No potential for impacts/Neutral impacts: UWF Grid Connection will remain part of the National Grid, therefore no impacts can occur.				

		<u>Source(s) of Impacts</u>	<u>Project Element</u>	<u>Pathway</u>	<u>Impacts (Consequences)</u>	<u>Rationale for Excluding (Scoping Out)</u>
Forestry Land	Sensitive Aspect	UWF Related Works: The cables will be pulled from the Internal Windfarm Cabling ducts at the turbines or at the substation; the ducting, Realigned Windfarm Roads and Haul Route Works will remain in-situ; therefore no decommissioning works to lands are required.				
		Upperchurch Windfarm: It is likely that the Consented UWF Substation will remain in-situ for use by ESNB and that the Consented UWF Roads will also remain in-situ for use by the landowner. Decommissioning works will be limited to the Consented UWF Turbines, hardstanding areas and associated drainage systems, along with the meteorological masts. All decommissioning works will take place from hard-core areas, with the vast majority of activity taking place on the turbine hardstands. Works area boundaries will not be required for decommissioning activities. Therefore, it is considered that decommissioning activities will have a Neutral effect on land use.				

9.3.5 Mitigation Measures for Impacts to Forestry Land

Mitigation measures are not relevant as **UWF Replacement Forestry will not cause adverse impacts** to Forestry Land.

9.3.6 Evaluation of Residual Impacts to Forestry Land

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 9.3.1), i.e. **no impacts**.

9.3.7 Application of Best Practice and the EMP for Forestry Land

No UWF Replacement Forestry Best Practice Measures have been developed specifically for Forestry Land.

9.3.8 Summary of Impacts to Forestry Land

The topic authors conclude that there is no potential for UWF Replacement Forestry to cause impacts to Forestry Land.

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 9-12: Summary of the impacts to Forestry Land

Impact to Forestry Land:	Loss of Use and Connectivity of Landholdings
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Section 9.3.4.1</i>
<i>Project Life-Cycle Stage (for Other Elements only)</i>	<i>Construction/early operational</i>
<u>UWF Replacement Forestry Impact</u>	No Impacts Evaluated as Excluded - see Section 9.3.1
Element 1: UWF Grid Connection	Imperceptible
Element 2: UWF Related Works	Imperceptible
Element 4: Upperchurch Windfarm	Slight
Element 5: UWF Other Activities	No Potential for Impact - Evaluated as Excluded, see Section 9.3.2.2.1
<u>Cumulative Impact:</u> <i>(for Other Elements only)</i>	
All Elements of the Whole UWF Project	Imperceptible

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities were evaluated as having potential to cause cumulative effects to Forestry Land with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 9.3.2.1).

Forestry Land

Sensitive Aspect

Land

Topic

9.4 Policy Context

9.4.1 National Policy

Agricultural Land: The further expansion and progression of agriculture as outlined in *Food Wise 2025 – Local Roots Global Reach* is adopted government policy and remains a key component of rural development.

Output growth in all the main agricultural commodities is envisaged along with similar increases in downstream food and beverage production. Agricultural growth is projected to occur sustainably and without compromising biodiversity.

In effect production increases at farm level will come about mainly through technology and scale.

Forestry Land: The use of land for forestry is consistent with long standing government policy as presented in the Irish government's *Forestry Programme 2014 to 2020* to increase the area of the national forest estate for economic, social, biodiversity, energy sustainability and climate change reasons.

Annual afforestation in Ireland is projected to continue at an average rate of about 7,200 ha per annum in period mentioned and the further development and utilisation of the national forest resource is targeted for further growth and societal well-being.

9.4.2 Regional Policy

There are no specific land use zoning objectives in Mid-West Regional Planning Guidelines 2010-2022, for the agricultural or forestry lands that are part of the Whole UWF Project.

9.4.3 North Tipperary County Development Plan 2010 (as varied):

The developments are wholly within the former North Tipperary County Council administrative area. There are no specific land use zoning objectives in North Tipperary County Development Plan 2010 (as varied), for the agricultural or forestry lands that are part of the Whole UWF Project.

9.5 Best Practice Measures

No UWF Replacement Forestry Best Practice Measures have been created specifically for Land.

9.6 Summary of the Land Chapter

The UWF Replacement Forestry is located in the rural countryside in County Tipperary, landuse within the site boundary is Agriculture. It is proposed to permanently change this land use to Forestry, through the planting of the 6ha site with native woodland species.

Sensitive Aspects of Land which were evaluated in this topic chapter include Agricultural Land and Forestry Land.

9.6.1 Summary of UWF Replacement Forestry Impacts

- No impacts to either Agricultural Land or Forestry Land are expected to occur as a consequence of the development of UWF Replacement Forestry.

9.6.2 Summary of Cumulative Impacts of the 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 for these Other Elements (in particular UWF Grid Connection, UWF Related Works and Upperchurch Windfarm).

- As the UWF Replacement Forestry will not cause effects to Agricultural Land or Forestry Land itself, there is no potential for this Element to have cumulative impacts with any of the Other Elements of the Whole UWF Project.
- Cumulative impacts to Agricultural Land and Forestry Land, of the Other Elements with each other will not be greater than Imperceptible. These cumulative impacts relate to loss of use and connectivity of lands during the construction stage and early operational stage.

9.6.3 Cumulative Impacts with Other Projects or Activities

There is no potential for cumulative effects with Other Projects or Activities.

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UWF Replacement Forestry EIA Report

Volume C2: EIAR Main Report

Chapter 10: Soils

Topic Chapter Authors:



EIAR Coordinator:



Topic	Soils

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

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Appendix 10.1	Trail Hole Investigations
Appendix 10.2	Borehole Investigations
Appendix 10.3	Peat Stability Assessment
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Appendix 10.5	Geophysical Survey Report

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

Glossary of Terms

<u>Term</u>	<u>Definition</u>
Alluvium	Deposits of clays, silts, sands and gravels associated with river action.
Blanket Bog	Blanket bog is an area of peatland, forming where there is a climate of high rainfall and a low level of evapotranspiration, allowing decomposed organic material to accumulate over large expanses of undulating ground.
Boulder Clay	See glacial till.
Glacial Till	Glacial sediment that is deposited directly from glacial ice and therefore not sorted. Also can be called overburden or boulder clay.
Greywacke	A variety of argillaceous sandstone that is highly indurated and poorly sorted.
Fluvio-glacial Deposits	Sediments deposited by river or/and glacial action.
Limestone	A sedimentary rock composed primarily of calcium carbonate. Some 10% to 15% of all sedimentary rocks are limestones. Limestone is usually organic, but it may also be inorganic.
Mineral Subsoil	Subsoil derived from parent bedrock material such as sandstone and limestone
Metasediments	Material derived from pre-existing rock which has undergone metamorphism.

<u>Term</u>	<u>Definition</u>
Mudstone	Argillaceous or clay-bearing sedimentary rock which is non-plastic and has a massive non-foliated appearance.
Overburden	See glacial till.
Project Design Measure	Measures for environmental protection, incorporated into the design of the project.
Sandstone	A clastic rock composed of particles that range in diameter from 1/16 millimetre to 2 millimetres in diameter. Sandstones make up about 25% of all sedimentary rocks.
Schist	A strongly foliated metamorphic rock that develops from mudstone or shale and splits easily into flat, parallel slabs.
Shale	A rock formed from fine-grained clay-size sediment.
Siltstone	A typically layered and flaggy rock composed of two thirds silt-sized particles.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Topsoil	The uppermost mineral or organic layer of soil
Volcanic	An igneous rock formed from lava that has flowed out onto the Earth's surface, characterised by rapid solidification.

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
NHA	National Heritage Area as defined by the National Parks and Wildlife Services
SAC	Special Areas of Conservation as defined by the National Parks and Wildlife Services
UGC	Underground Cables
UWF	Upperchurch Windfarm

Topic	Soils

10 Environmental Factor: Soils

10.1 Introduction to the Soils Chapter

10.1.1 What are Soils?

Soil is a biologically active, complex mixture of weathered minerals, organic matter, organisms, air and water. This mixture supports a range of critical functions such as supporting terrestrial ecosystems and biological diversity, agricultural food production, flood alleviation, water filtration and storage, and carbon capture.¹ This Soils chapter relates to the topsoil, peat, and mineral subsoil (collectively referred to as overburden) along with the underlying bedrock.

10.1.2 Overview of Soils in the Local Environment

The UWF Replacement Forestry will be located entirely on agricultural grassland in the eastern extent of the Slievefelim to Silvermines upland area, see [Figure RF 10.1: Location of the UWF Replacement Forestry](#). Figures and mapping which are referenced in this topic chapter can be found in [Volume C3 EIAR Figures](#).

Soils (*i.e.* superficial geology including subsoils) in the study area comprise mainly mineral or organic (peaty) topsoil over glacial tills with very minor sections of blanket bog – See [Figure RF 10.2: Local, Soils and Subsoils within the UWF Replacement Forestry study area](#).

The underlying bedrock in the study area comprises a mixture of sandstone, limestone and volcanic meta-sediments, with the latter being most predominant.

There is one designated site and one County Geological Heritage Site in the surrounding area; a County Geological Site – Owenbeg Moraines CHS, which relates to cross valley moraines in the Owenbeg Valley near Milestone, and the Lower River Suir SAC which extends up the Owenbeg River valley. Both of these sites are located to the south of the UWF Replacement Forestry, which does not exist within the SAC boundary or within the unaudited boundary of County Geology Heritage Site.

Overall, the soil, subsoil and bedrock at the majority of the study area can be considered to have a low to medium geological importance.

¹ www.epa.ie/irelandsenvironment/landandsoil/

10.1.3 Sensitive Aspects of the Soils 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	Local Soils, Subsoils and Bedrock	Section 10.2
Sensitive Aspect No. 2	Lower River Shannon SAC	Section 10.3
Sensitive Aspect No. 3	Bleanbeg Bog NHA	Section 10.4

Each of the above listed Sensitive Aspects are evaluated individually in Sections 10.2 to 10.4 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 10.2 to 10.4. The colour-codes have been applied to section headings, tables and on side-tabs on the edge of the pages.

10.1.4 Sensitive Aspects excluded from further evaluation

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

Mauherslieve Bog NHA	Evaluated as having no potential for impacts due to: Mauherslieve Bog NHA is an upland blanket bog which is located approximately 0.6km north of the UWF Grid Connection (110kV UGC at Route Section S72), 5km west of the UWF Related Works and Upperchurch Windfarm and 6.5km west of the <u>UWF Replacement Forestry</u>. As no element of the Whole UWF Project is located within this NHA, direct effects on soils and geology within the NHA are scoped out from further evaluation, as no impacts will take place. The potential for indirect hydrological effects are considered in Chapter 11 Water.
Lower River Suir SAC	Evaluated as having no potential for impacts due to: The Lower River Suir SAC is located to the south of the elements of the Whole UWF Project - 5.8km from UWF Grid Connection, 5.5km from UWF Related Works, 6km from Upperchurch Windfarm and 8.5km from <u>UWF Replacement Forestry</u> No element of the Whole UWF Project Interacts directly with the River Suir as there are no works located within the SAC boundary and therefore no direct impacts on soil and geology within the SAC will take place. The potential for indirect effects from sediment laden runoff into the SAC are considered in Chapter 11 Water.
Rear Cross Moraine	Effects evaluated as Neutral due to: Moraines are mapped in a valley less than 500m to the south of the UWF Grid Connection (110kV UGC) at Rear Cross. The route of the UWF Grid Connection (110kV UGC) north of Rear Cross passes within the unaudited boundary of Rear Cross Moraines. However, the route is largely via a forestry road and all works are contained within the carriageway of the road. Also, the temporary and shallow nature of the works means effects would be Neutral. UWF Related Works, <u>UWF Replacement Forestry</u>, Upperchurch Windfarm and UWF Other Activities are located greater than 5km from these Moraines and due to the intervening distance will not cause any effects to the Rear Cross Moraine.
Owenbeg Moraine	Evaluated as having no potential for impacts due to: The construction works areas are located at a distance from and do not intercept the unaudited mapped boundary of the Owenbeg Moraine, which is mapped in the Owenbeg River valley to the south of the UWF Related Works, Upperchurch Windfarm, UWF Grid Connection and <u>UWF Replacement Forestry</u>.

10.1.5 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 10-1: Subject Development –UWF Replacement Forestry

<u>Project ID</u>	<u>The Subject Development</u>	<u>Composition of the Subject Development</u>
Element 3	The Subject Development 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.

10.1.6 The Authors of the Soils Chapter

This report on the Environmental Factor Soils and Geology has been written by David Broderick (BSc, H. Dip Env Eng, MSc): Hydrogeologist; and Michael Gill (P. Geo., B.A., B.A.I., M.Sc., Dip. Geol, MIEI): Environmental Engineer and Hydrogeologist of Hydro-Environmental Services (HES). HES was established in 2005 as a hydrological, hydrogeological and environmental practice, specialising in soils and geology, and peatland and upland hydrology.

10.1.7 Sources of Baseline Information

The information sources outlined in Table 10-2 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 10-2: Sources of Baseline Information for Soils

Type	Source
Consultation	Feedback was received from Irish Peatland Conservation Council See Chapter 3: The Scoping Consultations, Chapter 3 Appendices for further details.
Industry Guidelines	- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes; and, - Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements
Desktop	- Environmental Protection Agency database (www.epa.ie); - Geological Survey of Ireland Database (www.gsi.ie); - National Parks & Wildlife Services Public Map Viewer (www.npws.ie); - Review of Chapter 9: Land - Review of the existing EIS and planning documents for the consented Upperchurch Windfarm and the consented Castlewaller Windfarm;; - Review of existing site investigation data for the Consented Upperchurch Windfarm (20 no. trial pits and 2 no. peat probes) in the context of the UWF Related Works, (Appendix 10.4)
Fieldwork	- Walkover surveys and geological mapping at the Whole UWF Project development areas were undertaken (2 no. full walkover surveys were completed); - A total of 41 no. of trial pits were undertaken within the UWF Grid Connection study area to assess soil / subsoil lithology, subsoil depth and ground conditions (32 of 41 no. were undertaken along the direct line of the route); (Appendix 10.1) 2 no. boreholes were completed at each of the three main river crossings along the 110kV UGC route (<i>i.e.</i> 6 no. boreholes in total) to assess subsoil and bedrock conditions (<i>i.e.</i> Newport (Mulkear) River, Bilboa River and Clare River); (Appendix 10.2) - A geophysical survey was undertaken at the Newport (Mulkear) River crossing (Appendix 10.5); - A peat stability assessment was undertaken for the route of the 110kV UGC; (Appendix 10.3); and, - Peat depths and gouge coring (6 no.) was undertaken for an off road section of the 110kV UGC within forestry blanket bog at Castlewaller (Appendix 10.3).

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

10.1.7.1 Certainty and Sufficiency of Information Provided

A clear documentary trail is provided throughout this chapter and chapter appendices 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 site specific investigations, data and documents generated by public bodies and statutory agencies. In respect of Soil no significant limitations or difficulties were encountered.

10.1.8 Methodology for Evaluating Soils Effects

10.1.8.1 NRA Soil Evaluation Criteria

The criteria used for soils appraisals are derived from the above listed Guidelines. Whilst this is tailored to the soil appraisal, the significance judgements correspond very closely with the EPA significance criteria with the main point of note being that significance of impacts range from “Imperceptible to Profound”. The criteria and approach for evaluation of soil are set out below.

When assessing the potential impacts on soil and geology resulting from a proposed development, the following approach and criteria are considered: Quantify the Importance; Estimate the Magnitude of the impact; and Determine the Significance of the impact.

Using the National Roads Authority (2008) guidance, an estimation of the importance of the soil and geological environment within the study area is quantified, using the criteria set out in Table 10-3 below. An estimation of the magnitude of the impact is assessed using criteria in Table 10.4 (NRA, 2008) and the rating of environmental impacts is then assessed using criteria in Table 10-5 (NRA, 2008).

Table 10-3: NRA Criteria for Determining the Importance of Soil and Geology

Importance	Criteria ¹	Typical Example
Very High	- Attribute has a high quality, significance or value on a regional or national scale. - Degree or extent of soil contamination is significant on a national or regional scale. - Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	- Geological feature rare on a regional or national scale (NHA/SAC). - Large existing quarry or pit. - Proven economically extractable mineral resource.
High	- Attribute has a high quality, significance or value on a local scale. - Degree or extent of soil contamination is significant on a local scale. - Volume of peat and/or soft organic soil underlying site is significant on a local scale.	- Contaminated soil on site with previous heavy industrial usage. - Large recent landfill site for mixed wastes. - Geological feature of high value on a local scale (County Geological Site). - Well drained and/or high fertility soils. - Moderately sized existing quarry or pit. - Marginally economic extractable mineral resource.
Medium	- Attribute has a medium quality, significance or value on a local scale. - Degree or extent of soil contamination is moderate on a local scale. - Volume of peat and/or soft organic soil underlying site is moderate on a local scale.	- Contaminated soil on site with previous light industrial usage. - Small recent landfill site for mixed Wastes. - Moderately drained and/or moderate fertility soils. - Small existing quarry or pit. - Sub-economic extractable mineral resource.
Low	- Attribute has a low quality, significance or value on a local scale. - Degree or extent of soil contamination is minor on a local scale. - Volume of peat and/or soft organic soil underlying site is small on a local scale.	- Large historical and/or recent site for construction and demolition wastes. - Small historical and/or recent landfill site for construction and demolition wastes. - Poorly drained and/or low fertility soils. - Uneconomically extractable mineral resource.

¹ High quality and a high degree of site contamination are put side by side in this table, because either could be a potentially constraining factor when developing a site. High quality will likely be more relevant to a Greenfield site, while the extent of contamination will likely be more relevant to a Brownfield site. The higher the quality or contamination means the higher the potential for constraints (i.e. the higher the importance).

Table 10-4: NRA Estimation of Magnitude of Impact (NRA, 2008)

<u>Magnitude of Impact</u>	<u>Criteria</u>	<u>Typical Examples</u>
Large Adverse	Results in loss of attribute	• Loss of high proportion of future quarry or pit reserves • Irreversible loss of high proportion of local high fertility soils • Removal of entirety of geological heritage feature • Requirement to excavate / remediate entire waste site • Requirement to excavate and replace high proportion of peat, • Organic soils and/or soft mineral soils beneath alignment
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	• Loss of moderate proportion of future quarry or pit reserves • Removal of part of geological heritage feature • Irreversible loss of moderate proportion of local high fertility soils • Requirement to excavate / remediate significant proportion of waste site • Requirement to excavate and replace moderate proportion of peat, • organic soils and/or soft mineral soils beneath alignment
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	• Loss of small proportion of future quarry or pit reserves • Removal of small part of geological heritage feature • Irreversible loss of small proportion of local high fertility soils and/or • High proportion of local low fertility soils • Requirement to excavate / remediate small proportion of waste site • Requirement to excavate and replace small proportion of peat, • Organic soils and/or soft mineral soils beneath alignment
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	• No measurable changes in attributes

Table 10-5: NRA Rating of Environmental Impacts at EIAR Stage (NRA, 2008)

	<u>Magnitude of Impact</u>			
<u>Importance of Tribute</u>	Negligible	Small Adverse	Moderate Adverse	Large Adverse
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/Moderate	Profound/Significant	Profound
High	Imperceptible	Moderate/Slight	Significant/Moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

10.2 Sensitive Aspect No.1: Local Soils, Subsoils & Bedrock

This Section provides a description and evaluation of the Sensitive Aspect - Local Soils, Subsoils & Bedrock.

10.2.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

10.2.1.1 Baseline Characteristics of Local Soils, Subsoils & Bedrock in relation to UWF Replacement Forestry

Soils (*i.e.* superficial geology including subsoils) in area of the UWF Replacement Forestry comprise mainly mineral or organic (peaty) topsoil over glacial tills with very minor sections of blanket bog. The underlying bedrock in the area comprises a mixture of sandstone, limestone and volcanic meta-sediments, with the latter being most predominant.

10.2.1.2 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 10-6 are relevant to **Local Soils, Subsoils & Bedrock**.

Table 10-6: UWF Replacement Forestry Project Design Measures relevant to Local Soils, Subsoils & Bedrock

PD ID	Project Design Environmental Protection Measure (PD)
RF-PD 02	The lands will be planted by hand, using spades and handtools.
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

10.2.1.3 Evaluation of UWF Replacement Forestry Study Area

UWF Replacement Forestry was evaluated for its potential to cause impacts to Local Soils, Subsoils & Bedrock.

It was evaluated by the topic authors that **no impacts Local Soils, Subsoils & Bedrock are likely to occur** due to the development of the UWF Replacement Forestry, for the following reasons:

- Neutral excavation/relocation effects or erosion effects to local soils or subsoils as there will be no requirement for mechanical excavations with the UWF Replacement Forestry being planted by hand using spades (Project Design Measure), any excavation of soil will be very localized and shallow.
- No potential for compaction effects, as there will be no use of heavy machinery during the planting or maintenance activities,
- No potential for impacts to bedrock, as there will be no requirement to excavate bedrock.
- Neutral contamination effects, as there will be no refuelling of vehicles, no storage of fuels and no overnight parking permitted within the site (Project Design Measure),

- No potential for contamination of soils by pesticides, fertilizers or cementitious materials, as pesticides or fertilizers will not be used (Project Design Measure) and there will be no requirement for cement based products for the UWF Replacement Forestry,
- No effects on soils and geology are expected during the growing (operational) phase as there is no requirement for any excavations.
- The UWF Replacement Forestry will be permanent woodland (project design) therefore no harvesting (changes to the project) will occur.

Note: The potential for indirect hydrological effects are considered in **Chapter 11 Water**.

10.2.1.4 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 is not likely to cause impacts to Local Soils, Subsoils & Bedrock itself, and therefore 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 evaluations for the Other Elements of the Whole UWF Project are included in Section 10.2.2 to Section 10.2.4 and included in the summary table in Section 10.2.8 in order to show the totality of the project.

10.2.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

10.2.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Local Soils, Subsoils & Bedrock 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 10.2.2.2.1](#) below.

The evaluation of cumulative impacts to Local Soils, Subsoils & Bedrock 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 Local Soils, Subsoils & Bedrock 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 \(Section A2.3.1 and Section A2.3.10\)](#).

The results of this scoping exercise are that: no other projects or activities will cause cumulative effects to Local Soils, Subsoils & Bedrock with UWF Replacement Forestry however in order to present the totality of the project – Castlewaller Windfarm has been scoped in for evaluation of cumulative effects relating to the Other Elements.

10.2.2.2 Cumulative Evaluation Study Area

The study area for the evaluation of cumulative effects is described in Table 10-7.

Table 10-7: Cumulative Evaluation Study Area for Soils - Local Soils, Subsoils & Bedrock

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Boundary of works areas, and activity locations	Only direct effects on soils and geology are anticipated.
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities: Castlewaller Windfarm 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		

10.2.2.2.1 Potential for Impacts to Local Soils, Subsoils and Bedrock

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 Local Soils, Subsoils and Bedrock. The results of this evaluation are included in Table 10-8.

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 10.2: Local Soils & Subsoils within the Cumulative Evaluation Study Area**, and **Figure CE 10.3: Local Bedrock within the Cumulative Evaluation Study Area**. (Volume C3 EIAR Figures).

Table 10-8: 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	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	Evaluated as excluded: Neutral effect/No potential for effects due to: Haul Route Activities: no potential for impacts as matting will be laid over any reinstated verges as necessary; these activities will not require any works, excavations or relocation of soils. Overhead Line Activities: Neutral impact, these activities will involve cable wrapping and re-sagging of the overhead existing lines and there and will not involve mechanical excavation or relocation of soils, therefore effects on soils will be Neutral. Upperchurch Hen Harrier Scheme: Neutral impact, this activity will comprise planting and fencing at hedgerows, watercourse boundaries and areas of scrub. These activities will generally take place on the periphery of fields and will not involve mechanical excavation or moving soils, therefore effects on soils will be Neutral. During the Operational Stage of UWF, farming practices under the Upperchurch Hen Harrier Scheme will, to a certain extent, cause lands to revert back to wet grassland which will have a neutral / positive effect on soils over time, albeit Neutral due to the extent of the Scheme area in the context of the extent of soils in the surrounding area. Monitoring Activities: No potential for impacts, these activities will not require any works, excavations or relocation of soils.
Other Projects or Activities	
Castlewaller Windfarm	Yes, included for the evaluation of cumulative effects 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.

10.2.2.3 Cumulative Information: Baseline Characteristics – Context & Character

10.2.2.3.1 Element 1: UWF Grid Connection

To put the soil and geological environment into context, the current landuse in the study area is briefly described here.

The UWF Grid Connection will be located in the Slievefelim to Silvermine Mountain upland area, predominately on upland agricultural grassland and forestry and along with both private and public roads, as outlined in Table 10-9.

The 110kV UGC will run in an easterly direction from the new Mountphilips Substation, which will be constructed on a grassland site near Newport, and crosses over the southern hills of the Silvermine Mountains / Slievefelim Mountains towards the Consented UWF Substation. The straight line distance between the Mountphilips Substation and the Consented UWF Substation is ~23km while the actual length of the 110kV UGC route is ~27.5km.

An overview of the current landuse at the UWF Grid Connection areas is shown in Table 10-9 below. Please refer to the Land Chapter (Chapter 9) for full details relating to landuse within the UWF Grid Connection study area. For information relating to historical landuse at the construction works areas, please refer to the Cultural Heritage Chapter (Chapter 16).

Table 10-9: Overview of Landuse within the UWF Grid Connection Study Area

<u>Element</u>	<u>Total Landuse (Ha)</u>	<u>Forestry</u>	<u>Agricultural</u>	<u>Public Roads</u>
UWF Grid Connection	39.1	47%	48%	5%

A summary of the Geological Survey of Ireland (GSI) mapped subsoil and bedrock geology within the study areas is shown in Table 10-10 below. The GSI mapping for subsoils and bedrock geology is illustrated on [Figure GC 10.2.1 to Figure GC 10.2.3](#) (Local Subsoil Maps 1 to 3) and on [Figure GC 10.3.1 to Figure GC 10.3.2](#) (Local Bedrock Geology Maps 1 to 2). Figures GC 10.2 and Figures GC 10.3 are part of the UWF Grid Connection EIA Report and are included in [Volume E: Reference Documents](#) with this planning application

Table 10-10: Summary of the GSI Mapped Geology within the UWF Grid Connection Study Area

<u>UWF Grid Connection part</u>	<u>Length (km) / Parts</u>	<u>General Bedrock Unit Name</u>	<u>GSI Local Bedrock Formation Description</u>	<u>Main Subsoil Type</u>	<u>Main Soil Type</u>
Mountphilips Substation & End Masts	All	Dinantian Lower Impure Limestone / Dinantian Sandstones, Shales and Limestone	Dark, muddy Limestone and Shale / Sandstone, Mudstone and thin Limestone	Sandstone Tills	Poorly Draining Mineral soil
110KV UGC (S1 - S6 ¹)	0.47	Dinantian Sandstones, Shales and Limestone	Sandstone, Mudstone and thin Limestone	Sandstone Tills	Poorly Draining and Well Draining Mineral soil
110KV UGC (S6 – S40)	8.5	Old Red Sandstones	Pale red Sandstone, Grit and Claystone	Sandstone Tills and Blanket Peat	Poorly Draining Mineral soil and Peaty Soil
110KV UGC (S40 – S102)	18.5	Silurian Metasediments and Volcanics	Greywacke, Siltstone and Grit	Sandstone and Shale Tills with some Blanket Peat	Peaty Soil and Poorly Draining Mineral Soil

Notes: The Mountphilips Substation is located at UGC Section 1; The Consented UWF Substation is located at the end of UGC Section 102.

The detailed walkover surveys and site investigations, (identified in Section 10.1.7 Sources of Baseline Information), were undertaken in UWF Grid Connection study area between January 2016 and September 2017. The findings of the walkover surveys and site investigations are summarised in Table 10-11. For ease of reference the findings of the investigations are described from west (110kV UGC Section 1) to east (110kV UGC Section 102) along the 110kV UGC (UWF Grid Connection). The location of site investigations is identified on the Local Subsoil Maps on [Figure GC 10.2.1](#) to [Figure GC 10.2.3](#) (part of the UWF Grid Connection EIA Report).

Table 10-11: Summary of Local Geology and Ground Conditions in UWF Grid Connection Study Area

Location	Landuse	Site Investigations	Summary of Local Geology and Ground Conditions
Mountphilips Substation (and End Masts)	Grassland	4 no. Trial Pits	- Poorly draining mineral soil over sandstone tills - Alluvium adjacent to stream flowing between Compound site and End Masts - Trial Pits intercepted sandy SILT over gravelly sandy CLAY - Depth to bedrock >3m at End Mast location; - Depth to bedrock >1.4m at Substation location.
110kV UGC Section S1 – S36	Mainly grass-land with some private forestry	5 no. Trial Pits	- Poorly draining soil on lower ground - Well draining soil on higher ground - Subsoils are sandstone tills - Trial Pits intercepted mainly sandy SILT/CLAY or sandy SILT - Silty sandy GRAVEL (Fluvial deposits) at W7 stream crossing - Depth to bedrock not met in any holes which ranged in depth from 1.4 – 1.6m.
Newport (Mulkear) River Crossing – W10 (110kV UGC)	Grassland on both river banks	2 no. Rotary Cores Holes (RC) and Geo-physical Survey	- Sandy gravelly CLAY over sandy GRAVEL on east bank (RC05) - SAND over sandy GRAVEL on west bank (RC06) - Depth to bedrock 3.4m on east bank - Depth to bedrock 2.7m on west bank - Underlying bedrock is slightly weathered, weak to moderate SANDSTONE - Beneath the river at the depth of the UWF Grid Connection (~5m), the geophysical survey interpreted the sandstone bedrock to be slightly weathered to fresh
110kV UGC Section S36 – S41	Mainly forestry track with some off-road forestry	6 no. Trial Pits 16 no. Peat Probes 6 no. Gouge Cores Peat Shear Vane Strength Testing	- Existing forestry tracks are underlain by mineral subsoil (Sandstone and Shale Till) as the peat has been removed - Trial Pits intercepted sandy SILT / CLAY with some gravelly CLAY - Depth to bedrock 0.3m to >1.8m - Off-road forestry 110kV UGC Section 39 (0.8km in length) overlain by heavily drained blanket bog (Peat) - Peat depth ranges from 0.7 to 3m, with an average of 2.1m - Peat underlain by thin layer (<0.5m) of sandy SILT mineral subsoil over bedrock - Average shear vane strength of peat - 34kPa - Low and acceptable risk rating of peat instability was the result of the Peat Stability Assessment (AGEC, 2017) - Section 38 - 39 of the grid route passes through Bleanbeg Bog pNHA (See Section 10.4.2 below).
110kV UGC Section S41 – S49	Mainly grass-land with some forestry (fire break)	2 no. Trial Pit 13 no. peat probes	- Poorly draining peaty soil or Peat over Sandstone and Shale Tills - Peat depth ranged from 0.2 – 1.2m with average of 0.5m - Trial hole intercepted sandy SILT over sandy GRAVEL east of the Tooreenbrien River crossing (W32) with SILT/CLAY on the higher ground to the east - Depth to bedrock not met either at 1.1m on higher ground on the east

Location	Landuse	Site Investigations	Summary of Local Geology and Ground Conditions
110kV UGC Section S49 – S61	Mainly grass-land with public road sections	3 no. Trial Pits 1 no. peat probe	- Well draining soil or peaty soil over Sandstone and Shale Tills and fluvial deposits - Some peaty ground east of Clare River with depths up 0.4m - Fluvial deposits along the Clare River flood plain - Trial pits intercepted gravelly SILT/CLAY in grassland area - Trial pits intercepted silty, sandy GRAVELS close to the Clare River crossing W36 (see next line in table) - Bedrock was met at Compound C2 at 0.8m
Clare River Crossing - W36 (110kV UGC)	Grassland on both river banks	2 no. Rotary Cores Holes (RC) 1 no. Trial Pit	- Sandy GRAVEL (Sand and Gravels) over Silty SAND and CLAY on east bank (RC03) - Sandy GRAVEL (Sand and Gravels) over gravelly sandy CLAY on west bank (RC04) - Depth to bedrock >10m at both locations
110kV UGC Section S61 – S73	Mainly forestry track with some grassland	5 no. Trial Pits	- Poorly draining peaty soil over Sandstone and Shale Tills - Trial pits intercepted mainly peaty topsoil over gravelly SILT or sandy SILT - Depth to bedrock in trial pits along the forestry track was between 1.3 and 1.5m
110kV UGC Section S73 – S86	Mainly grassland with some forestry track	4 no. Trial Pits 11 no. peat probes	- Poorly draining soil or well draining soil over Sandstone and Shale Tills in grassland - Peaty soil over Sandstone and Shale Tills in forestry areas - Blanket peat is mapped along the Bilboa River floodplain by the GSI - Peat probes within floodplain east of Bilboa River encountered pockets of peat between 1.1 and 2.5m in depth - Alluvium is present along the Bilboa River flood plain at the crossing point (see next line in table) - SILT (Alluvium) was encountered in a trial hole to the east of the Bilboa River - Sandy or gravelly SILT/CLAY was encountered in grassland and forestry areas - Peat probes in forestry area east of Kilcommon encountered thin peat (0.2 – 0.7m)
Bilboa River Crossing – W57 (110kV UGC)	Grassland on both river banks	2 no. Rotary Cores Holes (RC)	- CLAY and SILT with some inter-bedded GRAVEL on east bank (RC01) - CLAY and some inter-bedded GRAVEL on west bank (RC02) - Depth to bedrock >10m at both locations
110kV UGC Section S86 – S102	Grassland with some Forestry track	3 no. Trial Pits	- Poorly draining soil or well draining soil over Sandstone and Shale Tills in grassland and forestry areas - Gravelly SILT/CLAY or gravelly SILT was encountered in grassland and forestry areas Bedrock not met

Local Soils, Subsoil & Bedrock

Sensitive Aspect

10.2.2.3.2 Element 2: UWF Related Works

The UWF Related Works which will be located in the area of the Consented Upperchurch Windfarm are located on land comprising mainly upland agricultural grassland and some forestry. Some of the related Haul Route Works are located along the verges of local existing public roads. An overview of the current landuse at the other elements of the Whole UWF Project is shown in Table 10-12 below.

Soils

Topic

Table 10-12: Overview of Landuse within the Cumulative Evaluation Study Area (Other Elements)

<u>Element</u>	<u>Total Landuse (Ha)</u>	<u>Forestry</u>	<u>Agricultural</u>	<u>Public Roads</u>
UWF Related Works	20.9	34%	59%	7%

A summary of the Geological Survey of Ireland (GSI) mapped subsoil and bedrock geology within the UWF Related Works study areas is shown in Table 10-13 below. The GSI mapping for subsoils and bedrock geology is illustrated on [Figure CE 10.2](#) (Local Subsoil Maps) and [Figure CE 10.3](#) (Local Bedrock Geology Maps). More detailed mapping is included as part of the UWF Related Works EIA Report, and is included in [Volume E: Reference Documents](#) with this planning application - see [Figure RW 10.2](#) (Local Subsoil Maps), and [Figure RW 10.3](#) (Local Bedrock Geology).

Table 10-13: Summary of the GSI Mapped Geology within the UWF Related Works Study Area

<u>UWF Related Works</u>	<u>Length (km) /Parts</u>	<u>General Bedrock Unit Name</u>	<u>GSI Local Bedrock Formation Description</u>	<u>Main Subsoil Type</u>	<u>Main Soil Type</u>
All parts of the UWF Related Works	All	Silurian Meta-sediments and Volcanics	Greywacke, Siltstone and Grit	Sandstone and Shale Tills with some Blanket Peat	Well Draining and Poorly Draining Mineral soil

Detailed site investigations, (included as [Appendix 10.4](#)), were undertaken in the UWF Related Works study area back in 2012 as part of the original windfarm site investigation works. Walkover surveys of the UWF Related Works area were completed between January 2016 and September 2017. The locations of site investigations are identified on [Figure RW 10.2](#). The findings of the walkover surveys and 2012 site investigations are summarised in Table 10-14

Table 10-14: Summary of Local Geology and Ground Conditions in UWF Related Works Study Area

<u>Location</u>	<u>Landuse</u>	<u>Site Investigations</u>	<u>Summary of Local Geology and Ground Conditions</u>
Internal Wind-farm Cabling (S1 – S22)	Mainly grassland with some forestry	7 no. Trial Pits 1 no. Peat Probe	• Peaty and shallow well draining soil over sandstone and shale till • Trial pits encountered organic topsoil (<0.3m) on CLAY mineral subsoil over SILTSTONE bedrock • Depth to bedrock ranged from 1.8m to 2.3m • Peat with a depth of <1m was encountered at permitted turbine location T05 (i.e. UGC section S16)
Internal Wind-farm Cabling (S23 – S31)	Grassland along with some forestry firebreaks	1 no. Trial Pits	• Peaty and poorly draining soil over sandstone and shale till • Trial pit encountered organic topsoil (<0.2m) on CLAY mineral subsoil SILTSTONE bedrock • Depth to bedrock recorded at 2m
Internal Wind-farm Cabling (S32 – S57)	Grassland along with some forestry firebreaks	7 no. Trial Pits 1 no. Peat Probe	• Peaty and shallow well draining soil over sandstone and shale till • Trial pits encountered organic topsoil (<0.2m) on CLAY mineral subsoil over SHALE or SILTSTONE bedrock • Depth to bedrock ranged from 1.6m to 3m • Peat with a depth of <1m was encountered at turbine location T14 (i.e. UGC section S35)
Internal Wind-farm Cabling (S58 – S71)	Grassland along with some forestry firebreaks	2 no. Trial Pits	• Peaty and poorly draining soil over sandstone and shale till • Trial pits encountered organic topsoil (<0.2m) on CLAY mineral subsoil SILTSTONE bedrock • Depth to bedrock was recorded at 1.2 and 2.2m

Location	Landuse	Site Investigations	Summary of Local Geology and Ground Conditions
Internal Wind-farm Cabling (S72 – S83)	Grassland with some forestry	4 no. Trial Pits	• Peaty and shallow well draining soil over sandstone and shale till • Trial pits encountered organic topsoil (<0.2m) on CLAY mineral subsoil SILTSTONE bedrock • Depth to bedrock was recorded between 0.45 and 1.7m
Telecom Relay Pole	Grassland	Walkover Survey	• Well draining soil over Sandstone and Shale Tills • Trial pits undertaken at the turbine locations locally met bedrock at 1.7m
Haul Route Works	Public Road, Public Road Verges and grassland	Walkover Survey	• Peaty to poorly draining soil over sandstone and shale tills
Realigned Windfarm Roads	Grassland and Forestry	Walkover Survey	• Peaty to poorly draining soil over sandstone and shale tills

Local Soils, Subsoil & Bedrock

Sensitive Aspect

10.2.2.3.3 Element 4: Already Consented Upperchurch Windfarm

The Consented Upperchurch Windfarm is located on land comprising mainly upland agricultural grassland and some forestry. An overview of the current landuse is shown in Table 10-15 below.

Table 10-15: Overview of Landuse within the Cumulative Evaluation Study Area (Other Elements)

Element	Total Landuse (Ha)	Forestry	Agricultural	Public Roads
Upperchurch Windfarm	56.3	17%	83%	0%

A summary of the 2012 site investigations for the Upperchurch Windfarm is presented in Table 10-16.

Table 10-16: Summary of Local Geology and Ground Conditions on the Upperchurch Windfarm

Location	Landuse	Site Investigations	Summary of Local Geology and Ground Conditions
Consented Upperchurch Windfarm	Grassland Forestry	20. Trial Pits 2 no. Peat Probes	• Poorly draining peaty soil and well draining soil over Sandstone and Shale Tills • Most peat has been removed due to past agriculture improvements • Thin peat remains in some forested areas (<1m) • Trial holes mainly encountered peaty topsoil on gravelly CLAY over weathered SILTSTONE bedrock • Depth to bedrock ranged from 1.2 to 2.9m with an average of 1.9m • Peat probes undertaken at consented turbine locations T05 and T14 recorded peats depth less than 1m • (These 20 no. windfarm trial pits are discussed above in the context of the UWF Related Works)

10.2.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 10.2.2.2.1

Soils

Topic

10.2.2.3.5 Other Projects or Activities

Castlewaller Windfarm: Part of the landholding associated with the permitted Castlewaller Windfarm occurs within one of the landholdings associated with the 110kV UGC part of the UWF Grid Connection, in Castlewaller townland. Approximately 1.5km of the 110kV UGC route exists within the Castlewaller Windfarm site.

10.2.2.4 Cumulative Information - Importance of Local Soils, Subsoils & Bedrock

Soil, subsoil and bedrock at the vast majority of the works areas are not designated (*i.e.* NHA/SAC etc) and the soil types are locally and regionally abundant and are not unique in any way. These soils are heavily altered by the existing landuse and where blanket bog was encountered along the UWF Grid Connection (110kV UGC) off-road section at Castlewaller (110kV UGC Section S38 – S39) and at the Upperchurch Windfarm (limited to some forested areas) it has generally been heavily altered and degraded as a result of forestry drainage and/or agricultural land improvements. Therefore, based on the criteria set out in Table 10-3, the importance of the soils at the vast majority of the UWF Grid Connection study area, and the entirety of the UWF Related Works study area is classed as having a low to medium importance.

The exception to this importance rating occurs along the UWF Grid Connection, where the 110kV UGC briefly passes through two designated sites; Lower River Shannon SAC and the Bleanbeg Bog NHA, the characteristics of these two sensitive receptors is described separately in **Sections 10.3** and **10.4** below.

10.2.2.5 Cumulative Information - Sensitivity of Local Soils, Subsoils & Bedrock

Soils and geology can be sensitive to processes such as erosion, compaction and drainage. The rate of these processes can be increased by certain landuse practices or landuse changes such as deforestation. Soil is also biologically active and it supports complex ecosystems which are sensitive to chemical and biological changes.

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

The soils and subsoils in the study areas have all been altered to some extent by drainage or by other land improvement works related to the existing land use (*i.e.* forestry and agriculture). These landuse improvement practices are expected to continue, as agricultural land and forestry regularly needs continued ploughing, seeding, planting etc to improve soil and subsoil structure. This leaves land susceptible for periods to erosion and compaction. Forestry tracks and farm tracks are also regularly upgraded. The other main, on-going, land use improvement practice that will directly affect soil and subsoil is drainage works.

10.2.2.7 Cumulative Information - Receiving Environment (the Baseline + Trends)

Rates of natural processes (*i.e.* erosion and weathering) and changes made by landuse practices are typically relatively slow. Therefore it is assumed in this report that the baseline environment for soils as identified above will be the receiving environment at the time of construction.

10.2.3 Cumulative Information: PROJECT DESIGN MEASURES for Local Soils, Subsoils & Bedrock

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 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](#).

10.2.4 Cumulative Information: EVALUATION OF IMPACTS to Local Soils, Subsoils & Bedrock

It is evaluated that UWF Replacement Forestry has no potential to cause impacts to Local Soils, Subsoils & Bedrock, see Section 10.2.1.

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 and Other Projects or Activities.

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) - Local Soils, Subsoils & Bedrock.

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

Table 10-17: 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)
Excavation and relocation of soil, subsoil and bedrock (Construction Stage)	<i>Operational stage effects</i>
Soil and subsoil compaction (Construction Stage)	<i>Decommissioning stage effects</i>
Soil and subsoil erosion (Construction Stage)	
Contamination from Oils, Fuels & Chemicals (Construction Stage)	
Contamination from Cement Based Compounds (Construction Stage)	

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables, which are presented in the following sections 10.2.4.1 to 10.2.4.5.

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections - Section 10.2.4.6.

10.2.4.1 Impact Evaluation Table: Excavation & Relocation of soils, subsoil, bedrock

Evaluation of UWF Replacement Forestry Excluded: As there will be no requirement for mechanical excavation, with only shallow hand digging during planting works, the effects of UWF Replacement Forestry to Local Soils, Subsoils & Bedrock will be Neutral by itself, and consequently this project 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 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

Impact Source: n/a

Cumulative Impact Source: Groundworks, earthworks, extraction from borrow pits

Impact Pathway: Excavation, drilling, movement and mounding of overburden

Impact Description: The physical excavation and relocation of soil, subsoil and to a lesser extent bedrock from its natural location to a different location. All excavated and relocated soil will be contained within the boundary of construction works areas.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project**Element 1: UWF Grid Connection**

Impact Magnitude:

- In total, approximately 14,050 m³ of geological material will be permanently excavated and this will mainly arise from the UGC trenching/joint bays, Mountphilips Substation ground works and grid connection related access roads; comprising topsoil (9,615m³), peat (1,265 m³), subsoil, (2,390m³), rock (120m³), and spoil from public road excavations (660m³);
- 8,370m³ of the excavated material will be permanently stored along the 110kV UGC works area as linear berms and remainder (5,020m³) will be reinstated within the works area. The 660m³ of spoil from the public road excavations will be removed to a licenced waste facility.
- In addition, up to 11,140m³ of soils will be excavated from the construction works area boundary, including from the cable trench and from the footprint of any excavated temporary stone roads.
- Included in the above are:
- At the 3 No. drilling locations, the volume of cutting material that will arise and be relocated during the directional drilling at the Newport (Mulkear) River, Clare River and Bilboa River will be minimal (12m³ at W10, 9m³ at W36 and 8m³ at W57);
- The excavation of blanket peat along the 110kV UGC route at Section S39 in Castlewaller will amount to 680m³ due to the excavation of the cable trench in peat and the floating access road; and,
- There will also be some excavation of peat at route sections S42, S43 and S44 at Killeen (60m³), S45 and S46 at Knockacullin (120m³), S66 at Baurnadomeeny (105m³) and S75, S76 and S77 at Knocknabansha (300m³). This peat will be stored permanently as berms along route section S47.
- It is considered that the impact magnitude will be Small Adverse (refer to Table 10.4) as the excavation volumes, which are relatively small, will be spread out over a large geographical area over the length of the UWF Grid Connection (i.e. 27.5km latitudinal distance).

Significance of the Impact: Slight

Local Soils, Subsoil & Bedrock	Sensitive Aspect	<u>Rationale for Impact Evaluation:</u> • As per Table 10-4, Small Adverse magnitude combined with the Medium to Low Importance of soils and geology within the study area; • The relatively small excavation volumes required per individual private landholding area for the 110kV UGC trench by it being virtue of a relatively narrow and shallow depth of excavation; • The excavations required for the 110kV UGC works will be spread out over a large geographical area - 27.5km latitudinal distance, therefore are not concentrated in any one area, thereby distributing the overall effect on soils and geology over a wide geographical area); • The small area of lands subject to works, in the context of the overall landholding area (<1% for agricultural and for forestry); • The relatively shallow nature of the excavation works required for the 110kV UGC, Mountphilips Substation and associated works (i.e. 3 no. temporary compounds, temporary and permanent access roads and site entrances); • All excavations will be fully reinstated and landscaped immediately after the works by virtue of the design (i.e. backfilling and reinstatement of the 110kV UGC cable trench and reinstatement of temporary access roads); • All effects will be direct and relatively localised; • The soil and geology along the 110kV UGC are abundant and are not unique in any way; • With the exception of the short sections of the 110kV UGC route within Bleanbeg Bog NHA and the Lower River Shannon SAC (which are assessed separately below), the soil and geology is of low to medium importance; and, • All works will be temporary and transient in nature
Element 2: UWF Related Works		
<u>Impact Magnitude:</u>		• In total, approximately 11,830m³ of natural material will be excavated and this will mainly arise from the internal cable trenching/joint bays, haul route works, Realigned Windfarm Roads and Telecom Relay Pole. This will include topsoil (4,750m³), subsoil (6,670m³ to a much lesser extent bedrock (360m³) and spoil (50m³); and, • ~930m³ of overburden will be permanently stored within the windfarm and the remainder (10,850 m³) will be reinstated within the works area. The 50m³ of spoil will be removed to a licenced waste facility. • The impact magnitude is considered to Moderate Adverse (refer to Table 10.4) as the excavation volumes which are relatively small, will be spread out over the area of the Upperchurch Windfarm
<u>Significance of the Impact:</u> Slight to Moderate		
<u>Rationale for Impact Evaluation:</u>		• As per Table 10-4, Moderate Adverse magnitude combined with the Medium to Low Importance of soils and geology within the study area; • The relatively small excavation volumes required for the internal windfarm cable trench by it being virtue of a narrow, relatively shallow excavation; • Approximately 62% (11.1 of the total 17.9km) of the internal windfarm cabling will be within the Consented UWF Roads thereby reducing overall excavations volume requirements; • The small area of lands subject to works, in the context of the Upperchurch Windfarm site overall landholding (<1% for both agricultural and forestry); • The relatively shallow nature of the excavation works required for the other elements of the Windfarm Related works (i.e. haul route works, Realigned Windfarm Roads and Telecom Relay Pole); • All works will be temporary and transient in nature; • All excavations will be fully reinstated and landscaped immediately after the works by virtue of the design (i.e. backfilling and reinstatement of the internal cable trenching); • Following the completion of construction works in an area, lands will be reinstated to at least their former (or better) condition and returned to the landowner for use as before; • The soil and geology at the UWF Related Works area is abundant and not unique in any way; and, • The soil and geology is only of low to medium importance and is not designated (i.e. SAC, NHA or pNHA)
Topic	Soils	

Element 4: Consented Upperchurch WindfarmImpact Magnitude:

- As per the 2013 EIS, construction of the Upperchurch Windfarm will result in the removal of 108,000m³ of overburden. This will comprise soil (25,500m³), subsoil (79,600m³) and peat (2,900m³);
- There will be a total of 6 no. borrow pits within the site extracting bedrock with the total rock volume estimated at 43,000m³ (EIAR, 2017);
- Up to 56,000m³ of overburden will be reinstated and used for landscaping;
- Up to 52,000m³ of overburden will be permanently stored in bunds along Consented UWF Roads and at Consented Upperchurch Turbine hardstanding areas and around the met mast areas; and,
- As per the ABP Inspectors Report (2014, Section 2), the footprint of the Upperchurch Windfarm comprises 11ha within a total landholding area of c.1,050 hectares. Therefore, the footprint of the development accounts for only 1% of the total Upperchurch Windfarm landholding.
- It was assessed in the 2013 EIS that the effects on soils and geology will not be significant in light of the consented mitigation measures. This is equivalent to 'Not Significant' in respect of terminology used herein.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- the small scale (~1%) of lands subject works, in the context of the size of total windfarm landholding.
- the volume of overburden / bedrock to be excavated is minimal in the context of the natural resources present within the windfarm landholding; and,
- Following the completion of construction works in an area, lands outside the hard-core footprint of the Upperchurch Windfarm will be reinstated to their former condition and returned to the landowner for use as before.

Element 5: UWF Other Activities – *N/A, evaluated as excluded, see Section 10.2.2.2.1.*

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 Castlewaller WindfarmImpact Magnitude:

The Castlewaller Windfarm will require the construction of a total of 16 no. turbines and associated works within a total landholding of 550ha. However, only 1 no. turbine and 220m of access road is located within the Cumulative Evaluation Study Area.

The volume of material that will require excavation will amount to approximately 130m³. The magnitude of impact is considered to be Negligible

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area;
- The relatively small scale of the construction works within 100m of the 110kV UGC; and,
- All excavated material will be reinstated locally within the windfarm.

Evaluation of Cumulative Impacts – Excavation & Relocation of soils, subsoil and bedrock**All Other Elements of the Whole UWF Project - Excavation & Relocation of soils, subsoil and bedrock**Cumulative Impact Magnitude:

The Whole UWF Project will involve the excavation and relocation (from its natural location) of up to 144,540m³ of overburden and the excavation of 43,480m³ of bedrock within a combined landholding area of approximately 3,406 hectares across at latitudinal distance of ~30km.

It is considered that the overall impact magnitude will be **Moderate Adverse** (refer to Table 10.4) as the excavation volumes, which are moderate proportions, will be spread out over a large geographical area along the UWF Grid Connection and within the windfarm site.

Local Soils, Subsoil & Bedrock Sensitive Aspect	Significance of the Cumulative Impact: Slight to Moderate <u>Rationale for Cumulative Impact Evaluation:</u> • As per Table 10-4, Moderate Adverse magnitude combined with the Medium to Low Importance of soils and geology within the study area; • Due to the direct nature effects of excavation works on soils and geology (i.e. impacts will be limited to the construction works area) and the fact that each of the project development elements will largely have their own construction works area (with the exception of a short overlap of the 110kV UGC and the Upperchurch Windfarm and described below), increased excavations at any one element of the development will not be greater as a result of the works at another element of the development; • Only approximately 0.5km of the 110kV UGC route exists within the Upperchurch Windfarm landholding and therefore the effect of increased excavation volumes on soils and geology within the windfarm site is negligible; • With respect to the UWF Related Works. Approximately 62% of the internal windfarm cabling will be within the Consented UWF Roads thereby reducing overall excavations volumes; • The very small scale (1% or less) of lands subject to works, on average for all landholdings; and, • The transient and temporary nature of the construction works.
	All Other Elements of the Whole UWF Project with Other Projects or Activities <u>Cumulative Impact Magnitude:</u> The combined excavation volumes at the overlap of the Castlewaller Windfarm and the 110kV UGC is 220m³. (the 110kV UGC will require the excavation of a 230m cable trench along an existing forestry track within 100m of the Castlewaller Windfarm infrastructure. Approximately 90m³ of overburden will have to be excavated and this material will be reinstated along the 110kV UGC route). The in-combination magnitude of impact is considered to be Negligible in comparison to the total excavation volumes required for the Whole UWF Project. Significance of the Cumulative Impact: Imperceptible <u>Rationale for Cumulative Impact Evaluation:</u> • As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area; • The excavation volumes required for Castlewaller Windfarm at the overlap of the 110kV UGC route (220m³) only account for <0.16% of total overburden excavation volumes for the Whole UWF Project (144,540m³).

10.2.4.2 Impact Evaluation Table: Soil and Subsoil Compaction

Evaluation of UWF Replacement Forestry Excluded: As there will be no use of heavy machinery during the planting or maintenance activities, UWF Replacement Forestry will not cause compaction effects to Local Soils, Subsoils & Bedrock itself, and consequently this project 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 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

Impact Source: n/a

Cumulative Impact Source: Construction traffic movement, temporary infrastructure and temporary storage of overburden

Impact Pathway: Physical Compression

Impact Description: Soil and subsoil compaction due to the additional weight of construction machinery and traffic travelling on lands, the compaction of the soil and subsoil layers beneath permanent access roads, temporary construction compounds, temporary access roads and storage berms, due to the additional weight of this infrastructure along with any traffic, and the additional weight of soils in temporary and permanent overburden storage berms.

Any compacted soils under temporary access roads, temporary compounds and temporary berms will be loosened using chisel ploughing and levelling of the affected lands (Project Design Measure).

Impact Quality: Negative

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

Element 1: UWF Grid Connection

Impact Magnitude:

There is expected to be some soil and subsoil compaction along the 110kV UGC working corridor due to construction traffic and the presence of the temporary access roads (9.3km) and new permanent access roads (5.2km).

Soil and subsoil compaction can also be expected at the 3 no. 110kV UGC temporary construction compounds (1090m² at C1, 860m² at C2 and 860m² at C3) and at the Mountphilips Substation and compound area (6,350m²). Temporary and permanent storage of overburden may also result in some compaction of the stored material due to mounding.

Given the large geographical spread of the UWF Grid Connection over numerous landholdings, it is considered that the magnitude will be Negligible (refer to Table 10.4).

Significance of Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area;
- Construction traffic will be restricted to the construction works area associated with the 110kV UGC works area and tracking across adjacent ground will not be permitted;

Local Soils, Subsoil & Bedrock Sensitive Aspect	• The majority of the temporary and new permanent access roads will be required in grassland areas. The total size of the construction works areas associated with the temporary and new permanent access roads (beneath which some compaction is expected) account for less than <1% of the overall agricultural landholding area (~811ha); • Within forestry landholdings (which account for ~62% of the 110kV UGC route landholding) access will mainly be along existing forestry tracks and therefore further compaction of the underlying subsoil will be limited, if any occurs; • Only 3 no. temporary compounds will be required and the total area of the compounds relative to the overall size of the construction works area associated with the UWF Grid Connection is negligible (<1%); • Construction work in the area of the Mountphilips Substation/End Mast will be localised to the permanent footprint area and construction traffic to the site will use a new permanent access roads; • Any compaction that would be caused by the temporary or permanent footprint is reversible by reinstatement through the use of chisel ploughing and leveling (Project Design Measure); • Overburden deposited at temporary storage areas will only be left in place for less than 1 week before being reinstated and therefore compaction is unlikely to occur; • Overburden deposited at the permanent storage areas will be placed in shallow mounds/berms (<1.6m high) and therefore significant compaction over the timeframe of the project is not expected; and, • Permanent access roads on agricultural landholdings will remain in place post operational phase for the benefit of the landowner and therefore any loss of soil productivity due to compaction will likely have an overriding positive effect in terms of land accessibility.
	Element 2: UWF Related Works
Soils Topic	<u>Impact Magnitude:</u> There is expected to be some soil and subsoil compaction due to construction traffic along the internal windfarm cabling working corridor. Soil and subsoil compaction can also be expected locally under the Telecom Relay Pole, the new Realigned Windfarm Roads and at Haul Route Works locations. Given the small size of construction works areas within the overall landholding (<1%), it is considered that the magnitude will be Negligible (refer to Table 10.4).
	<u>Significance of Impact:</u> Imperceptible
	<u>Rationale for Impact Evaluation:</u> • As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area; • Approximately 62% of the internal windfarm cabling will be within the Consented UWF Roads thereby reducing the need to track off-road; • Where permanent access roads are not being installed, temporary roads will be used along the working corridor and these roads will offer some protection from compaction to the underlying soil/subsoils by distribution of weight; • The temporary access road footprint will account for <1% of the UWF Related Works landholding area; • Construction work in the area of the Realigned Windfarm Roads (3 no. locations) and the Telecom Relay Pole will be localised to the permanent windfarm footprint area and construction traffic will use the Consented UWF Roads to access these works locations; • The Haul Route Works will largely require construction vehicles working off public roads. The potential for compaction will largely be limited construction of access roads on private lands which only accounts for less <1% of the UWF Related Works landholding area; and, • Any compaction that would be caused by the temporary footprint is reversible by reinstatement involving chisel ploughing and leveling Project Design Measure).
	Element 4: Consented Upperchurch Windfarm
	<u>Impact Magnitude:</u> Soil and subsoil compaction was assessed in the 2013 Upperchurch Windfarm EIS with respect to construction activity. As per the 2013 EIS: short to medium term effects are expected to occur within the development footprint It was assessed in the 2013 EIS that the effects on soils and geology will not be significant in light of the consented mitigation measures. This is equivalent to 'Not Significant' in respect of terminology used herein.

Local Soils, Subsoil & Bedrock	Sensitive Aspect	Significance of Impact: Not Significant Rationale for Impact Evaluation: • Most of the traffic movement within the site during the construction phase will be over new or existing access roads; • Vehicular movement will be restricted to the footprint of the consented development, particularly with respect the new constructed access roads; and, • The small scale of lands subject works, in the context of the size of total Upperchurch Windfarm landholding. Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 10.2.2.2.1
		Cumulative Information for Other Projects or Activities <i>(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)</i> Consented Castlewaller Windfarm Impact Magnitude: Impacts were reported to be Minor in the Castlewaller WF EIS which is equivalent to Small Adverse Significance of Impact: Imperceptible to Slight Rationale for Impact Evaluation: • As per Table 10-4, Small Adverse magnitude combined with the Medium to Low Importance of soils and geology within the study area;
Soils	Topic	Evaluation of Cumulative Impacts – Soil and Subsoil Compaction All Elements of the Whole UWF Project - Cumulative Impact Magnitude: The potential for soil and subsoil compaction will be limited to the construction works area (88.5ha) associated with the combined UWF Grid Connection, UWF Related Works and Upperchurch Windfarm construction works area which accounts for <3% of the total landholding area of 3,406ha. Due to the direct nature of compaction effects on soils and geology (i.e. impacts will be limited to the footprint of the construction works areas) and the fact that each of the individual project elements have their own footprint area (with the exception of a short overlap of the 110kV UGC and the UWF Related Works (Internal Windfarm Cabling) and the overlap of UWF Related Works with Upperchurch Windfarm works, increased compaction at any one element of the development will not be greater as a result of the works at another element of the development; Only approximately 0.5km of the 110kV UGC route exists within the Upperchurch Windfarm landholding and therefore the effect of increased compaction on soils and geology within the windfarm site is negligible; With respect of the UWF Related Works (within the Upperchurch Windfarm site). Approximately 62% of the internal windfarm cabling will be within the Consented UWF Roads thereby reducing the overall potential for additional compaction of the soil and subsoil; Given the small size of the construction works areas within the overall size of landholdings (<3%), it is considered that the magnitude will be Negligible (refer to Table 10.4).
		Significance of the Cumulative Impact: Imperceptible Rationale for Cumulative Impact Evaluation: • As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area; • Any compaction that would be caused by the temporary footprint is reversible by

Local Soils, Subsoil & Bedrock	reinstatement involving chisel ploughing and leveling Project Design Measure); • Permanent access roads along the 110kV UGC and within the Upperchurch Windfarm will remain in place permanently for the benefit of the landowner and therefore any loss of soil productivity due to compaction will likely have an overriding positive effect in terms of improved land accessibility during wet weather events; and, • The small scale (<3%) of lands subject to works, on average for all landholdings.
	All Elements of the Whole UWF Project with Other Projects or Activities
	<u>Cumulative Impact Magnitude</u>: Due to small combined footprint of the 110kV UGC and the Castlewaller WF (within 100m scoping distance of the UGC), the cumulative compaction effects of both projects is likely to have Negligible effects on local soils and subsoil. Also the route of the 110kV UGC will be mainly along a forestry track at the Castlewaller site which reduced the effect of compaction.
	Significance of the Cumulative Impact: Imperceptible
	<u>Rationale for Cumulative Impact Evaluation</u>: • As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area;

Local Soils, Subsoil & Bedrock
Sensitive Aspect

Soils
Topic

10.2.4.3 Impact Evaluation Table: Soil & Subsoil Erosion

Evaluation of UWF Replacement Forestry Excluded: As there will be no for mechanical excavation of soil – with all planting works carried out by hand using spades, the effects of UWF Replacement Forestry to Local Soils, Subsoils & Bedrock will be Neutral by itself, and consequently this project 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 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

Impact Source: n/a

Cumulative Impact Source: Groundworks and storage of overburden

Impact Pathway: Excavations, tracking of construction traffic and wind and rain action

Impact Description: Erosion of soil and subsoil as a result of construction traffic and also as a result of natural process such as rain and wind action on exposed soil and subsoil.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project**Element 1: UWF Grid Connection**

Impact Magnitude:

There is likely to be some erosion of exposed soils and subsoils along the 110kV UGC route where excavations take place and also during the temporary and permanent storage of overburden. Tracking of construction traffic along off-road sections of the works areas has also the potential to cause erosion.

Given the large geographical spread of the UWF Grid Connection over numerous landholdings and the relatively small storage volumes which are also spread out over the works area, it is considered that the magnitude will be Negligible (refer to Table 10.4).

Significance of Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area;
- The exposed in-situ subsoil along the 110kV UGC route will be largely contained within a trench and therefore the potential for erosion and transport by water and wind action is low;
- The 110kV UGC trench will be backfilled, reinstated and reseeded very soon after excavation;
- Temporary overburden storage areas will only be exposed for a very short period of time (< 1 week) during the 110kV UGC trench works;
- The surface area of the permanent overburden storage berms is negligible compared to the total landholding area;
- The potential erosion of permanent overburden storages will be eventually limited by reseeded and vegetation growth;
- Within forested areas (which account for 47% of the 110kV UGC works area), access to the UGC will be mainly along existing forestry tracks and therefore the potential for additional erosion from construction traffic is low;
- On agricultural grassland, temporary or permanent access roads will be used to access the 110kV UGC route

Local Soils, Subsoil & Bedrock	Sensitive Aspect	and these roads will offer protection to the underlying soil/subsoils from erosion; and, • Floating roads will be used on the short section of the 110kV UGC on peat within the Castlewaller Windfarm and tracking on the natural bog surface will not occur.
		Element 2: UWF Related Works
Sensitive Aspect		<u>Impact Magnitude:</u> There is likely to be some erosion of exposed soils and subsoils at the UWF Related Works areas where excavations take place and also during the permanent storage of overburden. Tracking of construction traffic along off-road sections of the works areas has also the potential to cause erosion. Given the small area of the construction works areas within the overall landholding (<2%), it is considered that the magnitude will be Negligible (refer to Table 10.4).
		<u>Significance of Impact:</u> Imperceptible <u>Rationale for Impact Evaluation:</u> • As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area; • The exposed in-situ soil along the internal windfarm cabling will be largely contained within a trench and therefore the potential for erosion from water and wind is low; • The internal cabling trench will be backfilled and reinstated very soon after excavation; • The surface area of the permanent overburden storage berms is negligible compared to the total landholding area; • The potential erosion of permanent overburden storages will be eventually limited by reseeding and vegetation growth; • Approximately 62% of the internal windfarm cabling will be within the Consented UWF Roads thereby reducing the need to track off-road; • Where no Consented UWF Roads are present, temporary access roads will be used to access the Internal Windfarm Cabling areas and these roads will offer protection to the underlying natural soil/subsoils from erosion; • Construction work in the area of the Realigned Windfarm Roads (3 no. locations) and the Telecom Relay Pole will be localised to the construction works area and construction traffic will use consented roads to access these new locations; and, • The Haul Route Works will largely require construction vehicles working off public roads. In addition, any natural soils and subsoils exposed under the footprint of the road widening will be surfaced with hardcore, thereby reducing the potential for erosion.
Sensitive Aspect		Element 4: Consented Upperchurch Windfarm
		<u>Impact Magnitude:</u> There is likely to be some erosion of exposed soils and subsoils at the Upperchurch Windfarm construction works areas where excavations take place and also during the permanent storage of overburden. It was assessed in the 2013 EIS that the effects on soils and geology will not be significant in light of the small area of lands subject to works and the consented mitigation measures. This is equivalent to 'Not Significant' in respect of terminology used herein.
Sensitive Aspect		<u>Significance of the Impact:</u> Not Significant
		<u>Rationale for Impact Evaluation:</u> • Most of the traffic movement within the site during the construction phase will be over new access roads; • Vehicular movement will be restricted to the boundary of the construction works areas, particularly with respect the new constructed access roads; and • The small scale (1%) of lands subject to works, in the context of the total size of the Upperchurch Windfarm landholding.
Sensitive Aspect		Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 10.2.2.2.1

Local Soils, Subsoil & Bedrock	Sensitive Aspect		Soils	Topic

Cumulative Information for 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 Castlewaller Windfarm

Impact Magnitude: Impacts were reported to be Minor in the Castlewaller WF which is equivalent to Small Adverse

Significance of the Impact: Imperceptible to Slight

Rationale for Impact Evaluation:

- As per Table 10-4, Small Adverse magnitude combined with the Medium to Low Importance of soils and geology within the study area;

Evaluation of Cumulative Impacts - Soil and Subsoil Erosion**All Elements of the Whole UWF Project**Cumulative Impact Magnitude:

Soil and subsoil erosion will be limited to the construction works areas (88.5ha) associated with the combined UWF Grid Connection, UWF Related Works and Upperchurch Windfarm construction works area which accounts for <3% of the total landholding area of 3,406ha.

Due to the direct nature effects of erosion on soils and geology (i.e. impacts will be limited to the footprint of the construction works area) and the fact that each of the project development elements will largely have their own construction works area (with the exception of a short overlap of the 110kV UGC and the Upperchurch Windfarm and described below), increased erosion at any one element of the development will not be greater as a result of the works at another element of the development.

Only approximately 0.5km of the 110kV UGC route exists within the Upperchurch Windfarm landholding and therefore the effect of increased erosion on soils and geology within the windfarm site is negligible;

With respect of the UWF Related Works (within the Upperchurch Windfarm site). Approximately 62% of the internal windfarm cabling will be within the Consented UWF Roads thereby reducing the overall potential for erosion due to construction traffic;

Given the small size of the construction works area within the overall landholding (<3%), it is considered that the magnitude will be **Negligible** (refer to Table 10.4).

Significance of the Cumulative Impact: ImperceptibleRationale for Cumulative Impact Evaluation:

- As per Table 10-4, **Negligible** magnitude combined with the **Medium to Low Importance** of soils and geology within the study area; and,
- The small scale (<3%) of lands subject to works, on average for all landholdings.

All Elements of the Whole UWF Project with Other Projects or Activities

Cumulative Impact Magnitude: Due to small combined footprint of the 110kV UGC and the Castlewaller WF (within 100m scoping distance of the UGC), the cumulative erosion effects of both projects is likely to have a **Negligible** impact on local soils and subsoil.

Significance of the Cumulative Impact: ImperceptibleRationale for Cumulative Impact Evaluation:

- As per Table 10-4, **Negligible** magnitude combined with the **Medium to Low Importance** of soils and geology within the study area;

10.2.4.4 Impact Evaluation Table: Contamination by Oils, Fuels & Chemicals

Evaluation of UWF Replacement Forestry Excluded: As there will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within the site, the effects of UWF Replacement Forestry to Local Soils, Subsoils & Bedrock will be Neutral by itself, and consequently this project 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 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
Impact Source: n/a Cumulative Impact Source: Oils, Fuels and Chemicals Impact Pathway: Soil, subsoil and bedrock pore space Impact Description: The plant and equipment that will be used during the construction phase will be run on fuels and oils. This creates the potential for spillage and leakage of hydrocarbons from plant during refuelling or storage of oils and fuels. The effect on soil, subsoil and bedrock will be a direct, local effect. Impact Quality: Negative	

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project**Element 1: UWF Grid Connection**

Impact Magnitude:
Plant and equipment will be used at all the 110kV UGC works areas and therefore contamination effects could in theory occur at any of the construction works areas, which are 39.1ha in total. However, any effects will be minor - only relatively small volumes of fuels or oils will be on-site at any one time and therefore there is no significant spills, and any spillages, should they occur, will be limited to small accidental spillage (i.e. small spillage volumes) during storage of oils, fuels and chemicals and during refuelling of construction or excavation plant with petroleum hydrocarbons.

Given the large geographical spread of the works area and the small volumes of fuel that will be present on-site and any one time. it is considered that the magnitude will be Negligible (refer to Table 10.4).

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area;
- All fuels required for construction activities will be stored in a designated location, away from main traffic activity, within the Temporary Compounds. All fuel will be stored in bunded, locked storage containers (Project Design Measure);
- Overnight parking of plant and machinery will only be permitted at designated sites along the route where there is a hardcore surface in place and this reduces the risk posed by leaks (Project Design Measure);
- All chemical wastes will be stored in secure, bunded and covered storage containers, in a designated secure part of the Temporary Compounds, and will be removed from site and transported to an approved licensed facilities (Project Design Measure); and,
- Any effects that do occur will be very localised to the soils and subsoils at the source / works activity area.

Element 2: UWF Related WorksImpact Magnitude:

Plant and equipment will be used at all the UWF Related Works areas and therefore contamination effects could in theory occur at any of the construction works areas, which are 20.9ha in total. However, any effects will be minor - only relatively small volumes of fuels or oils will be on-site at any one time and therefore there is no significant spills, and any spillages, should they occur, will be limited to small accidental spillage (i.e. small spillage volumes) during storage of oils, fuels and chemicals and during refueling of construction or excavation plant with petroleum hydrocarbons.

Given the small size of the construction works area within the overall landholding (<1%) and the small volume of fuels that will be present on-site at any one time, it is considered that the magnitude will be Negligible (refer to Table 10.4).

Significance of the Impact: ImperceptibleRationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area;
- All fuels required for construction activities will be stored in a designated location within the windfarm site, away from main traffic activity, within the Temporary Compounds. All fuel will be stored in bunded, locked storage containers (Project Design Measure);
- Overnight parking of plant and machinery will only be permitted at designated sites where there is a hardcore surface in place and this reduces the risk posed by leaks (Project Design Measure);
- All chemical wastes will be stored in secure, bunded and covered storage containers, in a designated secure part of the Temporary Compounds, and will be removed from site and transported to either Enva Ireland Limited approved licensed facilities (Project Design Measure);
- Any effects that do occur will be localised to the soils and possibly shallow subsoils at the source / works activity area.

Element 4: Consented Upperchurch Windfarm

Impact Magnitude: The effects on soils and geology from hydrocarbon leaks are assessed in the Upperchurch Windfarm EIS. The EIS states that potential effects can occur to 'earth materials at and downhill from the development site'. Contamination effects could in theory occur at any of the construction works areas, which are 56.3ha in total. It was assessed in the 2013 EIS that the residual effects on soils and geology will not be significant in light of the small area of lands subject to works and the consented mitigation measures. This is equivalent to 'Not Significant' in respect of terminology used herein.

Significance of the Impact: Not significantRationale for Impact Evaluation:

- Condition No. 15 of the Grant of Permission requires the implementation of a Construction Environmental Management Plan, and Ecological Management Plan and an Environmental Management Plan. Furthermore, Condition No.15 specifies that: (a) all oils and fuels shall be stored in an area bunded to 110% of the total volume of stored oils and fuels; and (b) re-fuelling or machine servicing shall take place only within designated impermeable bunded areas, which shall be drained through an oil interceptor; and,
- The Environmental Management Plan (EMP) includes a Fuel Management Plan, which provides for the regular checking of vehicles, equipment, plant and material storage areas; and best practice measures for storing and handling of fuels/oils and procedures to deal with emergency incidents and spills

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 10.2.2.2.1

Cumulative Information for Other Projects or Activities	
(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>)	
Other Project: Consented Castlewaller Windfarm	
<u>Impact Magnitude:</u> Impacts were reported to be Minor in the Castlewaller WF which is equivalent to Small Adverse	
<u>Significance of the Impact:</u> Imperceptible to Slight	
<u>Rationale for Impact Evaluation:</u>	
As per Table 10-4, Small Adverse magnitude combined with the Medium to Low Importance of soils and geology within the study area;	
Evaluation of Cumulative Impacts – Contamination by Oils, Fuels & Chemicals	
All Elements of the Whole UWF Project	
<u>Cumulative Impact Magnitude:</u>	
Plant and equipment will be used at all works areas and therefore soil, subsoil and bedrock along the whole route are a potential receptor. However, any effects are only likely to be minor and localised within the construction works area.	
Due to the direct nature effects of spills and leaks on soils and geology (i.e. impacts will largely be limited to the footprint of the works area) and the fact that each of the project development elements will largely have their own construction works area, increased soil or subsoil contamination at any one element of the development is not expected to be increased contamination as a result of the works at another element of the development;	
It is considered that the overall magnitude will be Negligible (refer to Table 10.4).	
Significance of the Cumulative Impact: Imperceptible	
<u>Rationale for Cumulative Impact Evaluation:</u>	
- As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area; - Minor accidental spillage (i.e. small spillage volumes) during storage and refuelling of construction / excavation plant with petroleum hydrocarbons is only likely to occur (worst case); - Only relatively small volumes of fuels / oils will be on-site at any one time and therefore no significant effects are expected; - The large geographical spread of the Whole UWF Project means that large accumulation of spills / leaks at any one location is not possible; and, - Implementation of the Environmental Management Plan for the Upperchurch Windfarm.	
All Elements of the Whole UWF Project with Other Projects or Activities	
<u>Cumulative Impact Magnitude:</u>	
The combined volumes present on-site will be very small and cumulative effects are likely to be Negligible .	
Significance of the Cumulative Impact: Imperceptible	
<u>Rationale for Cumulative Impact Evaluation:</u>	
As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area;	

Local Soils, Subsoil & Bedrock

Sensitive Aspect

Soils

Topic

10.2.4.5 Impact Evaluation Table: Contamination by cement based compounds

Evaluation of UWF Replacement Forestry Excluded: As there will be no requirement for cement based compounds, UWF Replacement Forestry has no potential to cause contamination effects to Local Soils, Subsoils & Bedrock itself, and consequently this project 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 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

Impact Source: n/a

Cumulative Impact Source: Cement Based compounds

Impact Pathway: Soil, subsoil and bedrock pore space

Impact Description: Contamination of Soil, Subsoil and Bedrock due to direct contact with cement based construction compounds used for construction. Concrete and other cement-based products are highly alkaline and corrosive and can have impacts specifically on the soil and subsoils in terms of toxicity to its flora and fauna. The effects will largely be localised to the soil in direct contact area with cementitious material.

Impact Quality: Negative

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

Element 1: UWF Grid Connection

Impact Magnitude:

The main use of cement based compounds will be in the 110kV UGC cable trench and during the construction of foundations at the Mountphilips Substation and End Masts. The underlying subsoils at these locations will come in direct contact with the subsoils.

Given the large geographical spread of the UWF Grid Connection works area and the relatively small volume of cement that will be placed within each landholding, the impact magnitude is expected to be Negligible.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area;
- No batching of wet cement will take place on-site therefore large volumes of cement will not be present on-site at any one time;
- Semi-dry granular cement will be used in the cable trench and wet cement will only be used for substation and end mast foundation construction. Semi-dry granular cement will limit the mobility of the compound through potentially porous soil thereby restricting the effects to the contact area;
- Only precast concrete structures will be used at joint bays and at watercourse crossing locations as required; and,
- Only a temporary (and reversible) increase in the pH of the soil, subsoil and bedrock in direct contact with the cement is likely to occur. The effects, which will be localised to the cable trench and Mountphilips substation / end mast foundations will only persist until the cement mix has hardened and the high alkalinity leachate flushed out / diluted by rainfall. Indirect effects on groundwater quality and surface water quality from cement based compounds are assessed in the Water Chapter (Chapter 11).

Element 2: UWF Related Works	
<u>Impact Magnitude:</u> Cement will only be used at the Telecom Relay Pole foundation. Due to the small scale of the works, the impact magnitude is expected to be Negligible.	
<u>Significance of the Impact:</u> Imperceptible	
<u>Rationale for Impact Evaluation:</u> • Small scale of works (5m² compound)	
Element 4: Consented Upperchurch Windfarm	
<u>Impact Magnitude:</u> The primary use of cement at the windfarm will be construction of the Consented UWF Turbine foundations and in the foundations of the control building structure at the Consented UWF Substation. The volumes of cement that will be imported on-site will be considerable, but given that the consented windfarm is spread out over several landholding areas, the impact magnitude is considered to be Small Adverse (refer to Table 10.4).	
<u>Significance of the Impact:</u> Slight	
<u>Rationale for Impact Evaluation:</u> • As per Table 10-4, Small Adverse magnitude combined with the Medium to Low Importance of soils and geology within the study area; • No batching of wet cement will take place on-site and therefore large volumes will not be present on-site at any one time; • The pouring of turbine bases (22 no.) will be done over 3 - 4 months and therefore large volumes of wet cement will not be on-site at any one time; • A precast concrete structure, in the form of a clear span bridge, will be used at the watercourse crossing on the Upperchurch Windfarm site • Only a temporary (and reversible) increase in the pH of the soil, subsoil and bedrock in direct contact with the cement or indirectly via seepage water is likely to occur. • The effects, which will be localized, will only last until the cement mix has hardened and the high alkalinity leachate flushed out / diluted by rainfall; • A precast concrete structure, in the form of a clear span bridge, will be used at the watercourse crossing on the Upperchurch Windfarm site; and, • The implementation of Cement Control Procedures under the Environmental Management Plan for the Upperchurch Windfarm (See 2013 RFI).	
Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 10.2.2.2.1	
Cumulative Information for Other Projects or Activities	
(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>)	
Other Project: Consented Castlewaller Windfarm	
<u>Impact Magnitude:</u> Impacts were reported to be Minor in the Castlewaller WF which is equivalent to Small Adverse	
<u>Significance of the Impact:</u> Imperceptible to Slight	
<u>Rationale for Impact Evaluation:</u> • As per Table 10-4, Small Adverse magnitude combined with the Medium to Low Importance of soils and geology within the study area;	

Local Soils, Subsoil & Bedrock

Sensitive Aspect

Soils

Topic

Local Soils, Subsoil & Bedrock	Evaluation of Cumulative Impacts – Contamination by Cement Based Compounds	
	All Elements of the Whole UWF Project	
Sensitive Aspect	<u>Cumulative Impact Magnitude:</u> Plant and equipment will be used at all works areas and therefore soil, subsoil and bedrock along the whole route are a potential receptor. However, any effects are only likely to be minor and localised. Due to the direct nature effects of cement based compounds on effects on soils and geology (i.e. impacts will largely be limited to the construction works area) and the fact that each of the project development elements will largely have their own construction works area, increased cement exposure to soils and subsoils at any one element of the development is not expected to be increased as a result of the works at another element of the development. The overall impact magnitude is considered to be Small Adverse.	
	Significance of the Cumulative Impact: Slight	
	<u>Rationale for Cumulative Impact Evaluation:</u> • As per Table 10-4, Small Adverse magnitude combined with the Medium to Low Importance of soils and geology within the study area; and, • Only a temporary (and reversible) increase in the pH of the soil, subsoil and bedrock in direct contact with the cement or indirectly via seepage water is likely to occur.	
	All Elements of the Whole UWF Project with Other Projects or Activities	
	<u>Cumulative Impact Magnitude:</u> The combined volumes present are will be very small and cumulative effects are likely to be Negligible.	
	Significance of the Cumulative Impact: Imperceptible	
	<u>Rationale for Cumulative Impact Evaluation:</u> • As per Table 10-4, Negligible magnitude combined with the Medium to Low Importance of soils and geology within the study area;	

10.2.4.6 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 the table below.

Table 10-18: Description and Rationale for Excluded Impacts to Local Soils, Subsoils & Bedrock

<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>
Operational Stage Effects				
Neutral effect: There will be no requirement for any major excavation work or groundworks during the operational phase. All ground that was previously exposed during excavation works, along with permanent overburden storage berms will have vegetated over and therefore there will be no potential for erosion. Any impacts on soils and geology that do occur during the operational phase will be Neutral.				
Decommissioning Stage Effects				
<u>UWF Grid Connection</u> : No potential for impacts - the UWF Grid Connection will remain part of the National Grid on a permanent basis and is not expected to be decommissioned.				
<u>UWF Related Works</u> : No potential for impacts - The cables will be pulled from the Internal Windfarm Cabling ducts at the Consented UWF Turbines or at the Consented UWF Substation; the ducting, Realigned Windfarm Roads and Haul Route Works will remain in-situ; therefore no decommissioning works to soils or lands are required. The Telecom Relay Pole will be removed, and it's compound area reinstated and returned to agricultural. Neutral impacts to soils and geology will occur due to the very small footprint of the compound (25m ²).				
<u>Upperchurch Windfarm</u> : Neutral impact –It is likely that the Consented UWF Substation will remain in-situ for use by ESNB and that the Consented UWF Roads will also remain in-situ for use by the landowner. Decommissioning works will be limited to the Consented UWF Turbines, Turbine Hardstanding areas, Meteorological Masts and associated drainage systems, where the turbines and will be removed and the remaining hardstanding areas and associated drainage will be reinstated using the soils in the adjacent storage permanent overburden storage berms, this soil will be reseeded and will re-vegetate quickly, Neutral effects to soils are expected due to the small extent of the hardstands in the context of the large extent of soils in the surrounding area.				

10.2.5 Mitigation Measures for Impacts to Local Soils, Subsoil & Bedrock

Mitigation measures were incorporated into the project design, including the Project Design Measures. No additional mitigation measures are required as the topic authors conclude that **no impacts are likely to occur** to Local Soils, Subsoils & Bedrock as a consequence of the UWF Replacement Forestry.

10.2.6 Evaluation of Residual Impacts to Local Soils, Subsoil & Bedrock

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 Evaluation of UWF Replacement Forestry (Section 10.2.1.3), i.e. **no impacts are likely to occur**.

10.2.7 Application of Best Practice and the EMP for Local Soils, Subsoil & Bedrock

No UWF Replacement Forestry Best Practice Measures have been developed specially for the protection of Local Soils, Subsoils & Bedrock.

10.2.8 Summary of Impacts to Local Soils, Subsoils & Bedrock

The topic authors conclude that impacts to Local Soils, Subsoils & Bedrock are not likely to occur, as a consequence of the development of UWF Replacement Forestry.

Table 10-19: Summary of the impacts to Local Soils, Subsoils & Bedrock

Impact to Local Soils, Subsoils & Bedrock:	Excavation & Relocation of soils, subsoil and bedrock	Soil & Subsoil Compaction	Soil & Subsoil Erosion	Contamination from Oil, Fuels & Chemicals	Contamination from Cement Based Compounds
Evaluation Impact Table <i>(for Other Elements only)</i>	Section 10.2.4.1	Section 10.2.4.2	Section 10.2.4.3	Section 10.2.4.4	Section 10.2.4.5
Project Life-Cycle Stage <i>(for Other Elements only)</i>	Construction Stage	Construction Stage	Construction Stage	Construction Stage	Construction Stage
<u>UWF Replacement Forestry Impact</u>	No Impacts are Likely to Occur Evaluated as Excluded - see Section 10.2.1				
Element 1: UWF Grid Connection	Slight	Imperceptible	Imperceptible	Imperceptible	Imperceptible
Element 2: UWF Related Works	Slight to moderate	Imperceptible	Imperceptible	Imperceptible	Imperceptible
Element 4: Upperchurch Windfarm	Not Significant	Not Significant	Not Significant	Not Significant	Slight
Element 5: UWF Other Activities	No Potential for Impact - Evaluated as Excluded, see Section 10.2.2.1				
<u>Cumulative Impact:</u>					
All Elements of the Whole UWF Project	Slight to Moderate	Imperceptible	Imperceptible	Imperceptible	Slight
All Elements of the Whole UWF Project <i>cumulatively with Other Projects</i> or Activities Castlewaller Windfarm	Imperceptible	Imperceptible	Imperceptible	Imperceptible	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: 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)

Local Soils, Subsoil & Bedrock
Sensitive Aspect

Topic
Soils

10.3 Sensitive Aspect No.2: Lower River Shannon SAC

This Section provides a description and evaluation of the Sensitive Aspect - Lower River Shannon SAC.

10.3.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

10.3.1.1 Baseline Characteristics of Lower River Shannon SAC in relation to UWF Replacement Forestry

The Lower River Shannon is a designated SAC and contains many Annexed I habitats, including the most extensive area of estuarine habitat in Ireland.

All of the UWF Replacement Forestry lands are located within the River Suir regional catchment area.

10.3.1.2 Evaluation of UWF Replacement Forestry

UWF Replacement Forestry was evaluated for its potential to cause impacts to Lower River Shannon SAC.

It was evaluated by the topic authors that UWF Replacement Forestry has no potential to cause impacts to **Lower River Shannon SAC**, for the following reasons

- The entirety of the UWF Replacement Forestry lands occur outside both the boundary of the Lower River Shannon SAC and the River Shannon regional catchment area.

10.3.1.3 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 Lower River Shannon SAC itself, and therefore 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 evaluations for the Other Elements of the Whole UWF Project are included in Section 10.3.2 to Section 10.3.4 and included in the summary table in Section 10.3.8 in order to show the totality of the project.

10.3.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

10.3.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Lower River Shannon SAC 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 10.3.2.2.1** below.

The evaluation of cumulative impacts to Lower River Shannon SAC 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 Lower River Shannon SAC 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. 10)**.

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 Lower River Shannon SAC.

10.3.2.2 Cumulative Evaluation Study Area

The study area for the evaluation of cumulative effects is described in Table 10-20.

Table 10-20: Cumulative Evaluation Study Area for the Lower River Shannon SAC

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Boundary of works areas or activity locations where they interact/overlap with the boundary of the Lower River Shannon SAC	Only direct effects on soils and geology are anticipated.
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities	Not Relevant – No Other Projects or Activities were scoped in for evaluation of cumulative effects.	

10.3.2.2.1 Potential for Impacts to Lower River Shannon SAC

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 Lower River Shannon SAC. The results of this evaluation are included in Table 10-21.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on **Figure CE 10.4: Lower River Shannon SAC within the Cumulative Evaluation Study Area** (Volume C3 EIAR Figures).

Table 10-21: 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	Evaluated as excluded: No potential for effects due to: all UWF Related Works construction works areas occur at least 1.5km outside the boundary of the Lower River Shannon SAC.
Element 4: Upperchurch Windfarm (UWF)	Evaluated as excluded: No potential for effects due to: all Upperchurch Windfarm construction works areas occur at least 3km outside the boundary of the Lower River Shannon SAC.
Element 5: UWF Other Activities	Evaluated as excluded: No potential for effects due to: the UWF Other Activities will not occur within the boundary of the Lower River Shannon SAC.

10.3.2.3 Cumulative Information: Baseline Characteristics – Context & Character

10.3.2.3.1 Element 1: UWF Grid Connection

The Lower River Shannon SAC is being included for further impact assessment because the construction of the UWF Grid Connection is likely to have direct effects on soils and geology within the SAC. Soils and geology is not a qualifying feature of the SAC (which are described below). However, soils and geology are important from an overall habitat perspective. Its inclusion in the assessment also facilitates the evaluation of indirect effects on Water (Chapter 11) and Biodiversity (Chapter 8).

The Lower River Shannon SAC encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head.

The vast majority of the UWF Grid Connection construction works areas that occurs within the River Shannon catchment are at least 3-4km upstream of the SAC. The exception occurring in the UWF Grid Connection study area where the 110kV UGC is routed across the SAC at the crossing points of the 110kV under the Newport (Mulkear) River (watercourse crossing W10) and the Bilboa River (W57) as shown on **Figure GC 10.4: Lower River Shannon SAC within the UWF Grid Connection Study Area**. **Figure GC 10.4** is part of the EIA Report for the UWF Grid Connection, and is included in **Volume E: Reference Documents** with this planning application.

Directional drilling will be undertaken at these watercourse locations respectively to avoid direct impacts on these watercourses. However, a ~70m section of the 110kV UGC passes within the SAC on the western side of the Newport (Mulkear) River as the route approaches the western river bank. The route of the 110kV UGC within the SAC is along an existing farm track.

The qualifying interests of River Shannon SAC are largely aquatic and estuarine related. The route of the 110kV UGC is along a farm track which is underlain by mineral subsoil (sandstone tills). The 110kV UGC route within the SAC is located within the riparian zone of the Newport (Mulkear) River. Fluvial deposits over sandstone bedrock were confirmed by boreholes undertaken at the Newport (Mulkear) River crossing and fluvial deposits only were confirmed at the Bilboa River crossing. It is considered that the construction of the 110kV UGC will not directly affect the qualifying interests of River Shannon SAC.

10.3.2.3.2 Element 2: UWF Related Works

Not applicable – Element evaluated as excluded. See Section 10.3.2.2.1

10.3.2.3.3 Element 4: Already Consented Upperchurch Windfarm

Not applicable – Element evaluated as excluded. See Section 10.3.2.2.1

10.3.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 10.3.2.2.1

10.3.2.3.5 Other Projects or Activities

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 10.3.2.1.

10.3.2.4 Cumulative Information Baseline Characteristics - Importance of Lower River Shannon SAC

The Lower River Shannon is a designated SAC and contains many Annexed I habitats, including the most extensive area of estuarine habitat in Ireland. Based on the NRA (2008) criteria as shown in Table 10-3 (Section 10.1.5.1), the SAC is of Very High Importance. However, as stated above, the 110kV UGC will not directly affect the qualifying interests of River Shannon SAC.

10.3.2.5 Cumulative Information Baseline Characteristics - Sensitivity of Lower River Shannon SAC

The primary sensitivities in respect of the UWF Grid Connection will be surface water quality and its water dependant ecosystems and not soils and geology (indirect effects on surface water quality within the SAC from excavations are assessed in Chapter 11 Water). However, soils and geology are important from an overall habitat perspective and therefore effects need to be evaluated

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

The route of the 110kV UGC within the River Shannon SAC has already been altered for agricultural purposes. The current agricultural landuse (farm road) is expected to continue.

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

No landuse changes are expected to occur that would alter the character of the soils and geology within the River Shannon SAC. Therefore it is assumed in this report that the baseline environment identified above will be the receiving environment at the time of construction.

10.3.3 Cumulative Information: PROJECT DESIGN MEASURES for Lower River Shannon SAC

Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project (in particular 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 be found in this EIA Report in **Appendices 5.3 in Volume C4: EIA Appendices**.

10.3.4 Cumulative Information: EVALUATION OF IMPACTS to Lower River Shannon SAC

It is evaluated that UWF Replacement Forestry has no potential to cause impacts to Lower River Shannon SAC, see Section 10.3.1.

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) - Lower River Shannon SAC.

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

Table 10-22: List of all Impacts included and excluded from the Impact Evaluation Table sections

<u>Impacts Included</u> (Evaluated in the Impact Evaluation Table sections)	<u>Impacts Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Excavation & Relocation of Soil, Subsoil and Bedrock (construction stage)	<i>Erosion and/or Compaction (construction stage)</i>
Contamination from Oils, Fuels & Chemicals (construction stage)	<i>Operational Stage Effects</i>
Contamination from Cement Based Compounds (construction stage)	<i>Decommissioning Stage Effects</i>

The source-pathway-receptor links for included impacts are described in the **Impact Evaluation Tables** which are presented in the following sections **10.2.4.1 to 10.2.4.3**.

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Tables in Section 10.2.4.4.

10.3.4.1 Impact Evaluation Table: Excavation & Relocation of Soil, Subsoil and Bedrock

Evaluation of UWF Replacement Forestry Excluded: As the UWF Replacement Forestry lands are located outside the boundary of the Lower River Shannon SAC and in a different catchment than the River Shannon, there is no potential for UWF Replacement Forestry to cause effects to the Lower River Shannon SAC 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: Construction stage

Impact Source: N/A

Cumulative Impact Source: Groundworks, relocation and storage of overburden

Impact Pathway: Excavation, movement and mounding of overburden

Impact Description: The physical excavation and relocation of soil and subsoil and to a lesser extent bedrock from its natural location to a different location. The removal of soils from an SAC can have a direct effect on local habitats.

Impact Quality: Negative

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

Element 1: UWF Grid Connection

Impact Magnitude:

The route of the 110kV UGC is located within the SAC boundary at three points - a 70m section of farm road which is located within the SAC in Oakhampton, the crossing location of the Newport (Mulkear) River, just to the south of this farm road and the crossing point of the Bilboa River near Kilcommon village. The excavation and relocation of soil will be confined to the 70m section along the farm road, as the two river crossings will be carried out using drilling techniques and as all of the drilling techniques and construction works area boundary is located outside of the SAC boundary, there is no potential for effects to the SAC at these points.

In relation to the 70m section of the 110kV UGC which passes within the SAC on the northern side of the Newport (Mulkear) River just upstream of the crossing location, the construction works area will be entirely located in the existing farm track and construction works will involve trench excavations in mineral subsoil. It is estimated that approximately 52m³ of mineral subsoil and minor amounts of bedrock will be excavated and relocated during the cable installation works. The topsoil has already been removed as a result of the existing farm track being in place. All excavation material will be temporarily stored outside of the SAC and away from the river. Following the placement of the ducts and concrete, all of the previously excavated material will be backfilled along the trench and reinstated along the existing farm road inside the SAC.

As there will be no effects on the qualifying features of the SAC, which are largely aquatic habitats and species, the impact magnitude is considered to be Negligible.

Significance of the Impact: Imperceptible

Lower River Shannon SAC	Sensitive Aspect	Rationale for Impact Evaluation:
		• As per Table 10-4, Negligible magnitude combined with Very High Importance of the SAC; • There will be no excavation of the river bed or banks associated with either the Newport (Mulkear) or Bilboa rivers; • There will be no direct effects on the qualifying feature of the SAC which are largely aquatic habitats / species; • The effects will be limited to a short section of mineral subsoils within the riparian zone; • All works will be temporary and transient in nature; and, • There will be no removal of mineral subsoil as it will all be reinstated within the SAC.
		Element 2: UWF Related Works – N/A, evaluated as excluded, see Section 10.3.2.2.1
		Element 4: Consented Upperchurch Windfarm – N/A, evaluated as excluded, see Section 10.3.2.2.1
		Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 10.3.2.2.1
		Evaluation of Cumulative Impacts – Excavation & Relocation of Soil, Subsoil and Bedrock
		All Other Elements of the Whole UWF Project
		Cumulative Impact Magnitude: No potential for cumulative effects of the UWF Grid Connection with the Other Elements of the Whole UWF Project - only the UWF Grid Connection (110kV UGC route) is located within the Lower River Shannon SAC.
		Significance of the Cumulative Impact: No Cumulative Impact
		Rationale for Cumulative Impact Evaluation:
		• The UWF Grid Connection (110kV UGC route) is the only element which will result in impacts to the Lower River Shannon SAC.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities were evaluated as having potential to cause cumulative effects to Lower River Shannon SAC with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 10.3.2.1).

10.3.4.2 Impact Evaluation Table: Contamination from Oils, Fuels & Chemicals

Evaluation of UWF Replacement Forestry Excluded: As the UWF Replacement Forestry lands are located outside the boundary of the Lower River Shannon SAC and in a different catchment than the River Shannon, there is no potential for UWF Replacement Forestry to cause effects to the Lower River Shannon SAC 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

Impact Source: n/a

Cumulative Impact Source: Oils, Fuels and Chemicals

Impact Pathway: Soil, subsoil and bedrock pore space

Impact Description: The plant and equipment that will be used during the construction phase will be run on fuels and oils. This creates the potential for spillage and leakage of hydrocarbons from machinery or plant during refuelling. There will be no storage of oils or fuels within the SAC. Also, bentonite will be used at the Newport (Mulkear) River and Bilboa River directional drilling crossing works. Although, please note bentonite is an inert material and is not toxic.

Any spillages onto soil will contaminate the soil with toxic chemical and may cause secondary effects to water quality and biodiversity. Indirect effects on water quality and biodiversity are discussed in Chapter 11 and Chapter 8 respectively.

Impact Quality: Negative

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

Element 1: UWF Grid Connection

Impact Magnitude:

The laying of the cable for the UWF Grid Connection will require the excavation of a ~70m long trench within the SAC. Localised and very minor spills and leaks could potentially occur within the SAC.

- The potential for accidental spillages are limited to leaks and dripping from machinery and any leaks or drips will be very localized to the short section of subsoils underneath the existing access track where the laying of the cable for the UWF Grid Connection will require the excavation of a 70m long trench along an existing farm track which is located within the boundary of the Lower River Shannon SAC;
- At the two river drilling locations, the works areas for the drilling machines are located outside of the SAC, therefore no impacts on the SAC with respect to soils and geology are anticipated; and,
- Bentonite is a non-toxic material and therefore the effects on soils and geology at the crossing location will be negligible.

Given the small scale nature of the works within the SAC, the small volume of fuels/oils that will be present and unlikelihood of large spills/leaks, the impact magnitude is considered to be Negligible

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with Very High Importance of the SAC; and,
- Soils and geology is not a qualifying feature of the SAC. The qualifying interests are largely aquatic habitats and species;
- Minor accidental spillage (i.e. small spillage volumes) from leaks or dripping from machinery en-

gines/hydraulics is only likely to occur (worst case);
• There will be no refueling of machinery or storage of fuels permitted within the SAC (Project Design Measure); and, • Any effects that do occur will be very localised to the soils and subsoils at the source / works activity area
Element 2: UWF Related Works – <i>N/A, evaluated as excluded, see Section 10.3.2.2.1</i>
Element 4: Consented Upperchurch Windfarm – <i>N/A, evaluated as excluded, see Section 10.3.2.2.1</i>
Element 5: UWF Other Activities – <i>N/A, evaluated as excluded, see Section 10.3.2.2.1</i>
Evaluation of the Cumulative Impact – Contamination from Oils, Fuels & Chemicals
All Other Elements of the Whole UWF Project
<u>Cumulative Impact Magnitude</u> : No potential for cumulative effects of the UWF Grid Connection with the Other Elements of the Whole UWF Project - only the UWF Grid Connection (110kV UGC route) is located within the Lower River Shannon SAC.
Significance of the Cumulative Impact: No Cumulative Impact
<u>Rationale for Cumulative Impact Evaluation</u> :
• The UWF Grid Connection is the only element which will result in impacts to the Lower River Shannon SAC.

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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 were evaluated as having potential to cause cumulative effects to Lower River Shannon SAC with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 10.3.2.1)

10.3.4.3 Impact Evaluation Table: Contamination from Cement Based Compounds

Evaluation of UWF Replacement Forestry Excluded: As the UWF Replacement Forestry lands are located outside the boundary of the Lower River Shannon SAC and in a different catchment than the River Shannon, there is no potential for UWF Replacement Forestry to cause effects to the Lower River Shannon SAC 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

Impact Source: n/a

Cumulative Impact Source: Cement based compounds such as concrete

Impact Pathway: Soil, subsoil and bedrock pore space

Impact Description: Contamination of soil, subsoil and bedrock due to direct contact with cement based construction compounds used for construction. Concrete and other cement-based products are highly alkaline and corrosive and can have impacts directly on the soil and subsoils in terms of toxicity to its flora and fauna. The effects will largely be localised to the soil or subsoil in direct contact with the cementations material.

Impact Quality: Negative

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project**Element 1: UWF Grid Connection**

Impact Magnitude:

The use of cement within the SAC will be limited to the placement of semi-dry lean mix concrete in the cable trench. The cement will be in direct contact with the mineral subsoil beneath the existing access track. The cement will be covered and backfilled with natural material.

Given the small scale nature of the works within the SAC and the small volume of cement that will be placed within the SAC, the impact magnitude is considered to be Negligible.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with Very High Importance of the SAC;
- The volume of cement to be used within the SAC will be minimal (<30m³) due to the short length of works within or in close proximity to the boundary;
- Contact with the cement will be limited to a short section of mineral subsoils underneath the existing access track; and,
- Only a temporary (and reversible) increase in the pH of the soil, subsoil and bedrock in direct contact with the cement is likely to occur. 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.

Element 2: UWF Related Works – N/A, evaluated as excluded, see Section 10.3.2.2.1

Element 4: Consented Upperchurch Windfarm – N/A, evaluated as excluded, see Section 10.3.2.2.1

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 10.3.2.2.1

Evaluation of Cumulative Impacts – Contamination from Cement Based Compounds	
All Other Elements of the Whole UWF Project	
Cumulative Impact Magnitude: No potential for cumulative effects of the UWF Grid Connection with the Other Elements of the Whole UWF Project - only the UWF Grid Connection (110kV UGC route) is located within the Lower River Shannon SAC.	
Significance of the Cumulative Impact: No Cumulative Impact	
Rationale for Cumulative Impact Evaluation:	
The UWF Grid Connection (110kV UGC route) is the only element which will result in impacts to the Lower River Shannon SAC.	

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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 were evaluated as having potential to cause cumulative effects to Lower River Shannon SAC with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 10.3.2.1).

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10.3.4.4 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 the table below.

Table 10-23: Description and Rationale for Excluded Impacts to Lower River Shannon SAC

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
Construction Stage				
Excavations, construction machinery and traffic, storage of Overburden	1	Movement and mounding	Erosion and / or Compaction	Rationale for Excluding: No potential for impacts/Neutral Impacts: Project design has ensured that sources of effects are not located within the SAC boundary – there will be no temporary or new permanent access roads within the SAC; there will be no temporary or permanent storage of overburden within the SAC; and construction traffic and construction works will be confined to the existing farm track which travels for c.70m through the SAC within agricultural grassland to the northwest of the Newport (Mulkear) River crossing location (W10). Trenching works within the SAC boundary will be brief (1 to 2 days). Any compaction effects will be limited to a short section of mineral subsoils underneath the existing farm track, the use of this existing access track along the route of the 110kV UGC will prevent compaction effects to these mineral soils– any effects will be Neutral. Soils within the SAC boundary at this location are limited to mineral subsoil over sandstone bedrock. The location of construction works within the existing access track and the backfilling and reinstatement of the access track immediately after trenching works will avoid effects to subsoils by construction traffic– any effects will be Neutral. There are no soil based qualifying features of the SAC - the qualifying features are largely aquatic habitats / species, therefore there is no potential for direct effects to the qualifying features of the SAC– any effects will be Neutral.
Operational Stage Effects				
<u>UWF Grid Connection</u> : There will be no requirement for any excavation work or groundworks within the SAC boundary during the operational phase.				
Decommissioning Stage Effects				
<u>UWF Grid Connection</u> : No potential for impacts: The UWF Grid Connection will remain part of the National Grid on a permanent basis and is not expected to be decommissioned.				

10.3.5 Mitigation Measures for Impacts to Local River Shannon SAC

Mitigation measures are not relevant as there is **no potential for UWF Replacement Forestry to cause impacts** to Lower River Shannon SAC.

10.3.6 Evaluation of Residual Impacts to Local River Shannon SAC

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 10.3.1.2), i.e. **no potential for impacts**.

10.3.7 Application of Best Practice and the EMP for Local River Shannon SAC

No UWF Replacement Forestry Best Practice Measures have been developed specially for the protection of the Lower River Shannon SAC.

10.3.8 Summary of Impacts to the Lower River Shannon SAC

The topic authors conclude that there is no potential for UWF Replacement Forestry to cause impacts to Lower River Shannon SAC.

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 10-24: Summary of the impacts to the Lower River Shannon SAC

Impact to Lower River Shannon SAC:	Excavation & Relocation of Soil, Subsoil and Bedrock	Contamination from Oils, Fuels & Chemicals	Contamination from Cement Based Compounds
Evaluation Impact Table (for Other Elements only)	Section 10.3.4.1	Section 10.3.4.2	Section 10.3.4.3
Project Life-Cycle Stage (for Other Elements only)	Construction	Construction	Construction
<u>UWF Replacement Forestry Impact</u>	No Potential for Impacts Evaluated as Excluded - see Section 10.3.1		
Element 1: UWF Grid Connection	Imperceptible	Imperceptible	Imperceptible
Element 2: UWF Related Works	No Potential for Impact - Evaluated as Excluded, see Section 10.3.2.2.1		
Element 4: Upperchurch Windfarm	No Potential for Impact - Evaluated as Excluded, see Section 10.3.2.2.1		
Element 5: UWF Other Activities	No Potential for Impact - Evaluated as Excluded, see Section 10.3.2.2.1		
<u>Cumulative Impact:</u> (for Other Elements only)			
All Other Elements of the Whole UWF Project	No Potential for Cumulative Impact	No Potential for Cumulative Impact	No Potential for Cumulative Impact

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities were evaluated as having potential to cause cumulative effects to Lower River Shannon SAC with either the UWF Replacement Forestry or the Other Elements of the Whole UWF Project (see Section 10.3.2.1).

10.4 Sensitive Aspect No.3: Bleanbeg Bog NHA

This Section provides a description and evaluation of the Sensitive Aspect - Bleanbeg Bog NHA.

10.4.1 UWF REPLACEMENT FORESTRY – EVALUATED AS EXCLUDED

10.4.1.1 Baseline Characteristics of the Bleanbeg Bog NHA in relation to UWF Replacement Forestry

Bleanbeg Bog NHA is a 1.3km² area of upland blanket bog that is located approximately 7km east of Newport, Co. Tipperary. The site is designated for its upland blanket bog habitat.

The UWF Replacement Forestry land are located c.14km to the east of the NHA.

10.4.1.2 Evaluation of UWF Replacement Forestry

UWF Replacement Forestry was evaluated for its potential to cause impacts to the Bleanbeg Bog NHA.

It was evaluated by the topic authors that the UWF Replacement Forestry has **no potential to cause impacts to the Bleanbeg Bog NHA**, for the following reasons:

- The separation distance between UWF Replacement Forestry and Bleanbeg Bog NHA - the UWF Replacement Forestry lands are located c.14km from the boundary of Bleanbeg Bog NHA.

10.4.1.3 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 Bleanbeg Bog NHA itself, and therefore 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 evaluations for the Other Elements of the Whole UWF Project are included in Section 10.4.2 to Section 10.4.4 and included in the summary table in Section 10.4.8 in order to show the totality of the project.

10.4.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

10.4.2.1 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Bleanbeg Bog NHA 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 10.4.2.2.1** below.

The evaluation of cumulative impacts to Bleanbeg Bog NHA 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 Bleanbeg Bog NHA 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. 10)**.

The results of this scoping exercise are that: no other projects or activities will cause cumulative effects to Bleanbeg Bog NHA with UWF Replacement Forestry however in order to present the totality of the project – Turf-Cutting (activity) has been scoped in for evaluation of cumulative effects relating to the Other Elements.

10.4.2.2 Cumulative Evaluation Study Area

The study area for the evaluation of cumulative effects is described in Table 10-25.

Table 10-25: Cumulative Evaluation Study Area for Bleanbeg Bog NHA

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Entire Boundary of Bleanbeg Bog NHA	Only direct effects on soils and geology are anticipated and therefore for cumulative effects to occur a direct impact on the NHA from other projects / activities will have to occur..
Element 2: UWF Related Works		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
Other Projects or Activities: Turf Cutting 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.		

10.4.2.2.1 Potential for Impacts to Bleanbeg Bog NHA

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 Bleanbeg Bog NHA. The results of this evaluation are included in Table 10-26.

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 10.5: Bleanbeg Bog NHA within the Cumulative Evaluation Study Area**. (Volume C3 EIAR Figures).

Table 10-26: 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	Included for the evaluation of cumulative effects
Element 2: UWF Related Works	Evaluated as excluded: No potential for effects due to The separation distance between the UWF Related Works and Bleanbeg Bog NHA - all UWF Related Works construction works areas will occur c.12km from the boundary of Bleanbeg Bog NHA.
Element 4: Upperchurch Windfarm (UWF)	Evaluated as excluded: No potential for effects due to: The separation distance between the Upperchurch Windfarm and Bleanbeg Bog NHA - all UWF construction works areas will occur c.12km from the boundary of Bleanbeg Bog NHA.
Element 5: UWF Other Activities	Evaluated as excluded: No potential for effects due to: With the exception of Monitoring Activities, the UWF Other Activities will not occur within the boundary of the Lower River Shannon SAC. The Monitoring Activities will not involve any works to soils.
Other Project or Activity	
Activity: Turf-Cutting	Included for the evaluation of cumulative effects 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.

10.4.2.3 Cumulative Information: Baseline Characteristics – Context & Character**10.4.2.3.1 Element 1: UWF Grid Connection**

Bleanbeg Bog (Site Code: 002450) is being included for further impact assessment because the construction of the UWF Grid Connection will have direct effects on the soils and geology within the NHA. The site is designated for its upland blanket bog habitat, however there will be no effects on blanket bog as the UWF Grid Connection (route of the 110kV UGC) does not intercept blanket bog (this is further below).

Bleanbeg Bog NHA is a 1.3km² area of upland blanket bog that is located approximately 7km east of Newport, Co. Tipperary. The UWF Grid Connection is located within the NHA boundary along Section S38 of the 110kV UGC route where it intersects the NHA for approximately 140m at the extreme south-western edge of the NHA (99.9% of the NHA is upslope of the route). The route of the 110kV UGC inside the NHA is along an existing forestry track which runs immediately downslope of the bog cutaway face. Refer to **Figure GC 10.5: Bleanbeg Bog NHA within the UWF Grid Connection Study Area** for the location of the NHA in relation to the 110KV UGC. **Figure GC 10.2** is part of the EIA Report for the UWF Grid Connection, and is included in **Volume E: Reference Documents** with this planning application.

Bleanbeg Bog NHA 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 NHA site is defined by the

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transition from intact blanket bog to cutover bog, while the northern, eastern and southern sides of the NHA site are bounded by conifer plantation. A forestry road is located on the NHA site's southern boundary. The 110kV UGC is routed along a 140m section of this forestry road. Site investigations undertaken along the existing forestry road within the NHA (2 no. trial pits as shown on **Figure GC 10.5**) have shown that the forestry road is underlain by mineral subsoil (>1.3m in depth) comprising gravelly, sandy SILT/CLAY. There is no peat present on this existing road, along the 140m section of the 110kV UGC within the NHA. During trial pitting the mineral subsoil was found to be unsaturated.

10.4.2.3.2 Element 2: UWF Related Works

Not applicable – Element evaluated as excluded. See Section 10.4.2.2.1

10.4.2.3.3 Element 4: Already Consented Upperchurch Windfarm

Not applicable – Element evaluated as excluded. See Section 10.4.2.2.1

10.4.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 10.4.2.2.1

10.4.2.3.5 Other Projects or Activities

Turf-cutting occurs within the boundary of the NHA.

10.4.2.4 Cumulative Information Baseline Characteristics - Importance of Bleanbeg Bog NHA

Bleanbeg Bog NHA is an upland blanket bog and is considered by the NPWS to have high conservation importance (NPWS 2004 Site Synopsis report). The site is designated for its upland blanket bog habitat. Based on the NRA (2008) criteria as shown in Table 10-3, the NHA is of Very High Importance

10.4.2.5 Cumulative Information Baseline Characteristics - Sensitivity of Bleanbeg Bog NHA

The hydrology and morphology of upland blanket bogs and their water dependant ecosystems are very sensitive to impacts. Draining and cutting damages the morphology and hydrology of bog systems, leading to drying out of the bog surface, loss of the characteristic Sphagnum mosses and peat erosion. Removal of blanket bog also results in loss of peatland habitat.

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

It is reported by the NPWS (NPWS site synopsis report) that mainly hand cutting of turf for domestic purposes occurs on the margins of the bog, and that sausage machine cutting and associated drainage works and machine tracks have damaged small areas of the bog surface on the north-western and north-eastern edges of the NHA site. Coniferous tree saplings are also invading the bog margins in places. Peat cutting has occurred in the past in the area of the NHA intersected by the route of the 110kV UGC, to provide a forestry access road. This existing forestry road (along which the 110kV UGC is routed) is likely to continue to be used as a forestry access route.

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

Bleanbeg Bog NHA is a nationally protected site and any physical changes will be limited to relatively small scale turbary peat cutting. Species invasion will have a very gradual effect on the physical state of the bog. Therefore it is assumed in this report that the baseline environment identified above will be the receiving environment.

10.4.3 Cumulative Information: PROJECT DESIGN MEASURES for Bleanbeg Bog NHA

Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project (in particular 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: EIAR Appendices](#).

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10.4.4 Cumulative Information: EVALUATION OF IMPACTS to Bleanbeg Bog NHA

It is evaluated that **UWF Replacement Forestry has no potential to cause impacts to Bleanbeg Bog NHA**, see Section 10.4.1.

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 and Other Projects or Activities.

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) - Bleanbeg Bog NHA.

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

Table 10-27: List of all Impacts included and excluded from the Impact Evaluation Table sections

<u>Impacts Included</u> (Evaluated in the Impact Evaluation Table sections)	<u>Impacts Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Excavation & Relocation of Soil, Subsoil and Bedrock (construction stage)	<i>Erosion and/or Compaction (construction stage)</i>
Contamination from Oils, Fuels & Chemicals (construction stage)	<i>Operational Stage Effects</i>
Contamination from Cement Based Compounds (construction stage)	<i>Decommissioning Stage Effects</i>

The source-pathway-receptor links for included impacts are described in the **Impact Evaluation Tables**, which are presented in the following sections **10.2.4.1 to 10.2.4.3**.

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Tables in Section 10.2.4.4.

10.4.4.1 Impact Evaluation Table: Excavation & Relocation of Soil, Subsoil and Bedrock

Evaluation of UWF Replacement Forestry Excluded: As the UWF Replacement Forestry lands do not overlap the NHA boundary (closest point c.14km away), there is no potential for UWF Replacement Forestry to cause effects to Bleanbeg Bog NHA itself, and consequently this project 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 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
<u>Impact Source:</u> n/a <u>Cumulative Impact Source:</u> Groundworks, relocation and storage of overburden, turf-cutting <u>Impact Pathway:</u> Excavation, movement and mounding of overburden <u>Impact Description:</u> The physical excavation and relocation of soil and subsoil and to a lesser extent bedrock from its natural location to a different location. Excavation and relocation of soils in the NHA are limited to mineral soil and a minor amount of bedrock. Therefore, direct effects on blanket bog (which is the designating feature) will not occur. The construction of the UWF Grid Connection (110kV UGC) does not intersect blanket bog within the NHA as it uses an existing forestry track on the verge of the bog. Therefore, there will be no excavation of peat. <u>Impact Quality:</u> Negative	

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

Element 1: UWF Grid Connection

Impact Magnitude:
Trench excavations for the UWF Grid Connection (110kV UGC) will require the excavation of a 140m long trench within Bleanbeg NHA along an existing track. The cable will be placed in the mineral subsoil.

It is estimated that approximately 100m³ of mineral subsoil and a very minor amount of bedrock will be excavated. The topsoil [along the existing road within the NHA] has already been removed as a result of the existing track being put in place.

All of the excavated material from the NHA will be reinstated back in the trench inside the NHA.

As there will be no effects on the designating feature of the NHA, which is Upland blanket Bog (i.e. Peat), the impact magnitude is considered to be Negligible.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with a Very High Importance of the NHA;
- There will be no excavation of blanket bog;
- There will be no effects on the designating feature of the NHA which is Upland Blanket Bog;
- The effects will be limited to a short section of mineral subsoils on the verge of the bog;
- There will be no removal of mineral subsoil as it will all be reinstated within the NHA; and,
- The access road will be reinstated to its original condition.

Element 2: UWF Related Works – <i>N/A, evaluated as excluded, see Section 10.4.2.2.1</i>
Element 4: Consented Upperchurch Windfarm – <i>N/A, evaluated as excluded, see Section 10.4.2.2.1</i>
Element 5: UWF Other Activities – <i>N/A, evaluated as excluded, see Section 10.4.2.2.1</i>
Cumulative Information for Other Projects or Activities (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>)
Activity: Turf Cutting
<u>Impact Magnitude:</u> The turf cutting carried out to date has occurred on the edges of the bog and the impact could be considered Small Adverse
<u>Significance of the Impact:</u> Significant
<u>Rationale for Impact Evaluation:</u> As per Table 10-4, Small Adverse magnitude combined with a Very High Importance of the NHA;
Evaluation of Cumulative Impacts – Excavation & Relocation of Soil, Subsoil and Bedrock
All Other Elements of the Whole UWF Project
<u>Cumulative Impact Magnitude:</u> No potential for cumulative effects of the UWF Grid Connection with the Other Elements of the Whole UWF Project.
<u>Significance of the Cumulative Impact:</u> No Cumulative Impact
<u>Rationale for Cumulative Impact Evaluation:</u> - The UWF Grid Connection (110kV UGC) is the only element which will result in impacts to the Bleanbeg Bog NHA - No Other Element of the Whole UWF Project is located within the boundary of Bleanbeg Bog NHA.
All Other Elements of the Whole UWF Project with Other Projects or Activities
<u>Cumulative Impact Magnitude:</u> No additional magnitude due to the UWF Grid Connection, as 110kV UGC works within the NHA will <u>not</u> require removal of peat and any excavations for the 110kV UGC will be limited to the mineral subsoils which are not typically effected by turf cutting.
<u>Significance of the Cumulative Impact:</u> No Cumulative Impact
<u>Rationale for Cumulative Impact Evaluation:</u> No potential for additive effects caused by the UWF Grid Connection.

10.4.4.2 Impact Evaluation Table: Contamination from Oils, Fuels & Chemicals

Evaluation of UWF Replacement Forestry Excluded: As the UWF Replacement Forestry lands do not overlap the NHA boundary (closest point c.14km away), there is no potential for UWF Replacement Forestry to cause effects to Bleanbeg Bog NHA itself, and consequently this project 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 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

Impact Source: n/a

Cumulative Impact Source: Oils, Fuels and Chemicals

Impact Pathway: Soil, subsoil and bedrock pore space

Impact Description: The plant and equipment that will be used during the construction phase will be run on fuels and oils. This creates the potential for spillage and leakage of hydrocarbons from the machinery or plant during refuelling or leakages from stored oils and fuels. Any spillages onto soil will contaminate the soil with toxic chemicals and may cause secondary effects to water quality and biodiversity.

Impact Quality: Negative

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

Element 1: UWF Grid Connection

Impact Magnitude:

- The laying of the cable for the UWF Grid Connection will require the excavation of a 140m long trench within Bleanbeg Bog NHA. As the peat on this section of the NHA has already been removed, there is no potential for contamination of blanket bog;
- Plant and equipment ran on hydrocarbons will be used along the 140m length of 110kV UGC works areas in the NHA and therefore contamination effects could in theory occur;
- However, no fuel will be stored within the NHA and no refueling of plant or machinery will take place with the NHA boundary. The potential for accidental spillages are limited to leaks and dripping from machinery and any leaks or drips will be very localized to the short section of mineral subsoils underneath the existing access track; and,
- The access road exists downslope of the bog and therefore there can be no indirect effects on blanket bog or Upland Blanket Bog which is the designated feature of the NHA.
- As there will be no effects on the designating feature of the NHA, which is Upland blanket Bog (i.e. Peat), the impact magnitude is considered to be Negligible.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with the Very High Importance of the NHA;
- There will be no direct or indirect contamination of blanket bog;
- There will be no effects on the designating feature of the NHA which is Upland Blanket Bog;
- Any spills and leaks will be limited to leaks or drips from the machinery on the existing forestry track, and effects will be limited to a short section of mineral subsoils underneath the existing access track (the access road exists downslope of the bog and therefore there can be no indirect effects as a result of contaminated surface

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		Element 2: UWF Related Works – <i>N/A, evaluated as excluded, see Section 10.4.2.2.1</i>
		Element 4: Consented Upperchurch Windfarm – <i>N/A, evaluated as excluded, see Section 10.4.2.2.1</i>
		Element 5: UWF Other Activities – <i>N/A, evaluated as excluded, see Section 10.4.2.2.1</i>
		<u>Cumulative Information for Other Projects or Activities</u> (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)
		Activity: Turf Cutting
		<u>Impact Magnitude</u> : Negligible - the source is unlikely to be present in any significant volumes.
		<u>Significance of the Impact</u> : Imperceptible
		<u>Rationale for Impact Evaluation</u> : • As per Table 10-4, Negligible magnitude combined with the Very High Importance of the NHA; • the source is unlikely to be present in any significant volumes
Soils	Topic	Evaluation of the Cumulative Impact – Contamination from Oils, Fuels & Chemicals
		All Other Elements of the Whole UWF Project
		<u>Cumulative Impact Magnitude</u> : No potential for cumulative effects of the UWF Grid Connection with the Other Elements of the Whole UWF Project.
		<u>Significance of the Cumulative Impact</u>: Cumulative Impact
		<u>Rationale for Cumulative Impact Evaluation</u> : • The UWF Grid Connection (110kV UGC) is the only element which will result in impacts to the Bleanbeg Bog NHA • No Other Element of the Whole UWF Project is located within the boundary of Bleanbeg Bog NHA.
		All Other Elements of the Whole UWF Project with Other Projects or Activities
		<u>Cumulative Impact Magnitude</u> : No additional magnitude due to the UWF Grid Connection, as 110kV UGC works within the NHA are at a distance from turf cutting activities.
		<u>Significance of the Cumulative Impact</u>: No Cumulative Impact
		<u>Rationale for Cumulative Impact Evaluation</u> : • No potential for additive effects caused by the UWF Grid Connection.

10.4.4.3 Impact Evaluation Table: Contamination from Cement Based Compounds

Evaluation of UWF Replacement Forestry Excluded: As the UWF Replacement Forestry lands do not overlap the NHA boundary (closest point c.14km away), there is no potential for UWF Replacement Forestry to cause effects to Bleanbeg Bog NHA itself, and consequently this project 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 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
<u>Impact Source:</u> n/a <u>Cumulative Impact Source:</u> Cement based compounds <u>Impact Pathway:</u> Soil, subsoil and bedrock pore space <u>Impact Description:</u> Contamination of soil, subsoil and bedrock due to direct contact with cement based construction compounds used for construction. Concrete and other cement-based products are highly alkaline and corrosive and can have impacts specifically on the soil and subsoils in terms of toxicity to its flora and fauna. Blanket bog is an acidic environment and blanket bog habitats are very sensitive to alkaline compounds. The effects will largely be localised to the soil or subsoil in direct contact with the cementitious material. <u>Impact Quality:</u> Negative	

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project**Element 1: UWF Grid Connection**Impact Magnitude:

The use of cement within the NHA will be limited to the placement of semi-dry lean mix concrete in the cable trench. The cement will be in direct contact with the mineral subsoil beneath the existing access track. The cement will be covered and backfilled with natural material.

As there will be no effects on the designating feature of the NHA, which is Upland blanket Bog (i.e. Peat), the impact magnitude is considered to be Negligible.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- As per Table 10-4, Negligible magnitude combined with the Very Importance of the NHA;
- The small volume (<50m³) of cement that will be required within the NHA, by nature of the short route section;
- Contact with the cement will be limited to a short section of mineral subsoils underneath the existing access track (the access road exists downslope of the bog and therefore there can be no indirect effects as a result of contaminated surface water or groundwater flow towards the bog);
- There will be no direct or indirect contamination by cement of blanket bog;
- There will be no effects on the designating feature of the NHA which is Upland Blanket Bog; and,
- Only a temporary (and reversible) increase in the pH of the soil, subsoil and bedrock in direct contact with the cement is likely to occur. 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.

Element 2: UWF Related Works – N/A, evaluated as excluded, see Section 10.4.2.2.1

Element 4: Consented Upperchurch Windfarm – N/A, evaluated as excluded, see Section 10.4.2.2.1

Bleanbeg Bog NHA	Sensitive Aspect	Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 10.4.2.2.1
		Cumulative Information for Other Projects or Activities
		(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>)
		Activity: Turf Cutting
		<u>Impact Magnitude:</u> Negligible - the source (cement based compounds) is unlikely to be present
		<u>Significance of the Impact:</u> No Likely Impact
		<u>Rationale for Impact Evaluation:</u> • the source is unlikely to be present
		Evaluation of the Cumulative Impact – Contamination from Cement Based Compounds
		All Other Elements of the Whole UWF Project
		<u>Cumulative Impact Magnitude:</u> No potential for cumulative effects of the UWF Grid Connection with the Other Elements of the Whole UWF Project.
		Significance of the Cumulative Impact: No Cumulative Impact
		<u>Rationale for Cumulative Impact Evaluation:</u> • The UWF Grid Connection (110kV UGC) is the only element which will result in impacts to the Bleanbeg Bog NHA • No Other Element of the Whole UWF Project is located within the boundary of Bleanbeg Bog NHA.
		All Other Elements of the Whole UWF Project with Other Projects or Activities
		<u>Cumulative Impact Magnitude:</u> None – no potential for cumulative impacts
		Significance of the Cumulative Impact: No Cumulative Impact
		<u>Rationale for Cumulative Impact Evaluation:</u> • No potential for additive effects – source only present in relation to the UWF Grid Connection.

10.4.4.4 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 the table below.

Table 10-28: Description and Rationale for Excluded Impacts to Bleanbeg Bog NHA

Key: 1: UWF Grid Connection;

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rational for Excluding the Impact
Construction Stage				
Excavations, construction machinery and traffic, storage of Overburden	1	Movement and mounding	Erosion and / or Compaction	Rationale for Excluding: Neutral effect Project design has ensured that sources of effects are not located within the NHA boundary – there will be no temporary or new permanent access roads within the NHA; there will be no temporary or permanent storage of overburden within the NHA; and construction traffic and construction works will be confined to the existing forestry track which travels for c.140m through the NHA on it's southern boundary with the forestry plantation. There is no blanket bog remaining on or below this existing track (as proven by investigation), as it would have been removed during the construction of the forestry access road, therefore, as there is no blanket bog within the construction works area, there is no potential for compaction or erosion of natural blanket bog or on the designating feature of the NHA which is Upland Blanket Bog. Any compaction effects will be limited to a short section of mineral subsoils underneath the existing access track; the use of this existing access track along the route of the 110kV UGC will prevent compaction effects to these mineral soils. The use of this existing access track will also minimise the potential for erosion to these mineral soils due to the presence of the road surface– any effects will be Neutral..
Operational Stage Effects				
<u>UWF Grid Connection</u> : Neutral effect - There will be no requirement for any excavation work or groundworks within the Bleanbeg Bog NHA during the operational phase.				
Decommissioning Stage				
<u>UWF Grid Connection</u> : No potential for impacts: The UWF Grid Connection will remain part of the National Grid on a permanent basis and is not expected to be decommissioned.				

10.4.5 Mitigation Measures for Impacts to Bleanbeg Bog NHA

Mitigation measures are not relevant as there is **no potential for UWF Replacement Forestry to cause impacts** to Bleanbeg Bog NHA.

10.4.6 Evaluation of Residual Impacts to Bleanbeg Bog NHA

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 10.4.1.2), i.e. **no potential for impacts**.

10.4.7 Application of Best Practice and the EMP for Bleanbeg Bog NHA

No UWF Replacement Forestry Best Practice Measures have been developed specially to protect the Bleanbeg Bog NHA.

10.4.8 Summary of Impacts to Bleanbeg Bog NHA

The topic authors conclude that there is no potential for UWF Replacement Forestry to cause impacts to Bleanbeg Bog NHA.

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 10-29: Summary of the impacts to Bleanbeg Bog NHA

Impact to Bleanbeg Bog NHA	Excavation & Relocation of Soil, Subsoil and Bedrock	Contamination from Oils, Fuels & Chemicals	Contamination from Cement Based Compounds
Evaluation Impact Table (for Other Elements only)	Section 10.4.4.1	Section 10.4.4.2	Section 10.4.4.3
Project Life-Cycle Stage (for Other Elements only)	Construction	Construction	Construction
<u>UWF Replacement Forestry Impact</u>	No Potential for Impacts Evaluated as Excluded - see Section 10.4.1		
Element 1: UWF Grid Connection	Imperceptible	Imperceptible	Imperceptible
Element 2: UWF Related Works	No Potential for Impact - Evaluated as Excluded, see Section 10.4.2.2.1		
Element 4: Upperchurch Windfarm	No Potential for Impact - Evaluated as Excluded, see Section 10.4.2.2.1		
Element 5: UWF Other Activities	No Potential for Impact - Evaluated as Excluded, see Section 10.4.2.2.1		
<u>Cumulative Impact:</u> (for Other Elements only)			
All Other Elements of the Whole UWF Project	No Cumulative Impact	No Cumulative Impact	No Cumulative Impact
All Other Elements of the Whole UWF Project <i>cumulatively with Other Projects or Activities Turf-Cutting</i>	No Cumulative Impact	No Cumulative Impact	No Cumulative Impact

(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).

Sensitive Aspect	Bleanbeg Bog NHA

Topic	Soils

10.5 Policy Context

10.5.1 International Policy

At the EU policy level, a Soil Framework Directive does not exist at this time. The EU's Seventh Environmental Action Programme (1386/2013/EU) recommends that "the protection of soil and water should be fully taken into account in decisions relating to renewable energy (EU 2013)."

10.5.2 National Policy

At the national policy level, Ireland does not have specific legislation on soil protection in place. However, soil protection is indirectly covered by other policies in other policy areas such as agriculture, water and waste.

10.5.3 Mid-West Regional Planning Guidelines 2010-2022

The Mid-West Regional Planning Guidelines 2010-2022 contains no policies or guidelines relevant to the soil and geological environment within the study area.

10.5.4 North Tipperary County Development Plan 2010 (as varied):

The North Tipperary County Development Plan 2010 does not contain specific policies or objectives regarding the protection of the soil and geological environment.

The subject development will have regard to Policies LH6 and LH7 concerning the protection of designated sites (See Chapter 8: Biodiversity), and proposed developments are required to avoid a significant adverse impact on the ecological status of any designated sites within or in close proximity to the development area. As such the evaluation of the impacts to the soil, subsoil and geology of the Bleanbeg Bog NHA and the Lower River Shannon SAC, included in this chapter, have been used in Chapter 11: Water and Chapter 8: Biodiversity to evaluate an indirect impacts on water and biodiversity of these two designated sites.

It is an objective of the Council, subject to resources, to undertake a review of Geological Sites in Tipperary in association with the Geological Survey of Ireland over the lifetime of the Plan.

10.6 Best Practice Measures

No UWF Replacement Forestry Best Practice Measures have been created specifically for Soils.

10.7 Summary of the Soils Chapter

Soils relates to topsoil, subsoil and bedrock. UWF Replacement Forestry will be planted on agricultural lands. Soils in the area are not designated and comprise mainly mineral or organic (peaty) topsoil over glacial tills. The underlying bedrock mainly comprises volcanic meta-sediments.

Sensitive Aspects of Soils which were evaluated in this chapter include Local Soils, Subsoils & Bedrock; Bleanbeg Bog NHA and Lower River Shannon SAC. The evaluation of effects to Bleanbeg Bog NHA and the Lower River Shannon SAC relate to effects caused by another Element of the Whole UWF Project – the UWF Grid Connection.

10.7.1 Summary of UWF Replacement Forestry Impacts

- The UWF Replacement Forestry will cause Neutral impacts to Local Soils, Subsoils & Bedrock, this is mainly due to the small scale of works, planting by hand and no use of large machinery,
- There is no potential for UWF Replacement Forestry to cause impacts to the Lower River Shannon SAC as the lands are not located within the SAC boundary, with a separation distance of 3km.
- There is no potential for UWF Replacement Forestry to cause impacts to the Bleanbeg Bog NHA as the construction works areas are not located within the NHA boundary, with a separation distance of 14km.

10.7.2 Summary of Cumulative Impacts of the Other Elements of the Whole UWF Project

Although the UWF Replacement Forestry will not cause impacts to the sensitive aspects of soils, as it is one element of the larger Whole Upperchurch Windfarm Project (Whole UWF Project), the potential for cumulative effects of these Other Elements was examined (in particular the construction works relating to UWF Grid Connection, UWF Related Works and Upperchurch Windfarm).

- Cumulative impacts to Local Soils, Subsoils & Bedrock of the Other Elements will be Slight-Moderate in relation to soil excavation/relocation impacts, Slight in relation to potential contamination by cement-based compounds, and will remain cumulatively Imperceptible in relation to erosion, compaction or fuel/oil contamination effects.
- No cumulative impacts to either the Lower River Shannon SAC or Bleanbeg Bog NHA, the only Element which will cause impacts to these sites is the UWF Grid Connection which could cause Imperceptible impacts to both of these sites.

10.7.3 Summary of the Cumulative Impacts with Other Projects or Activities

There is no potential for UWF Replacement Forestry to cause either impacts to the Sensitive Aspects with Other Projects or Activities, and therefore there is no potential for cumulative impacts with Other Projects or Activities. Cumulative impacts of the Other Elements with Other Projects or Activities only relates to cumulative impacts of the UWF Grid Connection together with the consented Castlewaller Windfarm and Turf-Cutting.

- Cumulative effects to Local Soils, Subsoils & Bedrock will be no greater than Imperceptible Adverse as a consequence of the UWF Grid Connection cumulatively with the consented Castlewaller Windfarm.
- No cumulative effects are expected to Bleanbeg Bog NHA as a consequence of the UWF Grid Connection cumulatively with turf-cutting activities.
- There is no potential for cumulative effects to the Lower River Shannon SAC with Other Projects or Activities.

10.8 Reference List

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