UWF GRID CONNECTION

REFERENCE DOCUMENTS

UWF RELATED WORKS

VOLUME F1: EIAR NON-TECHNICAL SUMMARY & EIAR FIGURES

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 (EIAR)	Volume C1: EIAR Non-Technical Summary Volume C2: EIAR Main Report Volume C3: EIAR Figures Volume C4: EIAR 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 F1: EIAR NON-TECHNICAL SUMMARY & EIAR FIGURES** Volume F4: Environmental Management Plan for the UWF Related Works Volume F5 TO F7: 2018 UWF Replacement Forestry EIA Report Volume F8 to F9: Upperchurch Windfarm **DETAILS OVERLEAF**

Planning Application to An Bord Pleanála
by Ecopower Developments Limited, Zetec House, IDA Purcellsinch Business Park, Kilkenny.
Tel: 056-7750140. Email:office@ecopower.ie

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 RELATED WORKS

(UWF RELATED WORKS)

VOLUME C1:

REVISED EIAR NON-TECHNICAL SUMMARY

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 RELATED WORKS REVISED EIA REPORT** **(REVISED EIAR)**	**VOLUME C1: REVISED EIAR NON-TECHNICAL SUMMARY** Volume C2: Revised EIAR Main Report Volume C3: Revised EIAR Figures Volume C4: Revised EIAR Appendices
Volume D	Revised Environmental Management Plan for UWF Related Works	
Volume E	Revised Appropriate Assessment Reporting	
Volume F	Reference Documents for Other Elements of the Whole UWF Project	Vol F1 to F3: UWF Grid Connection EIA Report Vol F4: Environmental Management Plan for the UWF Grid Connection Vol F5 to F7: 2018 UWF Replacement Forestry EIA Report Vol F8 to F9: Upperchurch Windfarm

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UWF Related Works EIA Report

Volume C1: Revised EIAR Non-Technical Summary

Revised
Non-Technical Summary
of
Chapters 1 to 20
of the Revised EIAR Main Report

EIAR Coordinator:

ECOPOWER

January 2019

REFERENCE DOCUMENTS

Contents

List of Figures

Figures can be found at the end of this Non-Technical Summary

NTS of Chapter 1: Introduction

1.1 The Non-Technical Summary

This is the **Non-Technical Summary** of the **Revised Environmental Impact Assessment Report** (Revised EIA Report/EIAR) which has been submitted to An Bord Pleanála as part of a 1st Party Appeal from Ecopower Developments Limited (EDL) following refusal of the **Planning Application to Tipperary County Council** for **UWF Related Works** (Upperchurch Windfarm Related Works).

The UWF Related Works project has not been changed in terms of location and characteristics for the Appeal to An Bord Pleanála. However the original May 2018 EIA Report has been revised for this Appeal to An Bord Pleanála. The revisions to the May 2018 EIAR were necessary in order to take account of the Reason for Refusal by Tipperary County Council of UWF Related Works; the two Tipperary County Council Planner's Reports (dated 06/09/2018 and 10/01/2019); and the Submission to Tipperary County Council on UWF Related Works from NPWS dated 13.12.18. These revisions are detailed in Chapter 1 of this Revised EIAR Main Report.

The **Non-Technical Summary** has been compiled and written by Phil Kenealy, EIAR Coordinator. It is written in non-technical language, avoiding technical terms, detailed data and scientific discussion. The aim is that **the Non-Technical Summary is understandable to a lay member of the public**, who does not have a background in the environment or in-depth knowledge of the development itself.

The Non-Technical Summary provides a summary description of the development, the environment in which it will be located, the effects that it will have on that environment, proposals to lessen any negative effects and the end result after the development is built. It also sets out how the studies in the EIA Report were conducted.

This Non-Technical Summary is set out as follows

1) Section 1: An **introduction to this planning application** and a description of the UWF Related Works,
2) Section 2: A description of the EIA Report and the **process governing EIA** in the planning process,
3) Section 3: The **people consulted about the development** and the area before the EIA Reports were prepared,
4) Section 4: The **different locations and designs** that were considered for the development,
5) Section 5: A **description of the development**,
6) Section 6 – 17: A **summary, chapter by chapter** of the EIA Report's **12 scientific topic chapters**.

   Note: The numbering in these sections will facilitate the reader who wants more in-depth or scientific information, to find the relevant chapter or appendix in Volume C2, the Revised EIA Report, because they will have the same section/chapter numbering. For example 'Material Assets – Roads' is covered in **Section 15 of this Non-Technical Summary** document and in **Chapter 15 and Appendix 15 of the EIA Report**.
7) Section 18: A **summary of cross-factor effects** between the environmental topics or factors.
8) Section 19: A summary of the **monitoring arrangements** for the construction and operational stages.
9) Section 20: A **Summary Conclusion.**

1.2 The Planning Application

The planning application was submitted to Tipperary County Council on 17/07/2018, FI was requested on 10/09/2018. Tipperary County Council Refused Permission on 10th January, 2019. Planning Ref. 18/600913.

The full planning application includes

- Planning Drawings;
- EIAR Main Report,
- this Non-Technical Summary;
- Figures and Appendices for each chapter of the EIAR Main Report;
- Environmental Management Plan;
- Appropriate Assessment Screening and Natura Impact Statement on the effect on protected European Sites and

Reference Documents (including those for assessment of in-combination effects with other projects).

The Planning Appeal documents include

- Revised EIAR Main Report,
- this Revised Non-Technical Summary;
- Revised Figures and Appendices for each chapter of the EIAR Main Report (*Full pack included - Figures that have been revised for the Appeal to An Bord Pleanála are dated January 2019*);
- Revised Environmental Management Plan;
- Revised Appropriate Assessment Screening and Natura Impact Statement on the effect on protected European Sites.

1.3 The Proposed Development

The UWF Related Works proposal comprises of the following elements

- Internal Windfarm Cabling
- Realigned Windfarm Roads
- Haul Route Roads
- Telecom Relay Pole
- RW Ancillary Works.

Note: Upperchurch Windfarm is not built yet. The windfarm was granted planning permission in August 2014 and includes twenty two wind turbines and an electrical substation. **Upperchurch Windfarm is abbreviated** throughout these planning documents **to UWF**

1.4 The Purpose of the Development

Internal Windfarm Cabling: to connect the Consented UWF Turbines to the Consented UWF Substation.

Realigned Windfarm Roads: to realign two lengths of Consented UWF Roads and to provide access to a new telecom relay pole.

Haul Route Works: to facilitate the haulage of the large turbine components such as towers and blades, to the Upperchurch Windfarm site.

Telecom Relay Pole: to be erected in order to carry telecoms relay equipment, which will solve the interference with communication links impacts from operational Consented UWF Turbines on the communication signals between Foilnaman Mast and Laghtseefin Mast. The Telecom Relay Pole will fulfil Condition No. 18 of the planning conditions associated with the Upperchurch Windfarm.

RW Ancillary Works: to facilitate the construction of the UWF Related Works.

Note: The Consented UWF Turbines, Consented UWF Roads and the Consented UWF Substation refer to components of Upperchurch Windfarm (UWF).

1.5 The Location and Brief Description of the Development

The **Internal Windfarm Cabling** will connect the Consented UWF Turbines to the Consented UWF Substation, through the installation of underground cables in agricultural; forestry lands; and across public roads; in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchnaveigh, Coumnageeha, Coumbeg, Knocknamena Commons. Most of the Internal Windfarm Cabling is proposed to be located under Consented UWF Roads or Realigned Windfarm Roads, with the remaining Cabling in the vicinity of the windfarm site.

The Internal Windfarm Cabling consists of electrical cables, communication cables and the copper conductor cables which are installed inside ducting in underground trenches. Over-ground identification marker posts and marker plates which will be installed at regular intervals above the cables trench.

The **Realigned Windfarm Roads** are two sections of the already consented windfarm roads which require realignment and one length of new road to link a telecoms mast to the windfarm road, in agricultural and forestry lands in the townlands of Shevry, Knockmaroe, and Grousehall, which are all within the Upperchurch Windfarm site.

The **Haul Route Works** are proposed for public road verges, roadside boundaries and grassland fields located adjacent to the L4139-0, L4138-12, L2264-50, L6188-0, L6185-13 and R503 roads 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; temporary removal or part-removal of roadside boundaries; opening of temporary entrances and the construction of temporary access roads on private lands.

The **Telecom Relay Pole** is an 18m wooden pole proposed for a location in Knockmaroe townland, close to the existing Foilnaman Mast. The Relay Pole will be contained within a small compound, and a low voltage

power and communications supply will be provided from the existing Foilnaman Mast. Access will be from the windfarm road network.

RW Ancillary Works will facilitate the construction of the development and will include temporary access roads; temporary and permanent watercourse crossings; temporary site entrances; change of use at the entrance to the UWF Replacement Forestry; forestry felling; temporary and permanent hedgerow/tree removal; permanent hedgerow replanting; fencing; relocation of existing telephone poles and temporary storage of excavated materials; at various locations within construction works area boundaries.

Figure NTS 1: Location of UWF Related Works

1.6 The proposed development as part of the Whole Upperchurch Windfarm Project

UWF Related Works is Element 2 of a whole project which has the following other elements – Element 1: UWF Grid Connection; Element 3: UWF Replacement Forestry; Element 4: Upperchurch Windfarm (UWF) and; Element 5: UWF Other Activities. These are collectively referred to as the **Whole Upperchurch Windfarm Project (Whole UWF Project).**

An Environmental Impact Assessment Report was also prepared to accompany planning/licence applications to the relevant Competent Authorities for **Element 1 - UWF Grid Connection (An Bord Pleanála)** and **Element 3: UWF Replacement Forestry (Department of Agriculture, Food and the Marine)**. Element 4 – Upperchurch Windfarm has already being granted planning permission in August 2014 (Planning Ref. 13/51/0003) and Element 5 - UWF Other Activities are the types of activities that do not require planning permission, but are included in the EIA Report as part of the cumulative or in-combination assessment.

An Bord Pleanála refused permission for UWF Grid Connection on 17/12/18 based on the location of the grid connection cable under lands through the Slieve Felim to Silvermines SPA. A revised Planning Application with new proposal for the underground cable route, to be lodged in the coming months to An Bord Pleanála. The preliminary preferred route for the new proposal is used for the cumulative assessments in the Revised EIA Report submitted with this Appeal. An Afforestation license was received from the Minister for Agriculture, Food and the Marine for UWF Replacement Forestry on 07/11/18.

The vast majority of the **Whole Upperchurch Windfarm Project is located in County Tipperary** with some minor activities along the Upperchurch Windfarm turbine component haul route and on the existing Killonan to Nenagh overhead line, in County Limerick (these activities are part of UWF Other Activities). **The vast majority of the interaction of all five elements occur in and around the already consented Upperchurch Windfarm.**

The location of the Elements of the Whole Upperchurch Windfarm Project in the vicinity of Upperchurch Windfarm (consented but not constructed) is illustrated on:

Figure NTS 2: UWF Related Works and the Other Elements of the Whole UWF Project

1.7 The Applicant

Ecopower Developments Limited is part of the Ecopower Group of specialist on-shore wind energy development and windfarm operation companies, and has been involved in wind energy developments in Ireland since 1996.

NTS of Chapter 2: The EIA Report Process

2.1 Why is this EIA Report Required?

UWF Related Works is part of the Whole Upperchurch Windfarm Project, one element of which, the Upperchurch Windfarm, did require that Tipperary County Council carry out an **Environmental Impact Assessment (EIA)**. Therefore Tipperary County Council must now carry out a cumulative (in-combination) assessment of the Whole Upperchurch Windfarm Project, including UWF Related Works (the development being applied for here). Ecopower Developments has prepared an EIA Report to inform Tipperary County Council's EIA.

2.2 What topics does the EIA Report cover and who are the authors?

The developer prepares an EIA Report by appointing an EIA Report Co-ordinator, who arranges all the works and reports for the planning application; appoints engineering and scientific experts for The Project Design Team and the EIA Report Team and; co-ordinates the assembly and presentation of the EIA Report. Julie Brett and Phil Kenealy of Ecopower Developments are the EIA Report Co-ordinators for the UWF Related Works project.

In the EIA Report, the following environmental factors or topics are examined by experts in the field - **Population & Human Health (including socio-economics); Biodiversity** (Plants and Animals)**; Land; Soils; Water; Air** including Air Quality, Noise & Vibration and Electromagnetic Radiation**; Climate; Material Assets** including Electricity Network, Communication Network, Water Supply Infrastructure and **Roads**; **Cultural Heritage** (archaeology) **and Landscape**. Each topic has a dedicated chapter and was prepared by specialists who are competent in their field of expertise. The topic experts are identified at the start of each Section 6 to 17 of this Non-Technical Summary. The full list and the expert's experience is supplied in Chapter 2 of the EIA Report. The EIA Report **presents the likely effects** on the topics listed.

2.3 Key Activities in the preparation of the EIA Report

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

- An **introductory description of the proposed development** was prepared by Ecopower Developments and examined by the Project Team, which included the developer and the scientific experts.
- The **span of the topics that should be covered was investigated** by the Project Team (called scoping) through 'on the ground investigations' (fieldwork); desktop studies of guidelines and scientific publications; and consultation with environmental authorities, local and regional bodies, other interested parties, the landowners and the public.
- The **area that should be studied was identified**; potential aspects or receivers in that study area, that might be affected, were identified; and the means by which these could be affected was considered.
- **Potentially significant effects were identified**. Alternative locations, layouts and processes were considered for the development. Project Design Environmental Protection Measures were developed by the experts to endeavour to lessen any potentials for significant effects.
- The **final project design** was decided and **a description prepared**. For the cumulative assessment, a description of consequential development i.e the environmental information for the Other Elements of the Whole Upperchurch Windfarm Project was also provided. Other projects and activities in the area were also identified.

- This **final project was evaluated in twelve topic specific chapters, by the topic specific experts**, covering the factors listed above. Any additional measures that were required to further lessen negative effects from the development, were then suggested.
- An **evaluation of the cumulative effects** of UWF Related Works; a **cumulative evaluation of the in-combination with all the other Elements** of the **Whole Upperchurch Windfarm Project** and, a cumulative evaluation with **other projects and activities**, relevant to the development, was carried out also.

2.4 Terminology used to described the level of an impact

All aspects of the environment within the area, likely to be affected by the development, were identified using a combination of field surveys; desktop surveys; industry guidance (if any) on protection standards for the environmental topics and the expert's knowledge and expertise.

Taking into account the Project Design Environmental Protection Measures (Mitigation Measures), the likely ways that effects could happen to the various aspects of the environment, from the development, were identified and the size of the effect was calculated.

If it was **likely that an aspect of the environment could be affected and if that aspect could be measurably or noticeably affected, then it was evaluated in depth**.

The definitions used to describe the significance (or importance) of effects are explained in the following table;

Table 1: Significance of Effects (EPA, August 2017)

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	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

Note: *All effects are assumed negative unless stated otherwise.*

2.4.1 Matters evaluated as having No Effect

Some effects to the environment were considered, but due to the lack of potential or no likelihood for the effect to occur, or the due to the very small or negligible size of the effect, the effect was excluded from further in-depth evaluation. The term 'Neutral' is used to identify these effects.

Neutral is defined as: 'No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error'.

2.5 Presentation of the EIA Report

Accessibility, legibility and clarity were the key considerations when organizing the lay-out of the EIA Report Chapters.

- This Non-Technical Summary is presented in a handy, short separate volume with figures included. This is Volume C1: Non-Technical Summary.
- In Volume C2: EIAR Main Report, the information in the topic Chapters 6 to 17 is prepared by different **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.
- So that the information for the **cumulative evaluation** is clearly distinguishable from the information on the actual development being applied for, **all cumulative sections are highlighted in light grey**.
- **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. These are contained in – Volume C3: EIAR Figures.
- **Appendices** have been used for including detailed or supplementary information and photographs that are not core to the EIA Report but which nonetheless provide additional information on the matters evaluated in the chapter. These are contained in a **separate volume** - Volume C4: EIAR Appendices.

2.6 EIA Report Review

Two checklist reviews of the EIA Report, were carried out by the EIA Report Co-ordinator;

- A **CHECKLIST** review of compliance with EU legislation.
- A **CHECKLIST** review of the completeness of the information in the EIA Report.

As well as the EIA Report team, this checklist can be used by the Planning Authority and 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.

Both completed CHECKLISTS can be found in in Appendices to Chapter 2 Volume C4: EIAR Appendices

Appendix 2.1: Review of Compliance with Legislation.

Appendix 2.4 Completed EIA Report Checklist.

NTS of Chapter 3: The Consultations

Formal written consultation and face-to-face meetings took place with the Planning Authorities; Government Bodies and Non-Governmental Organisations (NGOs) that are likely to be concerned because of their particular interests; and The Public in the general area of development which includes UWF Related Works and the Whole Upperchurch Windfarm Project.

3.1 Principal Bodies Consulted

The principal **bodies consulted** and who engaged with the EIA Report Team, included

- Tipperary County Council (Planning and Roads Department)
- An Bord Pleanála (Strategic Infrastructure Division)
- Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
    - Development Application Unit (DAU) - archaeology
    - National Parks and Wildlife Service (NPWS) – natural heritage and ecological surveys
- Inland Fisheries Ireland (IFI) – watercourse protection at crossings and water quality protection
- Health Services Executive (HSE Naas) – public health and public consultation issues
- Irish Water – location of Irish Water public pipes
- Transport Infrastructure Ireland (Tii) – Haul Routes and Traffic Assessments
- Office of Public Works (OPW) – water crossings and flood defences
- National Federation of Group Water Schemes – schemes in the area.

3.2 Public Consultation

As well as personal contact with all the landowners of UWF Related Works; of UWF Grid Connection substation location and along the underground cable route; and landowners generally involved in Upperchurch Windfarm, part of the public consultation included a **Public Consultation and Information Day**, which Ecopower Developments organised 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; postering in and around the three 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.

Members of the Project Team and Coillte (as one of the landowners) were present to provide information, answer any questions and engage in consultation on the details and timing of the proposal.

Most attendees were landowners involved in either the Upperchurch Windfarm/UWF Related Works or the UWF Grid Connection or both. The landowners had a general interest in the Whole Upperchurch Windfarm Project which includes UWF Related Works; the sequencing; projected start date; types of jobs involved in

the construction and how to access employment in the area; possibility of catering being provided by local companies during construction; design and safety of the underground cable and disruption caused by the cabling works to farming day to day.

Of the 3rd parties who attended, all were local to the subject development area. Their interests in the project were disruption caused by the cabling works to local residents passing and repassing by car on the Local Roads, landowners going about their farm work and walkers on the designated walks; proximity of the works to their private property; the Ormond Way Walk and Ormond Way Cycle were missing from the Walks mapping presented at the events and the Eamonn a Chnoic Walk was incorrectly mapped; if there was capacity to connect more wind turbines if the grid connection was built; water crossing methods and proximity and visual impact of the substation.

There was general support expressed for undergrounding of the cable. There was a house call to a Kilcommon resident, who could not attend the event, and who was concerned about her private well and more turbines being erected in the local hills.

3.2.1 Action from the Public Information Days

- Contact will be maintained with the landowners on the day to day timing of the works.
- A dedicated Community Liaison Officer will keep very active contact with local residents on the traffic arrangements around the works, day to day.
- Mapping error on Walks was corrected and the Ormond Way Walk and Cycle was appraised in the EIA Report.
- Private well GPS to be recorded and assessed for the resident near Kilcommon.

All of the planning documents submitted to the Planning Authority, are also available for public examination on the internet at www.upperchurchwindfarm.ie. This dedicated website will also include details of the submission/observation procedure for the public to get involved in the planning process and contact details of the applicant.

3.2.2 3rd Party Submissions post application

The public had a further opportunity to express their views following submission of the planning application to Tipperary County Council. A number of post application submissions were made by 3rd Parties.

NTS of Chapter 4: Alternatives Considered

The consideration of alternative ways of designing, building or operating a development is the single most effective means of avoiding significant environmental effects.

4.1 Alternative Locations

Different locations were examined for Haul Route Works and for the new Telecom Relay Pole and the locations that were reasonably possible and had the least effect on the environment, were chosen.

4.1.1 Alternatives Locations for the Haul Route Works

The proposed Haul Route Works are to facilitate the construction deliveries to the windfarm, including large turbine components to Turbine T9 upto Turbine T22 and the windfarm substation, which are not immediately accessible from the Regional Thurles to Newport Road. The use of Local Roads will be needed.

During investigations of alternative locations for haul route works, three Local Road sections were investigated particularly for suitability taking into account general condition and capacity of the road including width; pavement strength; traffic use and water crossings. These are;

- Road A - L4139-0.
- Road B - the eastern section of the L6188-0
- Road C - the L2264-50 and the western section of the L6188-0

A combination of these Local Roads (i.e AB or CB or AC) is required to deliver turbine components for T9 upto T22 and electrical equipment to the substation. The final choice of road combinations - Road A with Road C - was the best fit after comparison of environmental effects. Road B is avoided altogether which avoids using Fahy's Bridge.

4.1.1.1 Turning Area for Road C Location Selection

Consideration of alternative locations for access to Road C (Borrisoleigh Road), from the R503 were then considered. Turbine components will come from the Thurles direction and the abnormal load lengths will not be able to make the right turn from the R503, onto Road C. A turning area is required west of the turnoff, so that the manoeuvre can be made 'straight on'.

Two alternative turning area locations were identified;

- Location 1: Turning point from the Nenagh Road at Knockabansha, which is at an existing farm entrance.
- Location 2: Turning point from the Thurles Road, which is at an existing forestry yard.

The existing forestry yard at Location 2 is the better choice when compared for environmental effects.

4.1.2 Alternative Locations for the Telecom Relay Pole

The Telecom Relay Pole is required to redirect communication signals around the operating wind turbines, from the existing mast at Knockmaroe to the existing mast at Laghtseefin. There were two possible location options which have the required line of sight to both the masts;

- Location 1: Top of Knockcurraghbola Crownlands.
- Location 2: Top of Knockmaroe.

Location 2 at Knockmaroe was chosen due to the easy access and also a readily available power source, negating the need to build a low voltage overhead line to provide power.

4.2 Alternative Layout

4.2.1 Alternative Layouts for the Internal Cables

The Internal Windfarm Cabling will connect the wind turbines to the consented windfarm substation. There are two reasonable options for the internal underground windfarm cabling;

- Layout A: Laid under the local roads whenever possible.
- Layout B: Laid under agricultural and forestry lands with road crossings only.

It was considered that cabling works under the Local Roads (Layout A) would cause considerable inconvenience to road users and, because there is an alternative of under agricultural and forestry lands with limited suitable wildlife habitat and requiring road crossings only for the internal cabling, then this alternative (Layout B) was the option chosen.

4.2.2 Alternative Layout for Realigned Windfarm Roads

The Realigned Windfarm Roads component of UWF Related Works is already an alternative layout for three sections of the consented windfarm roads. On-going pre-construction confirmatory site investigations and landowner consultations indicated to the developer that alternative layouts should be considered for two lengths of already consented windfarm roads. The proposed realignment of these roads will lessen the environmental effect on Land, Soils and Water because of less productive land being taken and less excavations required. The spur road from the already consented windfarm road required to access the Telecoms Relay Pole, is the shortest and most direct alternative for this access.

4.3 Alternative Processes and Mitigation Measures

The Processes associated with the construction and operation of UWF Related Works and Mitigation Measures to prevent or reduce negative impact, were identified by the Project Teams and through consultation with specialist bodies. An examination of these processes and measures, resulted in Alternative Processes being devised in order to avoid, prevent or reduce environmental effects. These Alternative Processes are an intrinsic part of the design of the UWF Related Works project and are referred throughout the EIA Report and Non-technical Summary as Project Design Environmental Protection Measures or **Project Design Measures**.

4.4 'Do-Nothing' Alternative

The 'do-nothing' alternative examines the effects caused by not proceeding with the development. The 'do-nothing' alternative for this project would result in;

As the purpose of UWF Related Works is to facilitate the construction of Upperchurch Windfarm, a secondary impact of UWF Related Works not progressing could be that Upperchurch Windfarm may not build and therefore;

- Passing the opportunity to produce **green electricity**.
- Lost opportunity of **economic activity during construction of Upperchurch Windfarm** i.e. employment in the construction sector; option and way leave payments; purchase of stone and concrete and other goods and services.

Lost opportunity of **economic activity during operation of Upperchurch Windfarm** i.e. rental payments to 36 local landowners; commercial rates to Tipperary County Council; Operation & Maintenance technician employment; substitution of coal, gas and oil imports for electricity generation.

NTS of Chapter 5: Description of the Development

5.1 Location and Features of UWF Related Works

The UWF Related works comprises of five components.

5.1.1 Internal Windfarm Cabling

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 and forestry felling of 0.1ha), and crossing under nine public roads. The cabling will traverse the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchnaveigh, 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.

5.1.2 Realigned Windfarm Roads

Realigned Windfarm Roads proposal to an alternative alignment to the consented UWF Windfarm Roads at three locations;

- RWR1: The consented windfarm road to Turbine No.5 in Shevry is 560m in length, Realigned Windfarm Road RWR1 will replace this road in its entirety with a new road 230m in length through forestry. This will require forestry felling of 0.2ha.
- RWR2: The consented windfarm road between Turbine No.19, Turbine No. 20 and Turbine No. 21, is 840m in length. RWR2 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.
- RWR3: A short length (30m) of new access road RWR3 is between the consented windfarm roads in Knock-maroe to the new Telecom Relay Pole.

5.1.3 Haul Route Works

Haul Route Works proposed for 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.

5.1.4 Telecom Relay Pole

The new Telecom Relay Pole will relay communication signals around the Consented UWF Turbines in order to avoid interference from the operating turbines. 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 long mound created from the excavations. A communications and low voltage (LV) electricity supply will be cabled underground to the compound, from the existing supply at the existing Foilnaman mast, by 300m in length of cabling.

5.1.5 RW Ancillary Works

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 temporary site entrances; 5300m of temporary access roads; temporary and permanent watercourse crossings, involving 24 small field drains and 8 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 existing telephone poles; 11,830m^3 of material will be excavated and temporarily stored for subsequent reinstatement or permanently placed in berms; reinstatement of roadside boundaries and public road surfaces.

The Watercourses and Local Roads in the development area shown on Figure NTS 3: Relevant Watercourses and Local Roads

5.1.6 Project Design Features and Measures which will protect the environment

At the start, when UWF Related Works was being designed, the Project Design Team focused on the potential or likely significant effects of the basic Project, on the environment where it is to be located. These potential or likely effects were then **avoided or reduced**, by developing and integrating measures (called **Project Design Environmental Protection Measures (Mitigation Measures**) into the fundamental design of the Project. There are **forty-three** of these measures. The Project Design Environmental Protection Measures are as much part of the project as the lengths of roads or number of new watercourse crossing structures. The Project that is examined and evaluated in the EIA Report includes these measures, not as a desirable addition, but as an **integral part of the Project.**

5.2 UWF Related Works: Construction and Operation

5.2.1 UWF Related Works Construction Phase

All elements of the Whole Upperchurch Windfarm Project (including UWF Related Works) will be constructed at the same time and is expected to commence 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.

For UWF Related Works, 23 loads of concrete and 292 loads of aggregate will be transported to the work sites by HGV, from local suppliers. A further 2 loads of road surfacing material and 43 loads of specific building materials will also be imported to the sites, from various suppliers in the Region.

The Haul Routes for Construction Deliveries are shown on Figure NTS 4: Haul Routes for Construction Deliveries.

5.2.2 UWF Related Works Operational Phase

Upperchurch Windfarm 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.

5.2.3 UWF Related Works Decommissioning

The UWF Related Works will cease to function following the decommissioning of the Upperchurch Windfarm. The following decommissioning works are relevant to the UWF Related Works: the cables will be pulled from the Internal Windfarm Cabling ducts and the Telecom Relay Pole will be decommissioned. The Realigned Windfarm Roads will remain in situ for use by the landowner. Haul Route Works are not required.

5.3 UWF Related Works: Use of Natural Resources, Emissions and Waste

5.3.1 UWF Related Works: Use of Natural Resources

4750m^3 of topsoil, 6670m^3 of subsoil and 360m^3 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 trees will be removed and the equivalent amount replanted following construction.

20.9 hectares of land within the full UWF Related Works construction site which is **reduced to just 25m^2** around the Telecom Relay Pole compound, during the **operational phase**.

5.3.2 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.

5.3.3 UWF Related Works: Waste

UWF Related Works **Construction** personnel will use the welfare facilities and waste facilities provided at the Upperchurch Windfarm Site Compound No. 1. At these facilities, waste water 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 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 Upperchurch Windfarm.

5.4 Vulnerability of UWF Related Works to Major Accidents and/or Disasters

UWF Related Works **is not vulnerable to Major Accidents or Disasters**, due to the minimal volumes of the Dangerous Substances which will be used during construction and operation.

UWF Related Works is **not vulnerable to land slippage**, due to the absence of peat or very shallow peats at the works locations.

UWF Related Works is **not vulnerable to flooding**, due to location in a Low Risk Flood Zone; most of the development is underground; and all new permanent watercourse crossing culverts will be suitably designed to accommodate flood flows.

NTS of Chapter 6: Population

The study in Chapter 6: Population examines the effect of the proposed UWF Related Works on the **economic activity of people living, working and visiting** in the area, which is between the villages of Kilcommon and Upperchurch.

6.1 How the Population study was carried out

The study on Population was carried out by John Lawler and Ciara Morley of EY-DKM Economic Consultants.

The effects on the **Local Economy** was evaluated. The Local Economy studied in relation to the UWF Related Works comprises the Electoral Districts (Foilnaman ED and Upperchurch ED) in which the UWF Related Works are located, along with adjacent Electoral Districts which contain towns and villages, important to the area.

The latest Census figures; Tipperary North and South Development Plans and; the GeoDirectory database of business and residential premises were examined, along with a site visit to the area to identify local services and businesses.

6.2 The make-up of the population and economic activity of the area

Examination of the **latest Census figures**; Tipperary **County Development Plans** and the **GeoDirectory database of business and residential premises** reveals the make-up of the local population and economic and social activity in the area.

UWF Related Works is proposed for the **rural uplands between Upperchurch and Kilcommon villages**. The area is sparsely populated with people living in farmsteads and once-off houses throughout the area, and in the small population centres. There are relatively few services in the area, concentrated mainly in the local villages typically comprising small shops, pubs and schools. A significant proportion of the **local workforce commutes to work**, and the key employment sectors in the area are Commerce & Trade and Professional Services, so it is likely that they are employed in the nearby urban areas, notably **Limerick, Thurles and Nenagh**. **Agriculture and forestry** are important sectors within the area, accounting for almost **78% of business premises**. Across the area some 17% of the workforce is engaged in Agriculture, Forestry & Fishing, much higher than the State average of 4%. There is also **noteworthy wind-farming activity** to the south of the proposal. **Walking and hiking are the main tourism offerings** to visitors in the area.

6.3 How could Population be affected?

The local economy could be positively affected by local spending and an increased demand for employment locally, and negatively affected by business disruption due to the presence of roadworks, or a reduction in tourism revenue to a reduction in visual amenity. Should the effects be large enough there may also be an effect to the National Economy. Settlement patterns locally could be affected by a large demand for new long-term employment in the area.

6.3.1 Measures to avoid, prevent or reduce negative Effects on Population

Environmental protection measures are not relevant to the positive effects on the local economy. Best Practice Measures will be implemented during construction relating to local sourcing of goods, services and labour, and will include the provision of a full time Community Liaison Officer. Protective measures for road safety and visual amenity will also indirectly protect the Local Economy. These protective measures are listed in Sections 15 and 17 of this Non-Technical Summary.

6.3.2 The effects of UWF Related Works

6.3.2.1 Local Economy

Gross Value Added to Business (local spend) & Employment Opportunities: *Imperceptible, positive effect*

The **construction of UWF Related Works** will increase value to business and create employment opportunities in the area due to the purchase of goods, materials and services, employment and payments to landowners, which will have a knock-on effect of increased spending in the local economy. The effect will be through

- c.5 persons working directly on building the UWF Related Works, most of them on-site, over the course of the construction phase,
- c.€100,000 to local landowners, in the form of wayleave payments,
- c.€500,000 spent on locally sourced goods and services.

This effect will be **positive but imperceptible** overall, because the additional monies and activity generated locally of c. **€600,000**, is only equivalent to approximately **2% of the overall size of the Local Economy in the UWF Related Works study area**. This will be a temporary effect during construction.

6.3.3 Matters evaluated as having No Effect

There will be **neutral effects** in terms of reduction **in tourism revenue and business disruption** during the construction and operation phase.

Due to its size, the effect on the **National Economy will be neutral and positive**.

Also the effect on **settlement patterns** in the area will also be neutral which means that the development will **not require** or result in any **temporary or permanent relocation, of business or population**.

6.3.4 The cumulative effects

When the effects of UWF Related Works on Population are considered with the effects of UWF Grid Connection, Upperchurch Windfarm and Bunkimalta Windfarm, the summary result **is that the cumulative effects will not be significant.**

6.4 Summary Conclusion

The experts who examined this topic concluded that **no likely significant effects** to Population will occur as a result of the UWF Related Works on its own, cumulatively or as part of the Whole Upperchurch Windfarm Project, or cumulatively with other projects.

NTS of Chapter 7: Human Health

The study in Chapter 7: Human Health evaluates the effects on human health of people in the area.

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.

7.1 How the Human Health study was carried out

The study was carried out by Dr. Andrew Buroni and Tara Barrett of RPS Group's Health and Social Impact Assessment team.

The effects on **Local Residents and Community** – i.e. the people who live and work in the development area; and **Transient People (people passing through**, whether road users, agricultural and farm workers and tourists and recreational users such as walkers and cyclists), and **Kilcommon National School** were studied.

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. A positive or negative impact to these topics, could in turn impact on human health.

The chapter is also informed by Human Health related guidelines and publications on electromagnetic fields from power lines and, on air pollution from construction activities.

7.2 The current status of Human Health in the area

People living in the area are assumed to be marginally more sensitive to health effects than the average population in Ireland in the context of the Census of Population 2016, which has indicated that the proportion of elderly and young people resident in the area is slightly higher than the national average, thereby making them more sensitive to health effects.

7.3 How could Human Health be affected by the development?

The health of local residents and members of the community could be negatively affected by indirect effects of contaminated water sources or a disruption in water supply, increases in airborne dust and other pollutants, increases in noise and disturbance to sleep, substantial increases in electromagnetic fields, a reduction in road safety, and feelings of stress and annoyance**.** Transient people (people working or moving through the area) could also potentially be affected by increased dust, noise, electromagnetic fields and pollutants. The health of local residents and community could additionally be positively impacted by increased employment**.**

7.3.1 Measures to avoid, prevent or reduce negative Effects on Human Health

Protective measures for air quality, noise, road safety and local water quality and supply will also indirectly protect human health. These protective measures are listed in Sections 6, 11, 12, 14 and 15 of this Non-Technical Summary. The most pertinent measures are repeated below:

- In order to prevent contamination to local water supplies (i.e. wells, springs or public piped supply) **during the construction phase** there will be no refuelling of vehicles or plant or; no storage of fuel or oils; or no

use of chemicals within 50m of a groundwater source, and confirmatory surveys and supervision of excavation works in proximity to underground pipes.

- Noise from **construction activities** will be limited to the following hours: **Monday to Friday 7am to 7pm and Saturday 8am to 4.30pm**.
- **Road safety measures** such as the use of appropriate **advance warning signage, flagmen and traffic management measures**, have been designed into the project

7.3.2 The effects of UWF Related Works

7.3.2.1 Local Residents & Community

Increased employment: *Imperceptible positive* effect

Increased employment will have a positive effect on human health, because employment is considered good for your health. Due to the temporary nature of increased employment in the study area (relating to very small increased employment opportunities during the construction stage), this positive effect on human health will be of **Imperceptible** significance.

7.3.2.2 Kilcommon National School

There is no potential for any health impacts to pupils or teachers at Kilcommon National School, due to the separation distances between the UWF Related Works and the school.

7.3.2.3 Transient People

No negative health effects are likely to occur to transient people working and passing through the area.

7.3.3 Matters evaluated as having No Effect

There will be **no negative impacts to the health of local residents or members of the community or to transient people** working and passing through the area as a result of cross factor effects from water, air or material assets (built services, roads), due to:

- No indirect impacts to human health are expected as the contamination or disruption of local wells and springs or piped water supply is not likely to occur;
- The existing background levels of air pollutants in the development area are significantly below EU limits, as established under EU Directive 2008/50/EC, for the protection of human health. Any dust from construction works will be temporary, infrequent and not enough or often enough to cause negative health effects;
- Any noise generated during the construction phase will not cause annoyance or sleep disturbance when considered in the context of the very short duration of works within close proximity to any property, and the carrying out of works during daylight hours between 7am and 7pm. No operational stage noise sources.
- Most of the roads being used are very **lightly trafficked** and the **designed capacity of the roads are sufficient** for the extra construction traffic envisaged. Therefore there is no increased risk of injury from road traffic accidents;
- There will be some increase in magnetic field levels at the **9 No. of local residences which are within 100m of the Internal Windfarm Cabling**. The worst case increased levels range from 0.001µT to 0.069µT. This is **significantly below the International Commission on Non-Ionizing Radiation Protection** electromagnetic field **safe reference level of 100µT**. As a result, electromagnetic fields will not negatively affect **human health**.

7.3.4 The cumulative effects

When the cumulative effects of UWF Related Works on Human Health are considered and the cumulative the effects with UWF Grid Connection Works, Upperchurch Windfarm and Bunkimalta Windfarm - the summary result **is that the cumulative effects will not be significant.**

7.4 Summary Conclusion

The experts who examined this topic concluded that **no likely significant effects** to Human Health will occur as a result of the UWF Related Works on its own, cumulatively or as part of the Whole Upperchurch Windfarm Project, or cumulatively with other projects.

7: Human Health

Topic **Non- Technical Summary of the UWF Related Works EIA Report**

NTS of Chapter 8: Biodiversity (Plants & Animals)

The study in Chapter 8: Biodiversity relates to natural areas, rivers and their fish and animal life, all birds including hen harriers, bats, all animals on the ground in the area, and the marsh fritillary butterfly.

The UWF Related Works are located within the eastern Slievefelim to Silvermines mountains uplands area. The receiving environment is representative of typical upland habitats, and includes lands under active management for agriculture and forestry. The watercourses and other protected sites are an important part of the natural environment of the development area. Relevant watercourses for this study include tributaries of the Clodiagh, Owenbeg and the Turraheen Rivers which eventually flow into the River Suir; and the Bilboa River which eventually flows into the River Shannon. Also relevant is the Slievefelim to Silvermines Mountains Special Protection Area (SPA) for the Hen Harrier.

8.1 How was the Biodiversity Study Carried Out

The study on Biodiversity, was carried out by Howard Williams and Chris Cullen and their team in Inis Environmental Consultants.

The effects on **National Sites**, **Aquatic (water) Habitats and Species**, **Terrestrial (land) Habitats**, the **Hen Harrier** bird, **General Bird Species**, **Bats**, **Non-Volant (not flying – i.e. land based) Mammals**, **Amphibians & Reptiles** and the **Marsh Fritillary** butterfly were studied. The effects on **European Sites** is summarised in Chapter 8, and evaluated in detail in the Appropriate Assessment Report which accompanies the planning application as Volume E.

Sources of information on the biodiversity in the area- i.e. nature, or the plants and animals in the area, came from **Consultations** locally and nationally with specialist bodies including **National Parks and Wildlife Service (NPWS)** and **Inland Fisheries Ireland (IFI)** and with the other experts on the EIA Report team in particular **Soil, Water** and **Air** experts.

Guidelines and **Publications** that were used extensively included; guidelines for evaluation of effects on biodiversity in an EIA Report, surveying techniques and protection measures for watercourses, plants and animals (including badgers, otters and bats) from the **National Roads Authority** and other national and international bodies; national and international publications on specific aspects of biodiversity and their protection; **Scottish Natural Heritage** recommendations for bird survey methods; the **Heritage Council** guide to the Habitats of Ireland; **IFI guidelines** for construction works; the EC **Water Framework Directive**; national and international guidance on controlling pollution; **NPWS, National Biodiversity Data Centre, Environmental Protection Agency, IFI, Birdwatch Ireland, Bat Conservation Ireland, Butterfly Ireland** websites; **County Development Plan** including strategies and action plans for **Biodiversity, Heritage, Renewable Energy**; **planning documents** relating to a) the whole Upperchurch Windfarm project and b) Other relevant Projects and Activities.

8.1.1 Summary of Fieldwork Surveys Carried Out

The following is a list of surveys conducted which informed the Biodiversity Chapter for UWF Related Works;

- **Aquatic Ecology Survey**: A watercourse characteristics survey of crossing locations along the underground cable route (by the Biodiversity and Water scientific expert teams) was carried out in January 2017. Surveys of watercourse crossing locations on haulage routes associated with the development, were carried out in June, 2017.
- **Terrestrial Habitat Surveys:** All habitat with 50m of the works was identified and examined

- **Hen Harrier Species Survey**: Breeding season surveys to establish if there are nesting attempts and Winter roost surveys.
- **General Bird Surveys:** Breeding season bird surveys were carried out in May/June 2016 and in April/June 2017. Winter Bird surveys were carried out over the same stretches in November and December 2016 and in January and February 2017.
- **Kingfisher Survey:** was undertaken in March 2016. Watercourse crossings were evaluated for any evidence of nest holes within 300m of crossing locations. In each case, riverbanks were inspected for evidence of Kingfisher.
- **Bat Surveys:** All buildings and bridges within 150m, and mature trees within 50m of the development, were examined for bat roost suitability and to identify if any bat roosts were present. Bat activity was also surveyed.
- **Otter Surveys**: Watercourse crossing points were examined during the winter months (2016/17) in order to optimize detection.
- **Badger Surveys**: Any dense vegetation (especially in summer) can reduce success in the identification of badger setts and activity so the badger surveys were conducted during the period November to April and in particular in the period mid-January to March, when badger activity is high, thus aiding in identification of badger signs. All areas within 50m of the works locations were searched for setts and all hedgerows and boundaries were comprehensively checked by the ecology team.
- **Other Mammals Surveys:** Field signs of all mammals were recorded during the otter and badger surveys, when signs of well-used pathways; prints/tracks; droppings; signs of feeding) were sought; places of shelter and features or areas likely to be of particular value as foraging resources were also visited. Photographs and detailed notes were also recorded for each feature and and these features were mapped.
- **Amphibians and Reptiles:** were recorded during the course of all site walkovers for habitat, mammal and bird surveys.
- **Marsh Fritillary (Butterfly):** Suitable habitats, determined by the presence of this butterfly's favoured food plant as well as an evaluation of vegetation height and structure, aspect and scrub cover, were identified along the underground cable route during the general site walkover habitat surveys. Suitable habitats identified were revisited in September 2016, to undertake larval web searches. A follow up detailed habitat survey was undertaken in April 2017 to identify the suitable habitats which were known to contain larval webs, from the 2016 survey. The extents of suitable micro-habitats were recorded using detailed aerial photography and GPS. Larval webs and the grid coordinates of scattered groups of basking/foraging larvae were also recorded during this survey.

All of these surveys formed the basis of identification of the biodiversity, or plants and animal life, in the area. Full details of all surveys can be found in Appendix 8.1 in Volume C4: EIAR Appendices.

8.2 The make-up of Biodiversity in the Area

European Sites: The UWF Related Works are mainly located in the **Clodiagh River sub-catchment of the River Suir** which drains downstream to the Lower River Suir c.SAC. **No works occur within the SAC,** the nearest point is 3km from the works. Some of the footprint **also drains downstream to the Lower River Shannon cSAC,** with the nearest point being 1.5km. One of the Haul Route Works (HW7) is partially located within the **Slieve Felim to Silvermines Mountains SPA.**

National Sites: The development will not overlap the boundary of any National Heritage Area (NHA) or proposed National Heritage Area (pNHA).

Aquatic Habitats & Species: There are **thirty-two watercourses** in the UWF Related Works study area, **six only** of which are **Class 1 or Class 2 (with fisheries values)** watercourses. **Twenty-four are drains** and two are very small streams with no or low flow.

Terrestrial habitats: The land in the UWF Related Works area comprise a **patchwork of** agricultural **grassland**, commercial **forestry plantations, peatlands, heath, earth banks, wet grassland, acid grasslands, private roads and public roads**.

Hen Harrier: The study area includes habitat which **may be used occasionally by foraging Hen Harrier**. **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.

General Birds: Many of the general birds present, both breeding and wintering birds, are typically representative of the current land use, and have strong associations with hill farming in respect of the quality of habitat present. Of Red Listed species **Meadow Pipit** was recorded in the area; species **not recorded** during site visits or during Upperchurch Windfarm bird studies were **Golden Plover** (although suitable foraging habitat is present); **Red Grouse** (no suitable habitat present)**; Merlin; Curlew; Kingfisher**.

Bats: During examination of buildings within 150m of the construction works for **bat roosts**, **four roosts were identified**, all of which were in dwelling houses and farm buildings. No roosts are located within the construction area boundary. **Activity levels** at two sampling locations were **relatively high**.

Mammals: No badger setts or **no evidence of Otter** were recorded with the UWF Related Works area. **Fallow Deer, Red Fox and Irish Hare** are present throughout the receiving environment.

Viviparous Lizard was recorded in suitable habitat (acid grassland) within the area boundary. **No Common Frog or Smooth Newt** was noted, but both species are considered as likely to occur in suitable habitat.

Habitat for Marsh Fritillary butterfly is present at **Shevry**, of which a very small amount overlaps the construction works area. Evidence of breeding in the form of larval webbing was recorded at **four locations** within this habitat in September 2017 – however the larval webbing was found outside of the construction works area boundary.

8.3 How could Biodiversity be affected by the development?

A deterioration in Water quality could indirectly affect the river catchments including the European Sites, Lower River Shannon SAC and the Lower River Suir SAC and all fisheries and animals relying on these natural areas.

The **land, trees and hedgerows** on which animals, birds and bats depend can be affected by **land use change and vegetation removal.** All animals, birds, bats and fish may be sensitive to **disturbance by construction and maintenance works**; **displacement** and **habitat loss** by permanent features of the works; the **changing of a natural habitat; the breaking up an animals natural range** for foraging and mating; the introduction of **invasive species**; a reduction in **prey species**; a reduction in **nesting/roosting habitat**; and **accidental death**.

8.3.1 Measures to avoid, prevent or reduce negative Effects on Biodiversity

The following is a list of the **Project Design Environmental Protection Measures (Mitigation Measures)**, which are built into the **Design** of the proposed UWF Related Works project, in order to avoid, prevent or reduce such negative effects on Biodiversity;

- Confirmatory surveys will be carried out ahead of construction works for hen harrier birds, otters, badgers, bats, and for Marsh Fritillary butterfly, and construction works will be controlled where works occur close to the breeding or resting places of these animals – for example no works within 500m of an active hen harrier nest, scheduling of works during a shorter daytime period within 150m of an otter holt or within 1000m of a hen harrier winter roost, no works within 50m of an active badger sett during the breeding season.
- Any construction works in 'Class 1' and 'Class 2' watercourses involving works to the banks or channel of a watercourse (called 'instream works') will be carried out during the months of July, August and September. All fish will be removed from the section of a watercourse before works commence. Following the completion of works at the watercourse the banks and channel of the watercourse will be reinstated. Reinstatement of watercourse bed, banks and riparian habitat will be carried out following instream works.
- The construction works will take place during daylight hours and all vehicles and machinery will be restricted to the fenced boundary of the construction works areas. Tracking across adjacent ground will be prohibited.
- Lighting which will be used at the Upperchurch Windfarm Site Compound No.1 will be for security lighting. All lights will be fitted with hoods or cowls to direct the light to limit light spillage. All lights will be controlled by timers and motion sensors to minimise the length of time the lights will be turned on. The lights will not be directed towards any trees, hedgerows or buildings which could be of use to bats.
- All trees which have suitable features for roosting bats, and which will be felled or have branches removed, will be surveyed beforehand for the presence of bats, trees with moderate or high suitability will be felled during the period mid-August to early November, trees will be felled carefully and left undisturbed on the ground for 48hours, bat boxes will be erected in the local area.
- Bat crossing structures will be erected at new gaps in hedgerows or other linear features which are close to areas of high bat activity or roost locations.
- Flagmen will be used at temporary site entrance to avoid or minimise the amount of roadside boundary (typically earthen banks and hedgerows) requiring removal;
- Construction works areas will be reinstated, this will not be carried out during very wet weather or when the land is waterlogged, any compacted soils will be loosened with a sub-soiler; construction traffic will be restricted to the construction works area which will be fenced;

- Fuel, oils and chemicals and waste will be stored in designated parts of Site Compound No.1.

Note: Project Design Environmental Protection Measures (Mitigation Measures) to prevent contamination of groundwater and surface water **which could indirectly affect biodiversity** are listed in the Non-Technical Summary for Water (see Section 11 below).

8.3.2 The Effects of UWF Related Works

8.3.2.1 European Sites

The potential for effects on European Sites of the UWF Related Works and the Other Elements of the Whole Upperchurch Windfarm Project **is evaluated in the Appropriate Assessment Report** (included as Volume E of the Planning Application).

In summary, there are 23 European protected sites within 15km of the construction works boundaries, afforestation lands and activity locations associated with all of the Elements of the Whole Upperchurch Windfarm Project, and it was evaluated that there is potential for significant effects to three sites; Lower River Shannon SAC, Lower River Suir SAC and the Slievefelim to Silvermines Mountains SPA. In summary, potentially significant effects have been evaluated and it is concluded that, with the implementation of the environmental protection measures, the development **will not result in any effects that will adversely affect the integrity of the European Sites** under consideration.

8.3.2.2 National Sites

The UWF Related Works **will not overlap any NHA boundary**, the nearest site is over 4km away, and **therefore there is no potential for impacts** due to distance and also the absence of any connectivity through water.

8.3.2.3 Aquatic (water) habitats and species

Decrease in the quality of the water bed and water: *imperceptible* to *moderate* locally because of the Project Design Environmental Protection Measures; the works at any particular water crossing point will be small; the duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish and freshwater pearl mussel, where siltation effects are evaluated to be temporary to short-term and not reversible but overall moderate due to the high status of the freshwater pearl mussel.

Change to Flow in the Watercourse: *Slight* because of the Project Design Environmental Protection Measures; the majority of the watercourses have already been altered by forestry or farming practices; instream works potentially affecting the flow are required at a limited number of locations during construction; most of the Class 1 and Class 2 watercourses are small streams; brief to temporary in duration and effects are reversible.

Disturbance or Displacement: *Slight* because of the Project Design Environmental Protection Measures and disturbance will only occur on one occasion, at half of the locations; brief to temporary in duration and effects are reversible.

Riparian habitat degradation: *Slight* to *Moderate* because of the Project Design Environmental Protection Measures; separate watercourse crossing locations within minor watercourses; impacts are temporary to short-term and reversible with reinstatement.

Spread of Aquatic Invasive Species: *Slight* to *Moderate* effect because a single, once-off introduction can have lasting, long-term ecosystem effects and are non-reversible.

8.3.2.4 Terrestrial (land) habitats:

Reduction in Terrestrial Habitats: *Not Significant* because of the low sensitivity of the land to be used and the limited amount of land required. The change will be permanent and non-reversible.

Hedgerow Severance: *Not Significant* because loss is limited to 170m of hedgerow made up mainly of earthen banks; therefore limited amount of fragmentation of hedgerows.

Loss of High Nature Value Trees: *Not Significant* because one mature tree and three immature trees to be removed and therefore loss and fragmentation is limited; permanent and non-reversible.

8.3.2.5 Hen Harrier

Reduction in or Loss of Suitable Foraging Habitat: *Slight* because of the high sensitivity rating of the hen harrier; the small amount of reduction and loss; the Project Design Environmental Protection Measures.

8.3.2.6 General Birds

Golden Plover: Habitat Loss and Disturbance: *Not Significant* for Habitat Loss because of the negligible amount of suitable roosting or foraging habitat (less than 1% of available habitat) lost; as no Golden Plover were recorded on site the probability of disturbance during construction is unlikely.

Meadow Pipit: Habitat Loss: *Not Significant* the negligible amount of suitable habitat (less than 1% of available habitat) lost.

General Birds: Habitat Improvement*: Imperceptible* (Positive) because of the benefits to birds in general due to all hedgerow removal being compensated for, by replanting hedgerow. c.370m of new hedgerow planting will also be carried out, at one of the realigned roads (RWR2).

8.3.2.7 Bats

Destruction or disturbance of bat roosts in trees: *No measurable effect because* there are no trees with bat roosting suitability within the construction works area boundary.

Severance of commuting routes or feeding areas: *Imperceptible* because of reinstatement of removed hedgerows and field boundaries and planting of additional hedgerow; bat crossing structures will be used in severed hedgerows to provide a continuation of the flight line for foraging bats and these will be maintained in the operational period until the replanting has grown sufficiently.

Disturbance or Displacement due to lighting: *Imperceptible* because of the use of cowling on lights to prevent light spill onto bat roosts or key commuting routes / feeding areas. Any lighting 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.

8.3.2.8 Non-Volant Mammals -Badger, Otter, Red Squirrel, Pine Martin, Fallow Deer and Irish Hare.

Badger: Habitat Loss: *No Measurable Effect* because of the small extent of land use change (less than 1% of an average territory size); no badger setts recorded in the study area surveys

Badger: Disturbance/Displacement: *No potential for Impact* because there were no badger setts recorded in the study area surveys.

Otter: Disturbance/Displacement: *No measurable effect* because there were no otter holts recorded in the study area surveys and works will take place during daylight hours only, and be brief duration at any one location.

Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Habitat Loss: *Not Significant* because of the negligible amount of permanent land use change (less than 1% of suitable foraging or breeding habitat) lost.

Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance/Displacement: *Moderate* because the construction activity and although brief in any one location, will move from one works location to another and therefore these animals might be disturbed. Overall populations are not expected to be effected.

8.3.2.9 Amphibians & Reptiles

Any impacts to Amphibians & Reptiles are expected to be Neutral - because of the small extent of landtake and any habitat loss will be temporary, with reinstatement occurring within 2 weeks.

8.3.2.10 Marsh Fritillary

Habitat Loss: *Slight* because of the habitat extent to be lost -5 - 20% of total suitable habitat present - however there is an absence of larval webs within the habitats to be removed.

8.3.3 Matters evaluated as having No Effect

The following effects were not evaluated in detail as it **they were considered to be Neutral if occurring at all** – any effects to **National Sites**; habitat degradation effects to **Aquatic Habitats & Species** as a result of tree felling; habitat degradation or fragmentation, loss of Flora Protection Order species and the introduction of invasive species effects to **Terrestrial Habitats**; reduction in prey species or nesting/roosting habitat, disturbance/displacement and mortality effects to **Hen Harrier**; habitat loss, physical injuries and displacement/disturbance effects to **General Birds** including Merlin, Red Grouse, Eurasian Curlew, Kingfisher.

8.3.4 The cumulative effects

When the effects of UWF Related Works on Biodiversity are considered with the effects of UWF Grid Connection, Upperchurch Windfarm, UWF Replacement Forestry and UWF Other Activities and Bunkimalta Windfarm, Forestry, Agriculture and Turf Cutting - the summary result **is that the cumulative effects will not be significant.**

8.4 Summary Conclusion

The experts who examined this topic concluded that no **likely significant negative effects** to Biodiversity will occur as a result of the UWF Related Works on their own, or cumulative as part of the Whole Upperchurch Windfarm Project, or cumulatively with other projects or activities.

8: Biodiversity

Topic **Non- Technical Summary of the UWF Related Works EIA Report**

NTS of Chapter 9: Land

The study in Chapter 9: Land relates to the land and landuse in the area.

9.1 How the Land study was carried out

The study on Land, was carried out by Andy Dunne of Environmental Agricultural Engineering Consultancy.

The effects on **Agricultural Land** and **Forestry Land** were studied. The landholdings in the area make up the study area for Land.

The Department of Agriculture, Food and Forestry's Rural Development Programme 2014-2020 along with the State of the Environment Report 2016 were examined. Other sources of information on Land in the area included the websites of NPWS, Bing and Google. A site visit and field walking was carried out on lands along the development site.

9.2 Lands and Land-use in the area

The lands for the development are located in rural countryside. The land-use in the area is generally **permanent grassland and commercial forestry**. 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. **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.

9.3 How could Land be affected by the development?

Agricultural and forestry land could be negatively affected by a loss of use and/or restricted access, a reduction in growth rates or a change of use. Land could be positively affected by an improvement in farm or forestry infrastructure such as roads.

9.3.1 Measures to avoid, prevent or reduce negative Effects on Land

The following is a list of the **Project Design Environmental Protection Measures**, which are built into the **Design** of the proposed UWF Related Works project, in order to avoid, prevent or reduce such negative effects on Land: construction traffic will be restricted to the boundary of the construction works areas (which will be fenced) and tracking of machinery across adjacent lands will not be permitted; the reinstatement of lands following construction works will not be carried out during very wet weather or if the ground is waterlogged; and any compaction along the construction works area will be ploughed with a subsoiler to loosen the subsoil layer.

9.3.2 The effects of the UWF Related Works

9.3.2.1 Agricultural Land

Loss of Use and Connectivity of Landholdings: *Imperceptible*. In relation to agricultural land, **one-third** of the construction works areas associated with the UWF Related Works are **located on agricultural lands**, with 7.2

hectares of land within construction works areas spread across **forty-one agricultural landholdings**. These landholdings together have a total area of c.1133 hectares.

Just **over a half** of the UWF Related Works areas are **located within already Consented UWF Roads**. The lands involved in construction represent a fraction of less than 1% of the landholdings.

9.3.2.2 Forestry Land

Loss of Use and Connectivity of Landholdings: *Imperceptible*. In the forestry, the construction works areas are located on **1.3 hectares of forestry lands** spread over **six landholdings**, with a total forestry landholding area of c.112 hectares. The forestry involved in construction represent 1% of the forestry landholdings. **Haul routes** are located on **0.9 km of the existing forestry road network**. Alternative access to forestry landholdings is available.

9.3.3 Matters evaluated as having No Effect

The following effects were not evaluated in detail as it **they were considered to be Neutral -** reduction in grass growth or forestry growth rates (due to changes in drainage regimes) during the construction stage; change of land use; improvement in farm or forestry infrastructure; loss of use or connectivity during the operational stage.

9.3.4 The cumulative effects

When the effects of UWF Related Works on Land are considered with the effects of UWF Grid Connection and Upperchurch Windfarm - the summary result **is that the cumulative effects will not be significant.**

9.4 Summary Conclusion

The expert who examined this topic concluded that **no likely significant effects** to Land will occur as a result of the UWF Related Works on its own or cumulatively.

NTS of Chapter 10: Soils

The study in Chapter 10: Soil relates to the **top soil or peat, subsoil and the underlying bedrock** (geology) in the area. Soil supports a range of critical functions such as land based ecosystems and biodiversity, agricultural food production, flood alleviation, water filtration and storage, and carbon capture.

10.1 How was the Soils study carried out?

The study on Soils, was carried out by David Broderick and Michael Gill of Hydro Environmental Services.

The effects on **Local Soils, Subsoils & Bedrock**, soils in the **Lower River Shannon SAC**, and soils in the **Bleanbeg Bog NHA** were studied.

National Roads Authority and Institute of Geologists Ireland Guidelines on the Assessment of Soils and Geology in EIA Reports, have been considered during the preparation of the evaluation.

Sources of information came from **Consultation** locally and nationally; **Desktop investigations** using the Environmental Protection Agency, Geological Survey of Ireland, National Parks & Wildlife Services Public Map Viewer **databases** and review of the EIA Report Chapter 9: Land, **Fieldwork** including **walkover surveys and geological mapping** of the whole Upperchurch Windfarm project area; Review of existing site investigation data for the Consented Upperchurch Windfarm (20 no. trial pits and **two peat probes** relevant to UWF Related Works area) in order to assess **soil / subsoil characters, subsoil depth and ground conditions**.

10.2 The Soils in the area

Overall, **the soil, subsoil and bedrock** at the majority of the development locations can be considered to have a **low to medium geological importance** and they are abundant and not unique in any way.

The UWF Related Works development areas will be located on mineral and peaty soil in grassland, on forestry and forestry firebreaks, public road and public road verges.

As only direct effects on local soils, subsoils and bedrock are anticipated, the study area is confined to soils within the works area and adjacent lands that adjoin the works area boundary.

10.3 How could Soils be affected by the development?

Soils and geology can be sensitive to **excavation and relocation of soil, subsoil and bedrock**; to **processes such as erosion, compaction and drainage** and from **contamination by fuels, oils, cement and other chemicals**.

10.3.1 Measures to avoid, prevent or reduce negative Effects to Soils

The following is a list of the **Project Design Environmental Protection Measures (Mitigation Measures)**, which are built into the **Design** of UWF Related Works, in order to avoid, prevent or reduce negative effects on Soils;

- Land reinstatement will not be carried out during very wet weather or when the soil is waterlogged.
- If any **compaction** has occurred along the construction works area, these areas **will be ploughed** with a sub-soiler to loosen the subsoil layer.

- Construction traffic will be restricted to the construction works area and **tracking** across adjacent ground **will not be permitted**.
- Permanent overburden storage berms will be **graded and seeded immediately after emplacement**.

To prevent contamination of Soils;

- Only **precast concrete culverts** or structures will be used at watercourse crossing locations. No batching of wet cement will take place on-site.
- There will be **no refuelling of vehicles or plant permitted within 100m of a watercourse** (to prevent run-off to water and soils)**.**
- The main **fuel stocks** for, and **chemical wastes** arising from, construction activities will be stored in a designated location, away from main traffic activity, within the Upperchurch Windfarm Site Compound No.1. All fuel will be stored in **bunded, locked storage containers**.
- **Overnight parking** of plant and machinery will only be permitted at locations which are **greater than 50m from watercourses and where there is an existing hard-core surface** in place (to prevent run-off to water and soils)**.**

10.3.2 The effects of UWF Related Works

10.3.2.1 Local Soils, Subsoils & Bedrock

Excavation and relocation of soils, subsoil and bedrock: *Slight to Moderate*.

In total, approximately **11,830m^3 of soil will be excavated** and this will mainly arise from the cable trenching, haul route works, Realigned Windfarm Roads and Telecom Relay Pole. This will include topsoil (4,750m^3), subsoil (6,670m^3) to a much lesser extent bedrock (360m^3). Only one-tenth of this material will be permanently stored in berms and reseeded and the remaining nine-tenths will be reinstated in the works area. 50m^3 of material will also be excavated from public road excavations and will be removed to a licensed waste facility. Mitigating factors include the **relatively small volumes involved**, just over half of the **internal cabling part of the UWF Related Works will be within Upperchurch Windfarm roads**, all works will be **temporary and fully reinstated** following construction.

Soil and Subsoil Compaction: *Imperceptible* in the context of the total footprint which accounts for **less than 1% of the overall development area**. Two-thirds 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; and the Haul Route Works will largely require **construction vehicles working from public roads**. Any compacted soils will be loosened, if required, using chisel ploughing and levelled, post construction.

Soil and Subsoil Erosion: *Imperceptible* because the c**able trench will be backfilled, reinstated and reseeded very soon after excavation**; the surface area of permanent mounds is very small compared to the whole area and these **mounds will be reseeded**; two-thirds of the internal windfarm cabling will be within the Consented UWF Roads thereby **reducing the need to track off-road**; where no windfarm 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 traffic will use the windfarm roads to access the Realigned Windfarm Roads and the Telecom Relay Pole locations and; the **Haul Route Works** will largely require **construction vehicles working from public roads** and any **soils and subsoils exposed under the footprint of the road widening, will be surfaced with hardcore**, thereby reducing the potential for erosion.

Contamination from Oil, Fuels & Chemicals: *Imperceptible* because only relatively small volumes of fuels or oils will be on-site at any one time. All fuels and chemical wastes will be stored in secure, bunded and covered storage containers, in a designated secure part of the Temporary Compounds.

Contamination from Cement based compounds: *Imperceptible* due to the small scale of the works and shallow foundation, the impact will be imperceptible.

10.3.2.2 Lower River Shannon SAC

There is no potential for impacts due to the location of UWF Related Works construction works areas at least **1.5km outside the boundary of the Lower River Shannon SAC.**

10.3.2.3 Bleanbeg Bog NHA

There is no potential for impacts due to the location of UWF Related Works construction works areas at c. **12km outside the boundary of the Bleanbeg Bog NHA**.

10.3.3 Matters evaluated as having No Effect

The following effects were not evaluated in detail as it **they were considered to be Neutral** or have no potential for impact due to separation distance – effects to Mauherslieve Bog NHA, Lower River Suir SAC, Rear Cross Moraines CGS, or Owenbeg Moraines CGS.

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, will have vegetated over and therefore there will be no potential for erosion. Any effects that do occur to soils during the operational phase will be Neutral.

10.3.4 The cumulative effects

When the effects of UWF Related Works on Soils are considered with the effects of UWF Grid Connection, Upperchurch Windfarm, Castlewaller Windfarm and turf-cutting in Bleanbeg Bog NHA, the summary result **is that the cumulative effects will not be significant.**

10.4 Summary Conclusion

The experts who examined this topic concluded that **no likely significant effects** to Soils will occur as a result of the UWF Related Works on its own or cumulatively.

10: Soils

Topic **Non- Technical Summary of the UWF Related Works EIA Report**

NTS of Chapter 11: Water

The study in Chapter 11: Water relates to the **surface water** which includes rivers, streams and drains and **groundwater** like aquifers, wells and springs; **water dependant designated sites** like Special Areas of Conservation (SACs) and Natural Heritage Areas (NHAs) and **special natural areas** dependant on good water quality.

11.1 How was the Water study carried out?

The study of the effects on Water, was carried out by David Broderick and Michael Gill of Hydro Environmental Services.

The effects on **Local Surface Water Bodies**, **Local Groundwater Bodies**, **Local Wells & Springs**, and effects to water in the **Lower River Shannon SAC**, **Lower River Suir SAC, Bleanbeg Bog NHA,** and **Local Water Dependent Habitats** were studied.

Sources of information on the Water in the area came from **Consultations** locally and nationally with **specialist bodies; Desktop Studies** of website-based databases of the **Environmental Protection Agency, Geological Survey of Ireland, Met Eireann, National Parks & Wildlife Services, Water Framework Directive, OPW Flood Maps** and **Catchment Flood Risk Assessment and Management; Field Surveys including** walkover surveys, mapping of all **watercourses and watercourse crossing areas**, **private well survey** within 50m of construction works, two rounds of **water sampling** at five locations and information from the **flood risk assessment** undertaken for the **whole Upperchurch windfarm project**.

The following is a list of **Fieldwork** conducted relevant to Water Chapter;

- Walkover surveys and hydrological mapping of the UWF Related Works locations;
- Mapping and examination of all existing and proposed watercourse crossing points;
- Excavation and examination of the trial pits investigations associated with the consented Upperchurch Windfarm, to assess existing soil and groundwater conditions;
- surface water sampling were undertaken and the results examined;
- Well survey of private dwellings and their associated water supplies (wells or springs if present) within 50m of construction works areas; and
- a site specific Flood Risk Assessment was undertaken for the Whole Upperchurch Windfarm Project area.

Results of these field surveys are described in detail in Chapter 11: Water of the EIAR Main Report (Volume C2)

11.2 The Water in the Area

Local Surface Water Bodies: the existing environment comprises regional and local surface water bodies. The vast majority of the works (16.2km of Internal Windfarm Cabling, the three Realigned Windfarm Roads and the Telecom Relay Pole) are within the **River Suir catchment** including the Clodiagh River, the Owenbeg River and the Turraheen River. The **majority of the works will take place locally within the Clodiagh River catchment**, c.12km upstream of the **Lower River Suir SAC**. One watercourse crossing, 1.7km of the Internal Cabling and some Haul Route Works will take place locally within the **Bilboa River** catchment, which is in the **River Shannon catchment**. Due to the elevated nature of the location of the construction works, the majority

of the watercourse crossings relate to **forestry drains or agricultural drains with no (or low) flow**. Out of **thirty-two watercourse crossings**, only **six are natural stream** crossings.

A **Flood Risk Assessment** was carried out and in summary, due to the elevated nature of the majority of the construction works areas, they are considered to be **areas at low risk to flooding**.

Local Groundwater Bodies: the area comprises two ground water bodies - the Slieve Phelim Ground Water Body and the Templemore A: Ground Water Body. The UWF Related Works are mainly located within the Templemore A groundwater Body.

Local Wells & Springs: Private water supplies comprise groundwater wells from the underlying bedrock aquifers or from shallow springs. There are **three private wells** within a 50m corridor, **all three wells are upstream** and therefore **cannot be impacted** by the works.

Lower River Shannon SAC: One watercourse crossing, 1.7km of the Internal Cabling and some Haul Route Works will take place locally within the **Bilboa River** catchment, which is in the **River Shannon catchment** with the nearest point being 1.5km away.

Lower River Suir SAC: No works occur within the SAC, The footprint **of construction works in the Clodiagh River catchment will take place c.12km upstream** of the **Lower River Suir SAC** boundary.

Bleanbeg Bog NHA: situated 12km west of UWF Related Works. No connectivity between the water draining the UWF Related Works site and this NHA.

Local Water Dependent Habitats relates to wet grassland and wet heath habitat which supports populations of Marsh Fritillary butterfly, this habitat occurs close to two sections of the Internal Windfarm Cabling in Shevry, but **upslope and therefore the natural drainage required for this habitat is unlikely to be impeded** by the construction works).

Figure NTS 3: Relevant Watercourses and Local Roads (at the end of this Volume C1)

11.3 How could Water be affected by the development?

Changes to surface water quality can effect local surface water bodies, local wells and springs, as well as the Lower River Shannon SAC and the Lower River Suir SAC. Surface Water quality could be negatively impacted during construction activities by **sediment (i.e. soil) laden run-off** into rivers, streams and drains from **tree felling**; **excavations** and **storage of soils**; **dewatering** cable trenches; **watercourse crossing** works; and **run-off** from permanent access roads. Bare unvegetated soil in storage mounds or on newly reinstated works areas, could be affected by **erosion** which could result in sedimentation run-off into surface water bodies downstream. Water quality can also be **contaminated** by **fuels, oils, chemical spills** and **cement run-off**. The watercourses themselves can be affected by **changes to the shape of the channel** due to in-stream works.

Groundwater Bodies including Local Wells and Springs could be **contaminated by spillage of fuels, oils, chemicals** and by **cement run-off** onto the soil. Construction workers **welfare facilities** can also pose a risk of contamination.

Local water dependant habitats could be affected by **changes in drainage regimes**.

11.3.1 Measures to avoid, prevent or reduce negative Effects to Water

The following is a list of the **Project Design Environmental Protection Measures**, which are built into the **design** of UWF Related Works in order to avoid, prevent or reduce negative effects to Water;

In order to prevent sedimentation effects:

- Permanent surface water drainage networks will be installed at new permanent infrastructure such as new Realigned Windfarm Roads. The drainage systems will include check dams which will settle suspended solids in water runoff, while also slowing down the rate of water run-off from these areas; For works within 50m of Class 1 or Class 2 watercourse[1] additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bales to direct the surface water flow and, where necessary, the use of plastic matting to prevent ground erosion and rutting.
- All excavated material will be removed for temporary or permanent storage at a suitable location more than 50m away from all other Class 1 and Class 2 watercourses. Temporary silt control methods such as silt fencing or containment mounds will be placed around all topsoil storage areas, and permanent topsoil storage banks will be graded and seeded immediately after they are created.
- Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Siltbuster, as appropriate.
- Flat locations were selected for the watercrossings to help control run-off.

In order to prevent in-combination sedimentation effects from the main potential sediment sources during construction works: a phased approach will be undertaken in relation to watercourse crossing works, earthworks, forestry felling and excavation dewatering, where these works occur within 50m of a Class 1 or Class 2 watercourse. The phased approach will only permit one of these potential sediment producing activities, to be carried out within 50m of a Class 1 or Class 2 watercourse, at any one time.

In order to prevent contamination of surface water and groundwater:

- There will be no refuelling activities, storage of fuel and overnight parking of machinery within 50m of a watercourse. The main fuel stocks and chemical wastes will be stored in bunded secure containers at the Upperchurch Windfarm Site Compound No.1.
- Only precast concrete structures will be used at culvert watercourse crossing locations. No batching of wet cement will take place on-site.

In order to prevent increased flood risk:

- All new permanent culverts will be sized to cope with a 1 in 100 year flood – at a minimum.
- All new permanent culverts in Class 1 or Class 2 watercourses will be bottomless or clear spanning.

[1] Class 1 and Class 2 watercourses are watercourses which contain habitats suitable for fish and aquatic species, such as streams and rivers. Drains, on the other hand are generally classified as Class 3 and Class 4 watercourses, which means that they have either low fisheries value or none at all

11.3.2 The Effects of UWF Related Works

11.3.2.1 Local Surface Water Bodies (i.e. streams and drains)

Changes to the shape and structure of the watercourse channel due to instream works: *Slight to Moderate*.

Decrease in Water Quality during construction works: *Imperceptible* effects from tree felling, dewatering of excavations, fuels, oils, chemicals and cement-based compounds; *Slight to Moderate* effects from excavations; *Imperceptible to Slight* effects from water-crossing works.

Decrease in Surface Water Quality during Operation: *Imperceptible* due to increased runoff from new permanent surface; *Imperceptible* increase flood risk.

The experts **overall conclusion of no significant negative effects on surface water bodies** from the works, is based on the following reasons;

- The Project Design Environmental Protection Measures (mitigation measures), that have been built into the design of the development, lessen the risk of sedimentation and contamination events;
- The minor nature of the watercourses to be crossed (75% of which are drains or marginal watercourses, with either low to no flows of water) and therefore the effectiveness of them acting as a surface water flowpath to more important downstream surface water bodies are limited;
- The Class 1 and Class 2 watercourses where in-stream works are required are mostly small streams;
- Many of the water channel shapes are already altered by forestry or agriculture.
- Relatively small felling area proposed (0.3 hectares in total);
- The vast majority of the works area (with the exception of watercourse crossings) are located more than 50m from a watercourse.
- The works and any effects will be brief and temporary and localised in nature.

11.3.2.2 Local Groundwater Bodies

Groundwater quantity impacts due to contamination by cement, fuels, oils and chemicals: *Imperceptible*

Groundwater quality impacts from cement-based compounds*: No Impact*

Groundwater level (quantity) impacts from dewatering of excavations: *No Impact*

The experts **overall conclusion of no significant negative effects on groundwater bodies** from the works are based on the following reasons;

- The Project Design Environmental Protection Measures (mitigation measures), that have been built into the design of the development, lessen the risk of contamination events;
- Very small volumes of fuels will be required (for vehicles and machinery only). Any accidental minor (low volume) spills on the ground surface will likely be absorbed by the underlying soils/subsoils and not be leached into the underlying groundwater.
- Negligible amounts of cement will be required in the cable trench and for the Telecom Relay Pole foundations.

11.3.2.3 Local Springs & Wells

The **three wells** located within 50m of the construction works are located up-gradient of the works areas and therefore ***No Likely Impacts*** **are predicted**.

11.3.2.4 Lower River Shannon SAC

Water Quality impacts: *No Impact* from tree felling, from dewatering of excavations, from watercrossing works, from fuels, oils, chemicals and cement based compounds; *Imperceptible* due to earthworks; *No Potential for Impact* from directional drilling work.

The experts **overall conclusion of no significant negative effects on Lower River Shannon SAC** from the works are based on the following reasons;

- The Project Design Environmental Protection Measures (mitigation measures), that have been built into the design of the development, lessen the risk of negative impacts;
- No tree felling within the River Shannon catchment;
- The small footprint of the construction works within the River Shannon catchment;
- The majority of the cabling within the River Shannon catchment will be installed under the windfarm roads, and therefore this reduces overall excavation requirements;
- The majority of the works within the River Shannon catchment are more than 50m from a watercourse (there is only one watercourse crossing in the River Shannon catchment);
- No dewatering is expected;
- The localised, dispersed, brief and reversible nature of the effects and;
- The reasons set out above for no significant effect on Local Surface Water Bodies and Local Groundwater Bodies.

11.3.2.5 Lower River Suir SAC

Water Quality impacts: *Imperceptible Impact* from tree felling, due to earthworks, from watercrossing works, from fuels, oils and chemicals; *No Impact* due to cement based compounds.

The experts **overall conclusion of no significant negative effects on Lower River Suir SAC** from the works are based on the following reasons;

- The Project Design Environmental Protection Measures (mitigation measures), that have been built into the design of the development, lessen the risk of negative effects;
- Relatively small felling area (0.3ha in total);
- The majority of the watercourses intercepted by the works are drains (Class 4 watercourse) with low flows or no flows, and therefore the effectiveness of them acting as a surface water flowpath to the downstream SAC is limited;
- The vast majority of the works area (with the exception of the one watercourse crossing) are located more than 50m from a watercourse;
- There is a significant overlap of works – two-thirds of the Internal Windfarm Cabling will be installed within the windfarm access roads, thereby reducing the need for additional excavations;
- The majority of the works areas are located at least 12km upstream of the Lower River Suir SAC. Twenty-six of the total thirty-one watercourse crossings are at least 12km upstream of the SAC with the others being at least 3km;
- Only between 1 and 2 watercourse crossings will be completed in any one day (2 construction crews will be working on the windfarm cabling works);
- The effects will be brief to temporary in nature and reversible.
- The reasons set out above for no significant effect on Surface Water and Groundwater.

11.3.2.6 Bleanbeg Bog NHA

There is **No Potential for Impacts** because UWF Related Works are located outside the NHA boundary, and at a distance of 12km to the east of the Bleanbeg Bog NHA.

11.3.2.7 Local Water Dependent Habitats

Drainage of Marsh Fritillary habitat: *Imperceptible, due to*

- The Project Design Environmental Protection Measures (mitigation measures), that have been built into the design of the development, lessen the risk of negative effects.
- The suitable habitat for the Marsh Fritillary is upslope of the two relevant cable trench sections; the works will be shallow and temporary in nature; the cable trench will be backfilled and the Internal Wind-farm Cabling in these locations is within the permanent windfarm access roads, any effects on drainage will be temporary and reversible.

11.3.3 Matters evaluated as having No Effect

The following effects were not evaluated in detail as it **they were considered to either Neutral, Not Likely to Occur or having No Potential to Occur;**

- Surface water quality impacts due to nutrient input from conifer plantation felling and impact to ground-water bodies during the operations phase;
- Surface water and groundwater contamination from oils, fuels, chemicals and cement based compounds;
- Surface water quality impacts to the Lower River Shannon SAC due to nutrient input, increased flood risk and suspended solid input;
- Surface water quality impacts to the Lower River Suir SAC due to nutrient input, increased flood risk, suspended solid input, nutrient input due to tree felling and excavation dewatering.

11.3.4 The cumulative effects

When the effects of UWF Related Works on Water are considered with the effects of UWF Grid Connection, UWF Replacement Forestry, Upperchurch Windfarm, Bunkimalta Windfarm and Turf-Cutting activities - the summary result **is that the cumulative effects will not be significant.**

11.4 Summary Conclusion

The expert who examined this topic concluded that **no likely significant effects** to Water will occur as a result of the UWF Related Works **on its own or cumulatively**.

11: Water

Topic **Non- Technical Summary of the UWF Related Works EIA Report**

NTS of Chapter 12: Air (Air Quality, Noise, Vibration, EMF)

The study in Chapter 12: Air relates to the effects locally of the development on **air quality, noise and vibration levels and electromagnetic field (EMF)** levels.

12.1 How was the Air study carried Out?

The study was carried out by Ciara Nolan of AWN Consultants, Peter Barry of Malachy Walsh & Partners, and John McAuley, Lewis Brien and Nigel Duignan of Compliance Engineering Ireland.

The effects on **Local Residents & Community** and **Transient People** were studied.

Effects from the development on **Air Quality, Noise and Vibration** levels are studied for people **living in residences and farmsteads** situated along the local road network or on private roads and also on recreational **users of waymarked trails** within 350m of the works; and also **people working in and travelling within 350m** of the works area. In relation to **Electromagnetic Field Levels (EMF)** local residents, community facilities, lands, roads and waymarked walking trails within **100m of Internal Windfarm Cables** were considered.

Sources of information on the specific area under study came from **Consultation** locally and nationally; the study was carried out in accordance with Transport Infrastructure Ireland (formally National Roads Authority) and Institute of Air Quality Management guidelines and industry standards and regulations; **Desktop review** of EPA reports and modelling of dust, noise, vibration and electromagnetic field levels; **Fieldwork** included site visits to establish the proximity of nearby sensitive receptors to the works areas.

In relation to electromagnetic fields, in order to demonstrate the maximum possible electromagnetic fields associated with the cables, in the context of international and national limits for EMF, the contribution of the **underground cables at maximum power**, is evaluated. The predictions for the exposure of only **people within 100m of the underground cable** was modelled because, electromagnetic field emission levels are **almost indiscernible over 100m away** from the source**.**

12.2 Air in the area

The setting is **predominantly rural and away from major sources of air pollution, noise and vibration and electromagnetic fields**.

The **existing levels of air pollutants** from vehicles and dust from earthworks in the area are **low**.

The existing noise sources are **natural sources**, mainly wind borne and there is also man-made noise sources including farm machinery when in operation, and traffic on the local road network.

The absence of intensive power and communications infrastructure results in **miniscule levels of both electric and magnetic fields in the area** – substantially less than national and international guideline levels. Local exposure is only from electrical equipment in farms, homes, businesses and community facilities and from existing power and communication lines.

All of these **low levels of pollutants, noise and electromagnetic fields are typical of rural Ireland**.

12.2.1 What are electromagnetic fields?

Electromagnetic Fields (EMF) radiate from natural and unnatural sources in the environment. Occurring naturally in our environment is a natural electric field at the earth's surface and the earth's magnetic field

which extends from the earth's core. Such naturally occurring electric and magnetic fields are not taken into account in this report.

In the built environment, man-made sources of electric and magnetic fields are referred to as alternating current (AC) fields. These are produced in all residential and working environments as a result of anything electrical i.e. electrical wiring, appliances, power lines and telecommunication masts. These fields are considered as part of the existing environment, for the purposes of this report.

12.2.1.1 What is a safe level of man-made electromagnetic fields?

Guidelines on limiting exposures of people to electromagnetic fields were published by the International Commission on Non-Ionising Radiation Protection (ICNIRP) in 1998 (and updated to a less conservative level in 2010). The European Union and the Irish Government have adopted the more conservative ICNIRP 1998 guidelines.

Exposure Characteristics ICNIRP	Electric Field Strength V/m	Magnetic Field Strength µT
1998 General Public Reference Level	5000 V/m	100 µT
2010 General Public Reference Level	5000 V/m	200 µT

The Irish Government Department of Communications, Marine and Natural Resources, have stated "**No adverse health effects have been established below the limits suggested by international guidelines**".

12.2.1.2 What is the average level of EMF in our environment?

In a recent study of homes in the UK, most homes had **average electric fields of less than 10V/m and average magnetic field levels in the range 0.2 µT to 0.4 µT** which were attributed to electrical sources (i.e., wiring, appliances, and distribution circuits). It is assumed in this EIA Report that the existing electric and magnetic field levels, at local residential dwellings and community facilities, are the same at 10V/m and 0.2 µT to 0.4 µT respectively. This means that the **electrical field present already is only $^{1}/_{500^{th}}$ of the guideline limit** and the **magnetic field present already is less than $^{1}/_{100^{th}}$ of the guideline limit**.

12.3 How could Air be affected by the development?

Air can be sensitive to; **Reductions in air quality** caused by **construction dust** from **excavating material**, loading and unloading of materials, tipping and storage and landscaping works. **Increases in ambient levels of noise and vibration** caused by working plant, moving machinery and excavation activities, and increases in ambient levels of electromagnetic fields (EMF) caused by the Internal Windfarm electrical Cabling which will emit EMF.

12.3.1 Measures to avoid, prevent or reduce negative Effects to Air

The following is a list of the **Project Design Environmental Protection Measures**, which are built into the **Design** of the proposed UWF Related Works, in order to avoid, prevent or reduce such negative effects on Air:

- Construction works will be carried out during daylight hours, between the hours of 7am and 7pm Monday to Friday , and between 8.30am and 4pm on Saturdays;
- Construction works in Knockmaroe and Knockcurraghbola Commons townlands, which are within 350m of local residences, will not take place at the same time as either the UWF Grid Connection or Upperchurch Windfarm.

12.3.2 The effects of UWF Related Works

Local Residents & Community

Increase in Airborne Dust: *Slight* impact on Local Residents & Community in relation to dust caused by construction works because of:

- The low risk to human health or of dust soiling, as a result of dust from earthworks, construction and trackout from vehicles leaving works areas with muck on the wheels;
- The temporary duration of the works and works traffic;
- The works will occur for a very short amount of time at each location;
- **The majority of properties are greater than 50m** from the works areas and haul routes;
- The **background levels of dust in the area are substantially below relevant EU recommended limits** and
- The impact is completely reversible once construction is complete.

Increase in noise levels: *Moderate* due to construction along the public road network close to the public road crossing points of the Internal Windfarm Cables or close to Haul Route Works, because;

- The recommended threshold limits are likely to be exceeded at the five dwellings within 50m of the works for a temporary duration of generally less that one week;
- Compliance with the guideline limits at all other properties, which are located farther than 60m from works areas;
- There are forty-one dwellings within 350m of the works which is low in the context of the spread of construction works over a large area, with works within 350m of a dwelling typically completed within 10 days;
- The effect is reversible once works are completed;
- Works will be carried out during daytime hours only;
- The amount of works are small and will be carried out in active areas such as working farms and local roads.

Increase in electromagnetic fields and Interference with Electronic Equipment (pacemakers etc): *Imperceptible* impact because;

- There will be **no increase in electric fields** at any dwelling **due to the internal windfarm cables** because electric fields are blocked by the metallic sheath surrounding the cables and by the soil and gravel and backfill materials in the trench above the cables.
- There are **nine houses within 100m of the internal windfarm cable**. The worst case increased levels of magnetic fields at these houses ranged from **0.001µT to 0.069µT.** The **levels will remain under 1µT** which is similar to levels experienced at the moment - which is less than $^{1}/100^{th}$ of the guideline levels.
- There will be no interference with electronic equipment worn by residents, the increase will be **significantly below** the 100µT **test level limit** for pacemakers.

12.3.2.1 Transient People

Increase in electromagnetic fields and Interference with Electronic Equipment: *Imperceptible* impact to transient people is predicted because;

- There will be **no increase in electric fields** due to the complete screening of these fields by both the metallic sheath surrounding the cables and the earth (backfill) materials above the cables.
- Walkers/cyclists on the way-marked trails and motorists, cyclists and pedestrians on roads crossed by cabling and farm and forestry workers will pass closer either over or beside the internal windfarm cables, but they will not be in such close proximity for any extended period of time. Magnetic field levels will be slightly higher in close proximity but they still remain below $^{1}/10^{th}$ of the guideline limits at 7.6µT.
- Equally any **pacemaker type devices** worn by people passing close to the new infrastructure **will not be affected** by the **electric fields** (due to screening) and by an increase in **magnetic fields,** to which is higher than ambient levels but **significantly below** the 100µT **test level limit** for pacemakers.

12.3.3 Matters evaluated as having No Effect

The following effects were not evaluated in detail as it they were **considered to be Neutral or having No Potential or Likelihood to Occur**:

- Impacts to **Local Residents & Community** due to air quality reductions caused by construction vehicle emissions; operational stage noise; increase in ambient electromagnetic fields during the construction stage; vibration during construction and operation
- Impacts to recreational walkers/cyclists and people working or passing through the area (**Transient People**) from construction vehicle emissions and airborne dust, construction and operational stage noise, increase in ambient electromagnetic fields during the construction stage; vibration during construction and operation.

12.3.4 The cumulative effects

When the effects of UWF Related Works on Air are considered with the effects of UWF Grid Connection, Upperchurch Windfarm, the existing 110kV and 220kV overhead lines and the consented Castlewaller Windfarm - the summary result **is that the cumulative effects will not be significant.**

12.4 Conclusion

The experts who examined this topic concluded that **no likely significant negative effects** to Air will occur as a result of the **UWF Related Works on its own or cumulatively.**

NTS of Chapter 13: Climate

Climate is defined as the average weather over a period of time. Climate change is a natural process, but in more recent years the climate is also changing as a result of human activities, through the much increases in the release of greenhouse gases. These gasses are altering the earth's atmosphere resulting in a 'Greenhouse Effect'. The release of carbon dioxide from the burning of gas, oil and coal to generate electricity, is a major cause of this release of gasses which is accelerating climate change.

13.1 How was the Climate study carried out?

The study was carried out by Ciara Nolan of AWN Consulting Ltd.

EPA data on greenhouse gas levels in Ireland, UK Environmental Agency carbon calculators were considered along with a review of Irelands energy targets and climate agreements.

13.2 Climate Change action in Ireland

Ireland has signed up to a number of Climate Agreements under the United Nations and the European Union. These agreements set limits for the amount of greenhouse gases which can be produced by a country on an annual basis. The EU agreement - 2030 Climate and Energy Policy Framework - aims to reduce greenhouse gas emissions, by 40% compared with 1990 levels, by 2030. Developing on-shore wind energy is an integral part of Ireland's limiting of greenhouse gasses because there are no emissions of greenhouse gasses from wind energy electricity production, compared with gas, coal or oil.

13.3 How could Climate be affected by the development?

Climate can be affected positively by increased production of electricity from renewable sources and from increased carbon uptake due to tree planting. Climate can be negatively affected by vehicle emissions, tree felling and the release of carbon from excavated soils and materials.

13.3.1 The effects of UWF Related Works

UWF Related Works itself will not cause positive or negative effects to Climate – any impacts will be *Neutral/No Impact*.

13.3.2 Matters evaluated as having No Effect

The following effects were not evaluated in detail as it they were considered to be *Neutral/No Impact* – increase in national levels of greenhouse gas emissions due to the very small scale of vehicle emissions and the very small scale of embodied emissions which could be released during construction works; decrease in national levels of carbon uptake due to the very small amount of forestry felling required to develop the project; no direct production of renewable electricity.

13.3.3 The cumulative effects

UWF Related Works is part of the Whole Upperchurch Windfarm Project and as such there will be a **positive impact from the renewable electricity produced by Upperchurch Windfarm**. The windfarm will reduce the need for electricity from fossil fuels and therefore reduce Ireland's greenhouse gas emissions, which will help us to reach our emissions limits commitments. The amount of electricity that will be exported from Upperchurch Windfarm will be approximately 2% of the total wind electricity made in Ireland.

When the effects of UWF Related Works on Climate are considered cumulatively with the effects of Upperchurch Windfarm and other operating windfarms in the Republic of Ireland - the summary result **is that the cumulative effects will be significant and positive.**

13.4 Conclusion

The expert who examined this topic concluded that while the UWF Related Works **will not cause any significant negative effects** to Climate on its own, **when the development is considered cumulatively** as part of the Whole Upperchurch Windfarm Project **and cumulatively with other windfarms in Ireland the effect to Climate will be a significant positive effect**.

NTS of Chapter 14: Material Assets - Built Services

The study in Chapter 14: Material Assets - Built Services relates to the **pipes, electricity system, lines and cables, telecoms cables and wireless signals** which supply the **drinking water, electricity, telephone and broadband services** to local residents, businesses and community facilities.

14.1 How was the Built Services study carried out?

The study of the effects on Built Services was carried out by a number of experts: David Broderick and Michael Gill of Hydro Environmental Services; Ruairí Geary of TLI Group (electrical engineers/utility infrastructure consultancy), Kevin Hays of Ai Bridges (telecommunication engineers).

The effects on **Local Residents & Community** and the **Electricity Transmission System** were studied.

The built services in the development area were identified by consultation with infrastructure owners; **ESB Networks, Eir, Irish Water, Airspeed, Three Ireland, and Gas Networks Ireland** and consultation with **landowners** (associated with the development) regarding their own **water supply**. A review of **built services mapping** was also undertaken and finally a **site walkover** of the construction works areas and **GPS survey of all existing Irish Water/Eir/ESBN networks services, within 20m of the works areas** was carried out. The **existing Foilnaman telecoms mast** was also surveyed.

14.2 Built Services in the area

Services used by Local Residents & Community The services in the area are made up of **overhead telephone lines** which are located along roadside boundaries, and **overhead electricity lines** which are generally located in fields close to the local roads, which are connected to local residences and well as a small number of community facilities and local businesses. As the study area is sparsely populated, **the number of houses and other properties connected to services is very low**. Other above-ground built services include a **telecommunications mast**, (known as the Foilnaman Mast) at Knockmaroe, along with other small masts in the wider area.

There is a **reservoir in Knocknabansha** which supplies the Knocknabansha area as well as the villages of Kilcommon and Rearcross. The underground **water mains** related to these are located **in and along public roads**.

Electricity Transmission System There are no high voltage **Electricity Transmission System** assets in the development area.

14.3 How could Material Assets – Built Services be affected by the development?

Without due care and precaution, the water, electricity and telecommunications network serving the locality, could potentially be damaged by **moving construction machinery and during excavation works on the public road.** Any damage to pipes, cables or lines would cause an interruption in supply to customers.

Minor works are planned on a small number of **telephone and electricity lines**. These works will require an **outage of the line for between 4 and 8 hours** on any one section.

14.3.1 Measures to avoid, prevent or reduce negative Effects to Built Services

The following is a list of the **Project Design Environmental Protection Measures**, which are built into the **Design** of the proposed UWF Related Works project, in order to avoid, prevent or reduce such negative effects on Built Services:

- **Confirmatory consultations** with Irish Water, Eir and ESB and confirmatory ground surveys at service locations will be carried out ahead of works; **'Goal Posts'** will be used to identify and highlight the height of **nearby overhead lines**; and a foreman will look out for underground pipes during excavations near services.
- All works will be carried out during **daylight hours**.
- **Flag-men** will be used at temporary site entrances rather than creating sightlines **by the removal of roadside boundaries.**

14.3.2 The effects of UWF Related Works

14.3.2.1 Local Residents & Community

It was evaluated by the topic authors that UWF Related Works will cause **no impact** to **Local Residents & Community.**

14.3.2.2 Electricity Transmission System

It was evaluated by the topic authors that UWF Related Works has **no potential to cause impacts** to **Electricity Transmission System** due to the absence of any Electricity Transmission System Assets in the area.

14.3.3 Matters evaluated as having No Effect

The following effects were not evaluated in detail as they were considered to have a **Neutral effect on Local Resident & Community** (if occurring at all)–

- **Loss of water, electricity or communications service**, **due to accidental damage** from large plant vehicle movements or excavations in the public road with consequential loss of services to local residents, business and other community facilities, **is unlikely**. This due to protection measures included as part of the project design. Also any the loss of service would be for a very short duration (about 1 day) while damaged pipes, lines or cables are being repaired.
- **Loss of water, electricity, communications service due to relocation of telephone or electricity poles/lines** would have a **Neutral impact on Local Residents & Community**. This is because of notification of local residents or business of the outage ahead of works, which will allow them to plan for the outage; the alternative means of communication available, and the completion of works in one day.

14.3.4 The cumulative effects

When the effects of UWF Related Works on Material Assets – Built Services are considered with the effects of UWF Grid Connection and Upperchurch Windfarm - the summary result **is that the cumulative effects will not be significant.**

14.4 Conclusion

The experts who examined this topic concluded that **no likely significant negative effects** to Material Assets – Built Services will occur as a result of the **UWF Related Works on its own or cumulatively**.

NTS of Chapter 15: Material Assets - Roads

The study in Chapter 15: Material Assets - Roads relates to local and regional roads in the area of the construction works and along routes of concentrated construction related delivery traffic.

15.1 How was the Roads study carried out?

The study of the effects on Roads, was carried out by Eoin Reynolds of NRB Consulting Engineers.

The effects on **Public Roads** and the **Road Users** were studied.

The public roads in question are the

- Local and Regional Roads which will be used to transport construction traffic (mainly **Thurles to Limerick Road, R503**);
- Roads used to access construction works areas (mainly **local roads north of the R503**).

The roads to be used for the construction of the development, are identified on Figure NTS 3: Relevant Watercourses and Local Roads at the end of this Volume C1.

Road Users relate to pedestrians, cyclists, and drivers of motor vehicles using the Local and Regional Roads network, who will encounter the construction traffic and construction road works

The evaluation in Chapter 15 of the Main Report, was **prepared in accordance with Transport Infrastructure Ireland's Traffic & Transportation Assessment Guidelines**. The following investigations were carried out on the affected roads;

- **Traffic count survey for a 24 hour** period at **forty locations**,
- Falling Weight Deflectometer (FWD) testing in order to determine the strength of the affected local roads. FWD is a **non-destructive test which determines the load bearing capacity of a pavement/road structure**,
- Consultations with **Tipperary County Council Roads Department**,
- **Examination of databases** - POWSCAR 2016 CSO Database (on vehicle use) and RSA Collision Statistics Database.

15.2 The Public Roads and Road Users in the Area

15.2.1.1 Public Roads

Access to works locations will be through the **windfarm entrance off the R503 Regional Road at Graneria** and then via local roads to the various site access points.

The roads which, could be potentially affected by the UWF Related Works and associated haulage to the site access points, are the **Regional Road** R503 (between Newport and Ballycahill) along with the **Local Roads** the L6185-13, L2264-50, L6188-0, L61881-0, L2264-34, L4139-16, L4138-12 and L4139-0 **radiating north from the R503** at **Knockcurraghbola** and **Knockmaroe** townland and at **Shevry** and **Gleninchnaveigh** townland.

All the relevant roads are 2-way, with the road itself varying in width from 3.5 to 5m. The roads are traditional tar and chippings, with narrow verges and road surface water drained to open drains, generally running along each of the roadsides. Road boundaries consist of a mix of hedgerows and simple mounded embankments, which are aligned beyond drains.

The **road surface** and **load bearing capacity** of the **Regional Roads** were found to be generally good.

The **road surface on the Local Roads** was found to be generally good with few potholes, however the **load bearing capacity** of the pavements were weak. This condition is consistent with rural local roads nationwide. The local roads are not subject to any vehicular weight restrictions.

There are **three culverts** under the relevant local roads, routing storm water under the road.

Observation during site visits and a review of the traffic count, confirms that **both the Regional and Local Roads in question are very lightly trafficked**, and have on average 97% spare capacity. The overwhelming majority (98.5%) of traffic is cars and vans and only 1% is heavy vehicles such as tractors, buses and trucks.

15.2.1.2 The Road Users

The **Regional Roads carry general traffic**, mainly comprising people commuting to work or school/college, or travelling to shops and businesses along the roads and onward. It is assumed that **tourists use these roads**, which are also scenic driving routes, to travel between the towns or to access a number of walking routes and a cycle route in the area.

The **Local Roads** generally serve as **access to local residential, forestry and farm traffic** and some amenity users i.e. walkers and cyclists.

15.3 How could Roads be affected by the development?

Road pavements and culverts can be effected by road works involving the **excavation** of the pavement or the adjacent verge and by **increases in traffic**, particularly truck traffic. **Road boundaries** can be affected by **new or widened accesses** from the public road network, onto the lands beyond.

Road Users could be sensitive to changes in road use conditions such as **increases in traffic volumes**, particularly trucks; presence of **roadworks and traffic management measures**, such as stop-go systems; and a **reduction in road pavement quality** which could either increase journey times or reduce road safety. Cyclists or walkers could also be **intimidated by the presence of trucks**, particularly on narrow roads. The presence of road works could cause **interrupted or disrupted access to property**.

15.3.1 The Development Works and Associated Traffic

15.3.2 Works on the Public Roads

Fourteen temporary entrances off the public road for the **Internal Windfarm Cabling trenching works**, **ten** of which will be newly opened, and **four** will comprise widening of existing farm gateways. This will involve small sections of **verge being removed and overlaid with hardcore.** Temporary entrances **will be reinstated,** including reinstatement of verges and roadside drainage.

The **Internal Windfarm Cabling** requires **nine** separate cable crossing of public roads, which will all be completed within one day. The road trenching crews will only open a trench that they can finish and reinstate before the end of the day, typically 1 to 2 crossings per day, depending on ground and weather conditions.

Haul Route Works will take place at **thirteen** locations and will be completed within **1 to 3 days at any location. Five** temporary entrances off the public road will be opened or widened to accommodate the **Haul Route Works**, **two** of which are through existing farm gates. The Haul Route Works will involve the **temporary**

removal of 1035m and the permanent removal of 25m of road boundaries. Verges will be trimmed and hardcore will be laid and compacted on these verge areas, and **following construction, soil and planting will be reinstated over the hardcore**.

15.3.3 Works Traffic

It is expected that the construction stage will commence in 2019 and **will last approximately 6-8 months**. The **UWF Related Works crews** will be **part of the whole project construction team** and will use the Upperchurch Windfarm construction compound Site Compound No. 1 at Graniera (windfarm substation) which is **accessed from the R503, at Graniera**. UWF Related Works will be built at the same time as the other elements of the Whole Upperchurch Windfarm Project. The working hours will be: Monday to Friday – 07.00hrs to 19.00hrs; Saturdays - 08.00hrs to 16.30hrs. No work on Sundays or Bank Holidays.

From the **Knockcurraghboola Commons construction compound**, the UWF Related Works crew will then be transported to the specific work locations by 'crew-cab' **4x4 vehicles** or similar. **Bulk deliveries of materials** will be made to the **construction compound** and stored there until needed. Materials will be transported to the works locations by way of **rigid body vehicle or tractor and trailer**. **Aggregate and concrete** will be delivered directly to works locations.

Flagmen will be used at the temporary site access points, as these access points will be briefly used. The use of flagmen will avoid substantial lengths of roadside boundary being removed. Where the underground cable crosses under a road, traffic flow will be maintained by placing a **steel plate over the trench** to allow traffic to pass over while the works are on-going and **flagmen will control a stop/go system**.

15.3.4 Measures to avoid, prevent or reduce negative Effects to Roads

The following is a list of the **Project Design Environmental Protection Measures**, which are built into the **Design** of the proposed UWF Related Works, in order to avoid, prevent or reduce such negative effects on Roads and Road Users:

- All construction works will be carried out during **daylight hours**.
- Flag-men will be used at temporary site entrances rather than creating sightlines by the removal of road-side boundaries. These **flagmen will control the movement of traffic on the public road**, so that road users can continue to use the local road network in a in a safe and efficient manner.
- **Construction works in Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons townlands,** which are within 350m of local residences, **will not take place at the same time** as either the UWF Grid Connection or Upperchurch Windfarm.

In addition;

- Following the **completion of construction works** in any particular area, **road surfaces will be repaired and/or resurfaced and roadside boundaries will be reinstated**. All road boundaries at temporary site access points or at temporary road widening locations will be reinstated along the existing alignment.
- All reinstatement of affected roads will be carried out in accordance with Tipperary County Council instructions.
- A **Traffic Management Plan** (TMP) for the public roads will be a key construction contract document, this plan will **control and minimise the traffic impacts of construction** through measures to **maximise the safety while keeping traffic flowing** as freely as possible. The appointed Contractor will be responsible for carrying out and managing the construction activities in accordance with the TMP. The adherence to the TMP will be audited regularly by the Environmental Clerk of Works, and **a Community Liaison Officer**

will liaise with local residences on upcoming construction schedules, in particular those relating to road works in their area.

15.3.5 The Effects of UWF Related Works

15.3.5.1 Public Roads

Damage to Road Boundaries*: Imperceptible Impact* because the loss of **road boundaries** will be **temporary** and **reinstated** to the satisfaction of Tipperary County Council. All **verges and roadside drainage will be reinstated** following works in any one area.

Damage to Road Pavements*: Imperceptible Impact* because of the **temporary duration** of the works, the roads are **lightly trafficked**, the trenching locations will be **reinstated** in accordance with the National Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads which will mean repairing any damage to road pavements **to at least as good a condition as pre-works**.

15.3.5.2 Road Users

Increased Journey Times*: Imperceptible* because of the **temporary duration** of the works (up to three days at any one location), with most trenching **completed within one day** at most locations; the roads are very **lightly trafficked; construction materials deliveries** will be of **temporary duration;** and **traffic management measures** and use of **flagmen** at the works locations.

15.3.6 Matters evaluated as having No Effect

The following effects were not evaluated in detail as it they were **considered to be Neutral or having no potential or likelihood to occur**: damage to Public Road culverts; Increased risk of accidents to Road Users; Interrupted/disrupted access to property; Works and Traffic during the operational and decommissioning stage.

15.3.7 The cumulative effects

When the effects of UWF Related Works on Roads are considered with the effects of UWF Grid Connection and Upperchurch Windfarm - the summary result is that the **cumulative effects will not be significant.**

15.4 Conclusion

The expert who examined this topic concluded that **no likely significant negative effects** to **Material Assets - Roads** will occur as a result of the **UWF Related Works on its own or cumulatively**.

NTS of Chapter 16: Cultural Heritage (Archaeology)

Cultural Heritage relates to sites of **archaeological, historical or architectural** significance in the form of **sites, monuments, historic structures, artefacts and environmental evidence**.

16.1 How was the Cultural Heritage study carried out?

The study was carried out by Barry Fitzgibbon and Cóilín O'Drisceoil of Kilkenny Archaeology.

The effects on **Recorded Legally Protected Sites**, **Other Recorded Sites**, **Previously Unrecorded Sites** and **Unrecorded Subsurface Sites** were studied.

In an archaeology context **Recorded Legally Protected Sites** are those that are listed on the Record of Monuments and Places and are protected under the National Monuments Acts (1934-2014). **Other Recorded Sites** are sites listed on the National Inventory of Architectural Heritage (NIAH), although not legally protected, they are an important part of Irish architectural heritage. **Previously Unrecorded Sites** are sites that are listed in this study, but are unrecorded in the Records of Monuments and do not have legal protection. The majority of these sites are features or ruins of features such as Lime Kilns, Wells, Quarries and Townland Boundaries. Previously **Unrecorded Subsurface Sites** are features or artefacts that have not been discovered yet.

The areas studied for effects **from groundworks** was set **a) for Recorded Legally Protected Sites and Other Recorded Sites** - within the footprint of the construction works area, plus 500m radius surrounding the footprint; **b) for Previously Unrecorded Sites** - within the footprint of construction works areas and extended out to 500m at certain locations which have features of potentially significant interest or importance and; **c) for Unrecorded Subsurface Archaeology** - within the footprint of construction works areas where groundworks will take place.

The **operational effects i.e. landscape or visual effects on archaeology** were considered for a 2km zone around the location of Telecoms Mast, which is the only permanent above ground structure of the development.

National and European guidelines on the assessment, protection and conservation of archaeological and architectural heritage have been considered during the preparation of the evaluation of cultural heritage in the area. These guidelines are listed in full in Chapter 16 of the EIA Report.

Sources of information on the area under study, came from **consultation locally**; **desktop study** of the Record of Monuments and Places; Record of Protected Structures; National Inventory of Architectural Heritage; National Museum of Ireland Topographic Files; All editions of the historic Ordnance Survey Maps (including the first edition 1841 and the second edition 1898 1:10560 maps); Other historic mapping, such as the Down Survey (1655) and the Griffith Valuation (1850); and aerial photography mapping of the area. **Field studies** including **walking of the works area** and a **test excavation** in the area of **one recorded monument**.

A detailed description of the archaeological context of the study area and the results of the test excavations and field surveys are described in detail in Chapter 16: Cultural Heritage of the EIAR Main Report (Volume C2).

16.2 Cultural Heritage in the Area

The UWF Related Works is located on the eastern slopes of the Slievefelim – Silvermine Mountain uplands area, which is a region with a **rich and diverse history of human settlement going back to prehistoric times**. This extended period of occupation is reflected in the archaeological record. The broader upland landscape (over 100m above sea level) has numerous known monuments, recorded on the Record of Monuments and Places. While the spread of these monuments date from **the Neolithic through to post medieval and modern times**, the upland region appears to have been most intensively settled in the late Neolithic, with populations dispersing to the lower slopes during later periods.

16.2.1 Recorded Legally Protected Sites

There are **fifteen Recorded Legally Protected Sites within 500m** of **construction works areas** and a **further nine within 2km of the Telecoms Mast** (the only above ground structure following construction). This total of twenty four includes Barrows, a Cist, Enclosures, a Fulacht Fiadh, a Possible Field System, a Ringfort, Megalithic Tombs, Standing Stones, a Stone Row and a Stone Circle. The construction works areas occur within the zone of notification of **one of these sites:** a Stone Row (30m from a section of Internal Windfarm Cabling). Archaeological testing was carried out at this site – no features or artefacts were found during test excavations.

In relation to the **Operational Visual** setting for Recorded Legally Protected Sites, there are **seven sites** which will have theoretical visibility of the Telecoms Mast.

16.2.2 Other Recorded Sites

There are **no Other Recorded Sites** within, or close to (within 500m), the UWF Related Works.

16.2.3 Previously Unrecorded Sites

Cartographic analysis, aerial photography and a thorough field survey identified a total of **forty one Previously Unrecorded Sites** within the study areas. The majority of these sites consist of wells, townland boundaries, quarries and lime kilns. While these were all mapped over the course of this report, only **one Previously Unrecorded Site, which were deemed to have relevance, were numbered, listed and described** in the complete table of sites in Appendix 16.1.

In relation to the Operational Stage, there are **nineteen Previously Unrecorded Sites which will have theoretical visibility of the Telecoms Relay Pole;** including a lime kiln, gravel pits/quarries, springs/wells, points where the Internal Windfarm Cabling crosses townland boundaries and a house. The environment within which these monuments occur is largely rural in nature across a mix of open farmland and cultivated forestry.

16.2.4 Unrecorded Subsurface Sites

Because **much of the study area has been subject to intensive agriculture and later forestry planting**, it is considered that **Unrecorded Subsurface Sites** exposed during the course of construction ground works are most likely to be **levelled earthworks, back filled ditches or slot trenches** cut directly into the natural subsoil, or areas of large scale burning such as you might find at a **Fulacht Fiadh** site. There is also the possibility for other site types being exposed, including (but not limited to) **artefact scatters**, objects such as **pottery, stone and bronze axes**, **foundations of buried structures, burials, and trackways**.

Because of an increased likelihood of **Unrecorded Subsurface Sites** being present in the vicinity of known archaeological monuments, archaeological **test excavations** were carried out at **one location** along the Related Works construction works areas **– a Stone Row in Knockcurraghbola Commons – no features or artefacts were found during test excavations.**

16.3 How could this Cultural Heritage be affected by the development?

Archaeological sites can be **affected by any groundworks** which would partially or wholly damage the site itself or features/objects associated with the site or which may damage any associated subsurface features or structures which are no longer visible. **A wider area than the actual groundworks area was examined in sensitive areas**, in order to ensure that the full extent of the heritage site, as well as any associated, or ancillary, features or structures, could be fully appraised.

Townland boundaries can be **affected by groundworks**. Often modern townland boundaries have **origins going back to the medieval period or earlier**, where they might have acted as extents for manors or ancient landholdings. As such, any associated structures or ditches may contain archaeologically significant material which may be damaged or removed during groundworks.

Also, some **archaeological sites or monuments** were **purposefully constructed** in specific locations, on specific alignments, **to take advantage of views of the surrounding landscape, celestial events and other monument**s. As such the **views of and from these sites** are an integral part of the monument's character and could be **affected by the presence of new structures** in the local area.

16.3.1 Measures to avoid, prevent or reduce negative Effects to Cultural Heritage

The following **Project Design Environmental Protection Measures**, were built into the **Design** of the proposed UWF Related Works, in order to avoid, prevent or reduce such negative effects to Cultural Heritage:

- The design of the development includes for the **archaeological monitoring of all initial ground works during the construction stage.** This will allow for an onsite archaeologist, in consultation with the National Monuments Service and the National Museum of Ireland, to monitor groundworks and stop works in the event of any archaeological features or objects being uncovered, and will ensure that any features or objects uncovered will be correctly recorded and preserved, in consultation with the National Monuments Service and the National Museum of Ireland.
- The **use of flagmen at the temporary sites entrances**, rather than removing roadside boundaries to create sightlines.

16.3.2 The Effects of UWF Related Works

16.3.2.1 Recorded Legally Protected Sites

Visual Impact: *Imperceptible* - Although seven sites are theoretically visible from the new Telecoms Relay Pole, any visual impact is negligible to non-existent, and the Telecoms Relay Pole will be similar in appearance to wooden telephone and electricity poles which are common in the area. The nearest Site is 1.53km distant.

16.3.2.2 Other Recorded Sites

***No potential* for impacts due to physical damage or visual** impacts because there are no Other Recorded Sites within 500m of construction works areas (physical damage) or 2km (visual impacts) of the Telecom Relay Pole.

16.3.2.3 Previously Unrecorded Sites.

Damage to townland boundaries**:** *Slight Impact* from removal **of small sections of townland boundaries**. The construction will involve the **temporary removal of c.55m of boundary at twelve townland boundaries** and the **permanent removal of c.15m at three townlands boundaries** along the route of the Internal Windfarm Cabling, Haul Route Works and Realigned Windfarm Road locations. Three of these points are through existing farm/forestry gates or farm/forestry roads, and twelve are new boundary crossing points. During field investigations, **nothing of archaeological significance was found at any of these boundary points**. The impact of this disturbance is considered slight because of the **small scale (up to 10m in most cases);** no features of archaeological interest were found during field surveys; **these boundaries have already been altered and demolished extensively due to modern farming and forestry practices**; and there will be archaeological monitoring of all initial groundworks.

16.3.2.4 Unrecorded Subsurface Sites

Complete or Partial Destruction**:** *Slight Impact* as it is **possible that there could be a negative impact on these sites,** particularly given the high number of Cultural Heritage Sites in the general study area. However because of the **continuous intensification of agriculture and forestry** any construction groundworks finds will likely include only leveled earthworks, backfilled cuts, and areas of large scale burning or artefact scatters. **It is unlikely that any fully intact remains of special archaeological significance will be uncovered.**

16.3.3 Matters evaluated as having No Effect

The following effects were not evaluated in detail as it they were **considered to be Neutral or having no potential or likelihood to occur**:

- **Recorded Legally Protected Sites:** Complete or partial destruction due to distance from these sites from the construction works areas, which are located outside the Zone of Notification for four of the six sites. At the remaining two sites test excavations encountered no features or objects of archaeological significance. Decommissioning Stage Effects- – none due to absence of groundworks at this stage.
- **Previously Unrecorded Sites and Unrecorded Subsurface Sites:** Complete or partial destruction on other Previously Unrecorded Sites (i.e. not townlands) is unlikely due to archaeology monitoring during construction; Visual Impact – none because the only archaeology likely to be uncovered are small artefacts, levelled earthworks or backfilled cuts. These types of archaeology are not sensitive to visual effects. Also the visual presence of the Telecoms Relay Pole is minor and common in this area; or Decommissioning Stage Effects – due to absence of groundworks at this stage.

16.3.4 The cumulative effects

When the effects of UWF Related Works on Cultural Heritage are considered with the effects of UWF Grid Connection, Upperchurch Windfarm, Milestone Windfarm, Foilnaman Mast and Cummermore Communications Pole - the summary result **is that the cumulative effects will not be significant.**

16.4 Conclusion

The experts who examined this topic concluded that **no likely significant negative effects** to Cultural Heritage will occur as a result of the UWF Related Works **on its own or cumulatively.**

NTS of Chapter 17: Landscape

Landscape is an Area perceived by People, whose character is the result of the action and interaction of natural and/or human factors. Landscape is about the relationship between people and place and provides the setting for our day-to-day lives.

17.1 How was the Landscape study carried out?

The study was carried out by Richard Barker of Macroworks (Landscape architect).

The effects on **Landscape Character** and **Visual Amenity** were studied.

Industry guidelines on the assessment of landscape and visual impacts have been considered during the preparation of the evaluation of Landscape in the area.

Sources of information on the area under study, came from **consultation locally**; **review of county development plans, including the Landscape Character Assessment for County Tipperary,** and online research of tourism and amenity features in the area**. Field studies** including site visit, and photographs of the area.

17.2 The Landscape setting for the development

The landscape around UWF Related Works, which are proposed for the vicinity of the consented but not constructed Upperchurch Windfarm, is part of the uplands of the Slievefelim to Silvermine Mountains and is wholly rural in terms of land use (grassland and forestry) and character.

17.3 How could Landscape be affected by the development?

Landscape can be affected by changes to land cover and land cover patterns, increases in activity which can cause a reduction in rural tranquillity or visual clutter; and increases in built development which can affect the integrity of the rural area or cause visual disharmony or clutter in views of the area.

17.3.1 Measures to avoid, prevent or reduce negative Effects to Landscape

The following is a list of the **Project Design Environmental Protection Measures**, which are built into the **Design** of the proposed UWF Related Works project, in order to avoid, prevent or reduce such negative effects on Landscape:

- Use of flagmen at temporary site access points rather than providing sightlines through the removal of roadside boundaries;
- the control of construction schedules in the Knocknabansha/Knockmaroe/Knockcurraghbola Crown-lands and Knockcurraghbola Commons area to reduce the intensity of construction activities in that area.

17.3.2 The Effects of UWF Related Works

17.3.2.1 Landscape Character

Alteration or division of land cover and vegetation patterns: *Imperceptible.* There will be **temporary alterations to land cover and vegetation** due to excavations and the removal or disruption of soils; felling of 0.3 hectares of forestry; removal of 170m of hedgerow and four mature trees, mainly along public road

boundaries. There will be *Imperceptible Impact* because the vast majority of the **works area will be reinstated, hedgerows and trees will be restored or replanted like for like.**

Intensification of activity causing a reduction in rural tranquillity: *Imperceptible Impact* because **construction activity will be dispersed** around the works site and will be temporary and brief at any one location.

Intensification of built development and reduction in the integrity of rural landscape pattern: *Imperceptible Impact* because the permanent above ground works and land cover changes will be barely discernible in the area.

17.3.2.2 Visual Amenity

Intensification of activity causing visual disharmony, clutter or complexity: *Imperceptible Impact* because **of the small scale of the works** and **construction activity will be dispersed** around the works site and will be temporary and brief at any one location.

Addition of new features/loss of existing features causing visual disharmony, clutter or complexity: *Imperceptible Impact* because of the barely discernible, permanent above-ground expression of all aspects of the UWF Related Works except the Telecoms Relay Pole and the barely noticeable, localised, long-term impact on visual amenity of the new Telecoms Relay Pole.

17.3.3 Matters evaluated as having No Effect

The following effects were not evaluated in detail as it **they were considered to be Neutral** – intensification of activity during the operational stage and decommissioning stage causing a reduction in rural tranquillity to Landscape Character and Visual Amenity.

17.3.4 The cumulative effects

When the effects of UWF Related Works on Landscape are considered with the effects of UWF Grid Connection, UWF Replacement Forestry, Upperchurch Windfarm, Milestone Windfarm, Foilnaman Mast, Cummermore Communications Pole, Forestry and Agricultural activities - summary result **is that the cumulative effects will not be significant.**

17.4 Conclusion

The experts who examined this topic concluded that **no likely significant negative effects** to Landscape will occur as a result of the **UWF Related Works on its own or cumulatively**.

NTS of Chapter 18: Interaction of the Foregoing

In the application reports, all the required Environmental Factors are examined. These are **Population & Human Health**; **Biodiversity** (plants and animals); **Land; Soils**; **Water**; **Air** (air quality, noise, vibration and electromagnetic fields); **Climate**; **Material Assets** including **Built Services** (electricity network, communication network, water supply infrastructure) and **Roads**; **Cultural Heritage** (archaeology) and **Landscape**. Each Factor has a dedicated chapter.

Any interaction between these Environmental Factors is called a **cross factor effect**. A cross factor effect happens when the effect on one Environmental Factor causes an indirect effect on another environmental factor – e.g. excavation to **Soils** causing run-off of soils into a drain or watercourse which then causes an indirect effect to **Water** quality.

In the previous sections of this Non-Technical Summary, likely direct and indirect effects are presented.

In summary there are no effects on one Environmental Factor likely to cause significant indirect effects on another Environmental Factor.

NTS of Chapter 19: Monitoring Arrangements

The Project Promoter is **committed to developing the UWF Related Works without causing significant negative effects on the environment**.

To achieve this commitment, **Environmental Commitments** have been developed during the design of the project and the preparation of this EIA Report.

The Project Promoter will **contractually oblige the construction contractors to carry out the works in accordance with all of the Environmental Commitments**. These commitments will be **monitored** on the ground by a full time **Environmental Clerk of Works and team of environmental experts**.

A **Schedule of Monitoring Measures** is included in Chapter 19.

Non-Technical Summary Conclusion

This planning application, UWF Related Works is a development proposed for an area in County Tipperary west of Upperchurch village. The purpose of UWF Related Works is to facilitate the construction of Upperchurch Windfarm. Upperchurch Windfarm is not built yet. The windfarm was granted planning permission in August 2014 and includes twenty two wind turbines and an electrical substation. **Most of the UWF Related Works** are proposed for **locations adjacent to, or within Upperchurch Windfarm**.

UWF Related Works, comprises the following elements:

Internal Windfarm Cabling: to connect the Consented UWF Turbines to the Consented UWF Substation.

Realigned Windfarm Roads: to realign two lengths of Consented UWF Roads and to provide access to a new telecom relay pole.

Haul Route Works: to facilitate the haulage of turbine components to the Upperchurch Windfarm site.

Telecom Relay Pole: to be relay communication signals between the existing Foilnaman Mast and the existing Laghtseefin Mast around the Consented UWF Turbines. The Telecom Relay Pole will fulfil Condition No. 18 of the planning conditions associated with the Upperchurch Windfarm.

RW Ancillary Works: to facilitate the construction of the UWF Related Works.

Note: The Consented UWF Turbines, Consented UWF Roads and the Consented UWF Substation refer to components of Upperchurch Windfarm (UWF).

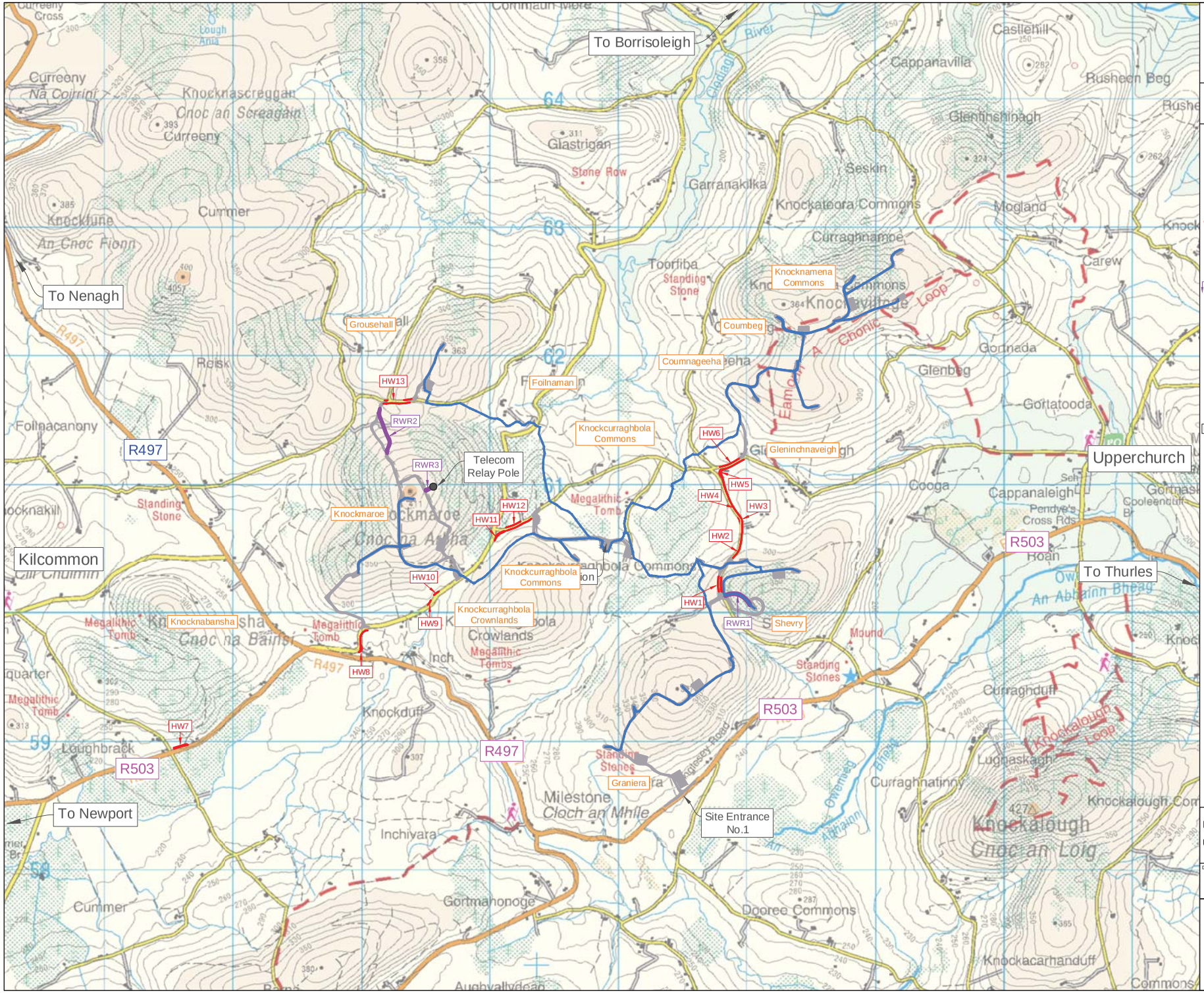
The surrounding area is **largely rural, with the land managed as agricultural grassland and commercial forestry plantations, linked by a network of public roads and private farm and forestry roads**. There are isolated residences and farmsteads throughout the area. Nearby settlements include the villages of Upperchurch and Kilcommon.

This EIA Report has been prepared by a team of experts. The experts examined the effects of the UWF Related Works on the environmental factors and have concluded that **no significant negative effects** will occur **to the environment or human health, as a result of the UWF Related Works**, either on its own or **cumulatively or cumulatively as part of the Whole Upperchurch Windfarm Project**, or **cumulatively with other projects or activities**.

While the **UWF Related Works will not generate renewable electricity itself**, it will enable **Upperchurch Windfarm to be built and thereby export renewable electricity to the National Grid** which, together with the other operational windfarms in Ireland, will have a **significant positive effect on Ireland's commitment to tackling Climate change.**

This UWF Related Works Revised EIA Report and all other application documents are available for **viewing on-line** at

www.upperchurchwindfarm.ie



Title:
Figure NTS 1
Location of UWF Related Works

Map Number:
1 of 1

Legend:

UWF Related Works

- Haul Route Works
- HW1 — Haul Route Works Numbers (HW1 - HW13)
- Realigned Windfarm Road
- RWR1 — Realigned Windfarm Road Numbers (RWR1 - RWR3)
- Internal Windfarm Cabling
- Telecom Relay Pole
- Upperchurch Windfarm (UWF)
- R503 — Regional Road Number
- Kilcommon — Village

REFERENCE DOCUMENTS

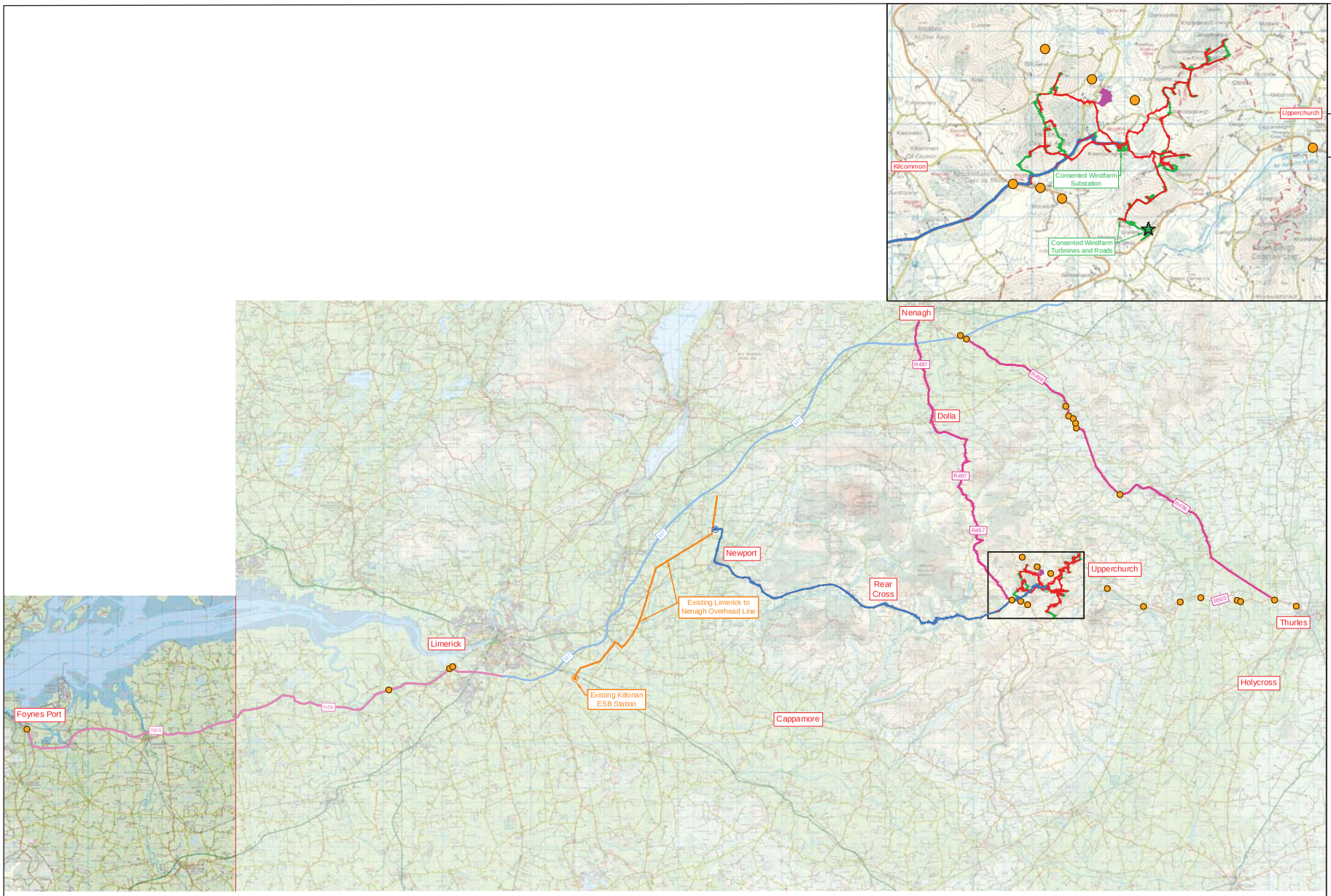
N

Project:
UWF Related Works (RW)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	JB	January 19	A3

Aoife Butler
Ecopower Developments Ltd
Zetec House,
Purcellsinch Business Park, Kilkenny
TEL: +353 56 7750140
MOB: +353 83 8805644

ECOPOWER



Title:

Figure NTS 2

UWF Related Works and the Other Elements of the Whole UWF Project

Map Number:
1 of 1

Legend:

Element 1:
- Underground Cable
- Mountphilips Substation

Element 2:
- UWF Related Works

Element 3:
- UWF Replacement Forestry

Element 4:
- Upperchurch Windfarm (UWF)

Element 5:
- UWF Other Activites

REFERENCE DOCUMENTS

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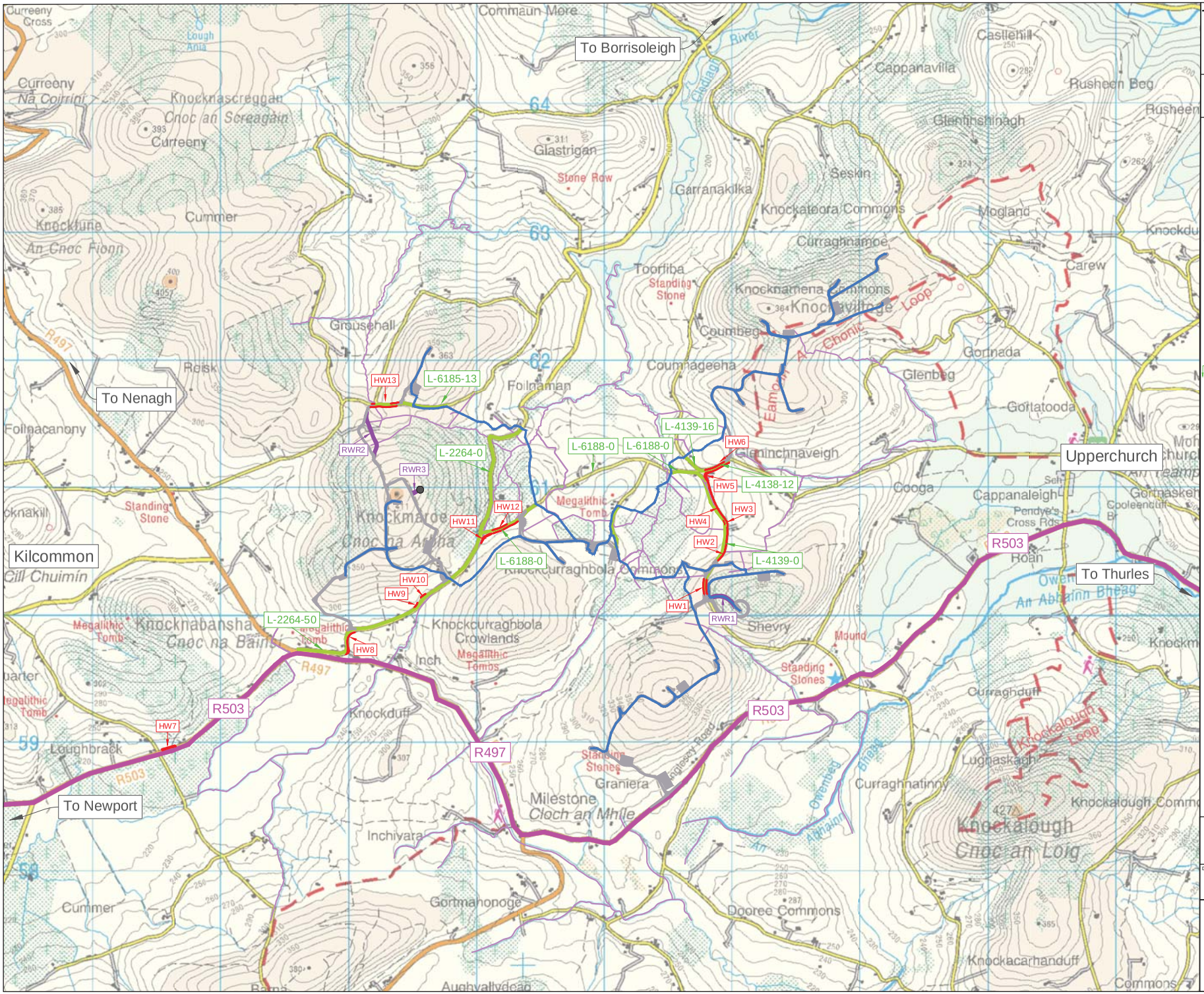
Project:
UWF Related Works (RW)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	JB	January 19	A3

Aoife Butler
Ecopower Developments Ltd
Zetec House,
Purcellsinch Business Park, Kilkenny
TEL: +353 56 7750140
MOB: +353 83 8805644

ECOPOWER



Title:
Figure NTS 3

Relevant Watercourses and Local Roads

Map Number:
1 of 1

Legend:

- Haul Route Works
- HW1 — Haul Route Works Numbers (HW1 - HW13)
- Realigned Windfarm Road
- RWR1 — Realigned Windfarm Road Numbers (RWR1 - RWR3)
- Internal Windfarm Cabling
- Telecom Relay Pole
- Streams and Drains
- Local Road
- L-2266-11 — Local Road Number
- Regional Road
- R503 — Regional Road Number
- Upperchurch Windfarm (UWF)
- Kilcommon — Village

REFERENCE DOCUMENTS

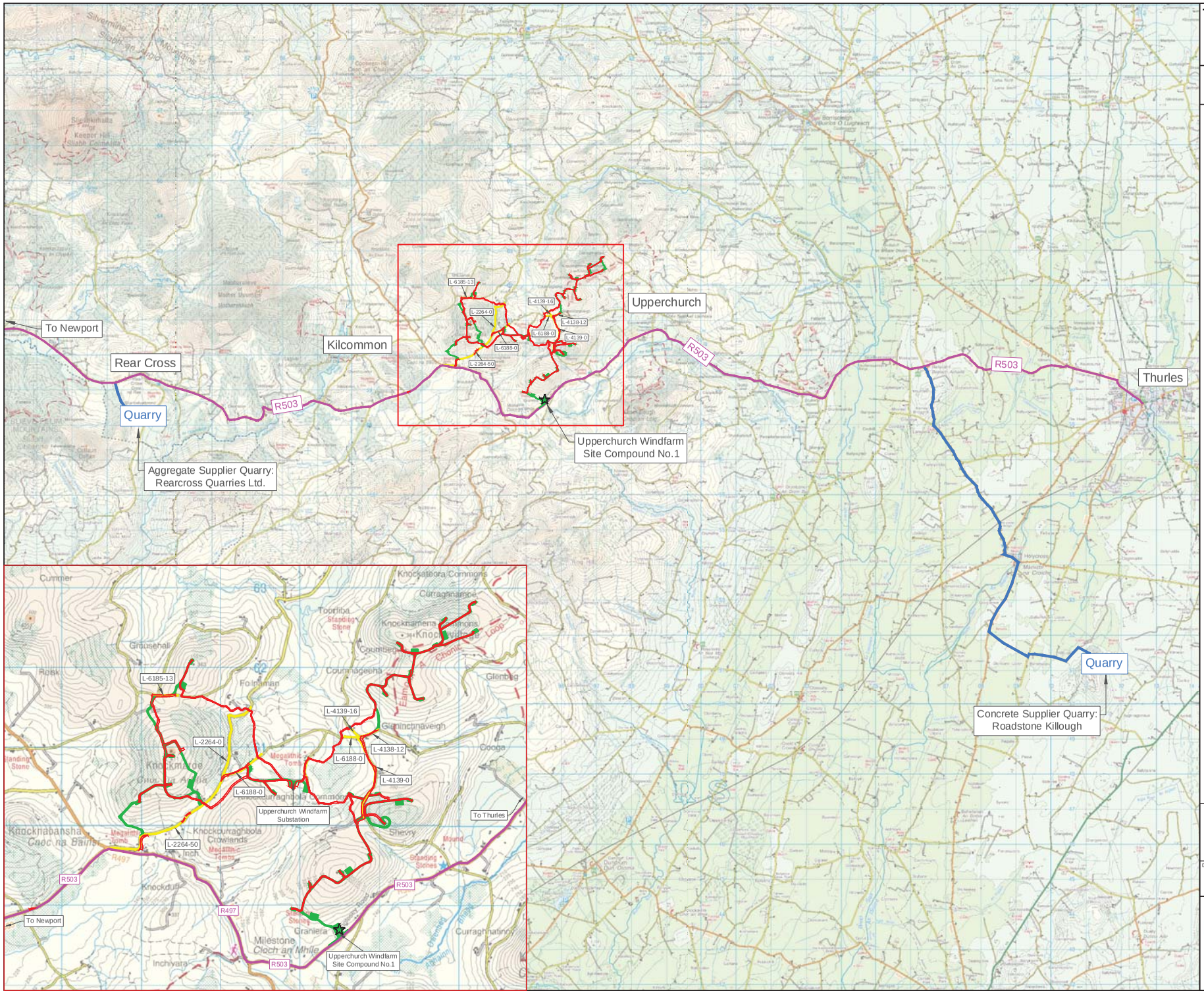
N

Project:
UWF Related Works (RW)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	JB	January 19	A3

Aoife Butler
Ecopower Developments Ltd
Zetec House,
Purcellsinch Business Park, Kilkenny
TEL: +353 56 7750140
MOB: +353 83 8805644

ECOPOWER



Title:

Figure NTS 4

Haul Routes for Construction Deliveries

Map Number:
1 of 1

Legend:

- UWF Related Works Counstruction Works Area Boundary
  - Internal Windfarm Cabling
  - Haul Route Works
  - Telecom Relay Pole
  - Realigned Windfarm Road
- Haul Route from Local Quarries to the R503
- Regional Road R503
- Local Roads used to access the UWF Related Works Area
- Consented UWF Roads used to access the UWF Related Works Area
- Upperchurch Windfarm Site Compound No.1
- L-4139-0 Local Road Number

REFERENCE DOCUMENTS

Project:

UWF Related Works (RW)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	JB	January 19	A3

Aoife Butler
Ecopower Developments Ltd
Zetec House,
Purcellsinch Business Park, Kilkenny
TEL: +353 56 7750140
MOB: +353 83 8805644

ECOPOWER