

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

REFERENCE DOCUMENT 24 of 36

This document contains the following:

UWF Grid Connection (ABP ref. ABP-306204-19)

- **2019 Appropriate Assessment Report for Upperchurch Windfarm Grid Connection – Volume E (Volume 1 of 2)**
 - Stage 1: Screening For Appropriate Assessment
 - Stage 2: Natura Impact Statement

VOLUME E: APPROPRIATE ASSESSMENT REPORT

APPROPRIATE ASSESSMENT REPORT FOR UPPERCHURCH WINDFARM GRID CONNECTION

VOLUME 1 OF 2

STAGE 1: SCREENING FOR APPROPRIATE ASSESSMENT

STAGE 2: NATURA IMPACT STATEMENT

OCTOBER 2019



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Volume E
APPROPRIATE ASSESSMENT REPORT

Appropriate Assessment Report
for
Upperchurch Windfarm Grid Connection

Stage 1
Screening for Appropriate Assessment

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Inis

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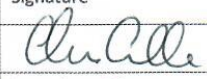
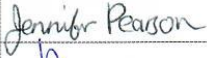
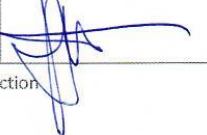
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Quality Assurance

The findings outlined within this report and the data we have provided are to our knowledge true and express our bona fide professional opinions. This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct. Where pertinent, CIEEM Guidelines used in the preparation of this report include the *Guidelines for Ecological Report Writing* (CIEEM, 2017), *Guidelines for Preliminary Ecological Appraisals* (CIEEM, 2015) and *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine*, (CIEEM, 2018). CIEEM Guidelines include model formats for Preliminary Ecological Appraisal and Ecological Impact Assessment. Also, where pertinent, evaluations presented herein take cognisance of recommended Guidance from the EPA such as *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017), and in respect of European Sites, *Managing Natura 2000 sites: The provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC* (European Commission, 2018).

Due cognisance has been given at all times to the provisions of the *Wildlife Act (1976)*, the *Wildlife (Amendment) Act (2000)*, the *European Union (Natural Habitats) Regulations (SI 378/2005)*, the *European Communities (Birds and Natural Habitats) Regulations (2011)*, EU Regulation on Invasive Alien Species under *EU Regulation 1143/2014*, the *EU Birds Directive 2009/147/EC* and the *EU Habitats Directive 92/43/EEC*.

No method of assessment can completely remove the possibility of obtaining partially imprecise or incomplete information. In line with Best Practice, any limitation to the methods applied or constraints however are clearly identified within the main body of this document.

Version	Date		Name	Signature
1	30/10/2019	Report prepared by:	Chris Cullen DFE ACIEEM	
1	04/12/2019	Report checked by:	Jennifer Pearson MSc ACIEEM	
1	04/12/2019	Report signed off by:	Howard Williams CEnv, MCIEEM CBiol MRSB MIFM	
Title		Appropriate Assessment Report for Upperchurch Windfarm Grid Connection Part 1 - Stage 1 Screening for Appropriate Assessment		

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1 INTRODUCTION

This Screening for Appropriate Assessment Report has been prepared by Chris Cullen of Inis Environmental Consultants with contributions from Howard Williams, Dr. Alex Copland, Mr. Daireann McDonnell, Ms. Jennifer Pearson and Mr. Donncha O Cathain, and contains information which will facilitate the Competent Authority to carry out an Appropriate Assessment for the Upperchurch Windfarm (UWF) Grid Connection project.

The preparation of this Screening for Appropriate Assessment Report has had regard to;

- EU Habitats Directive (92/43/EEC),
- EU Birds Directive (Council Directive (2009/147/EC)
- the Part XAB of the Planning and Development Act 2000,
- European Communities (Birds and Natural Habitats) Regulations 2011,
- Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission 2001,
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government (2010).
- Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC, European Commission, 2018.

1.1 Appropriate Assessment Process

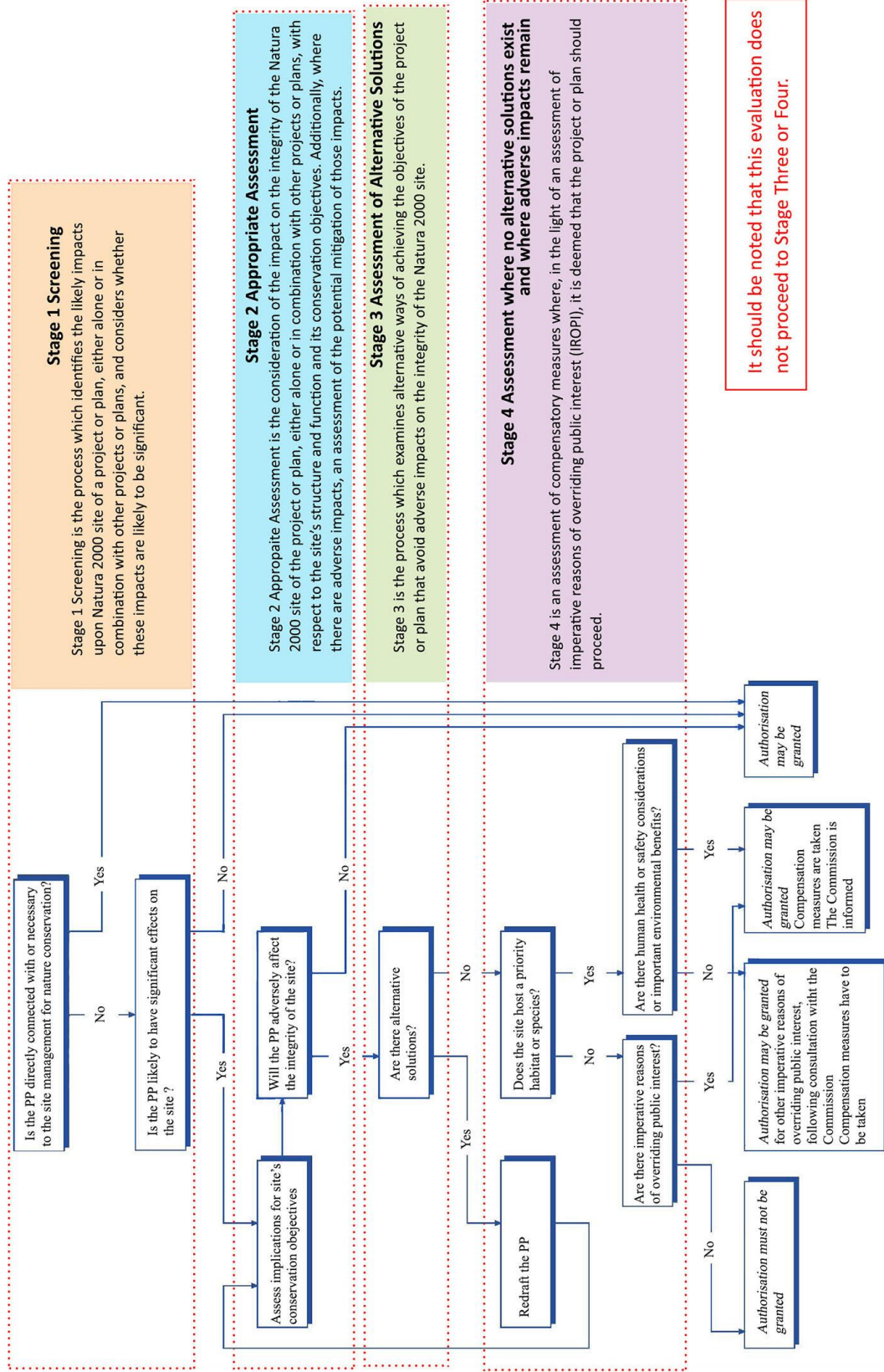
Under Article 6(3) of the Habitats Directive, an Appropriate Assessment of the implications of a project for the European Site concerned implies that, before a project is approved, all the aspects of the project which can, either individually or in combination with other plans or projects, affect the conservation objectives of that European Site must be identified, in the light of the best scientific knowledge in the field. The competent national authorities are to authorise an activity on the protected site only if they have made certain that it will not adversely affect the integrity of any European site.

1.1.1 Stages of the Appropriate Assessment Process

Appropriate Assessment involves a number of steps and tests that are applied using a stage-by-stage approach. Each step or stage in the assessment process precedes and provides a basis for other steps. The four stages in an Appropriate Assessment (AA), as outlined in EC Guidance on Assessment of Projects¹ are illustrated in the following flow chart (over).

¹ Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission 2001

STAGES OF THE APPROPRIATE ASSESSMENT PROCESS FOR A PLAN OR PROJECT (PP)

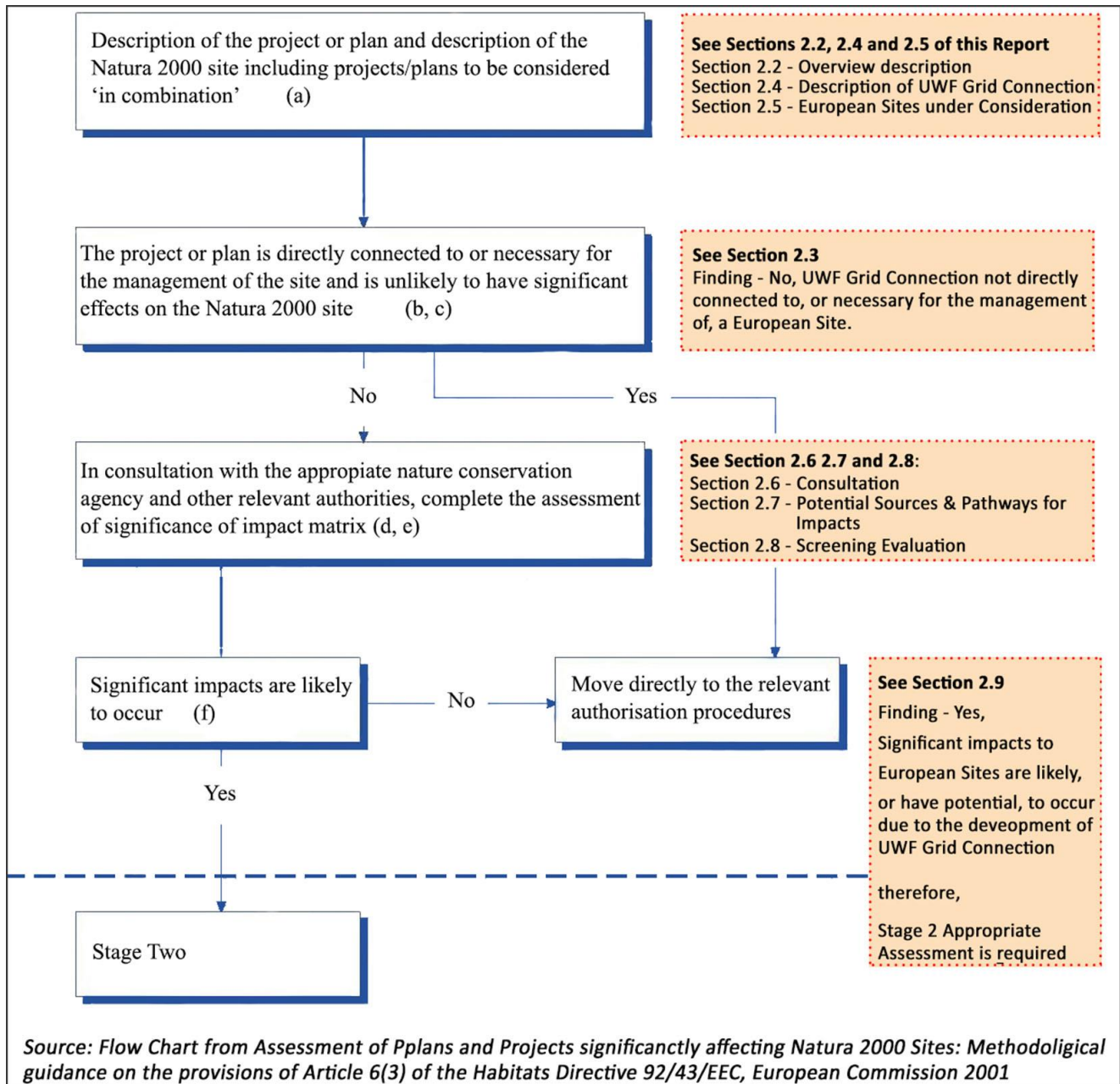


Source: Flow Chart and Description Notes from Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission 2001

2 STAGE 1: SCREENING

2.1 Screening Evaluation Process

The Screening process examines the potential for the UWF Grid Connection project, either alone or in combination with other projects or plans, upon a European site and considers whether it can be objectively concluded that these effects will not be significant. The Screening evaluation comprises four steps, as outlined in the diagram below:



2.2 Screening: Overview of the UWF Grid Connection Project

2.2.1 Overview

Upperchurch Windfarm (UWF) has already received planning permission but is not yet constructed. This application is for grid connection works (UWF Grid Connection) to connect the windfarm to the national electricity system.

UWF Grid Connection comprises two main parts;

- the first part is the proposed '**110kV UGC**' which is a 30.5km long underground electrical cabling network at high voltage (110 kilovolts (kV)), to connect the already consented Upperchurch Windfarm substation at Knockcurraghbola Commons townland to a new proposed substation at Mountphilips townland;
- the second part is a proposed 110kV electrical substation '**Mountphilips Substation**', which will manage and control the power coming (via the 110kV UGC) from the consented Upperchurch Windfarm, and from Mountphilips Substation the power will be transported to national electricity system, at an adjacent point on the existing Killonan to Nenagh 110kV overhead line.

2.2.2 Purpose

The purpose of UWF Grid Connection is to connect the Consented UWF Substation at Upperchurch Windfarm to the now proposed substation at Mountphilips. The Mountphilips substation will in turn, be connected to the existing, adjacent Killonan - Nenagh 110kV overhead line and thereby export electricity, from Upperchurch Windfarm when constructed and operational, to the national grid.

2.3 Screening: Is the Project Directly Connected to or Necessary for Management of a European Site?

For a project or plan to be 'directly connected with or necessary to the management of the site', the 'management' component must refer to management measures that are for conservation purposes, and the 'directly' element refers to measures that are solely conceived for the conservation management of a site and not direct or indirect consequences of other activities.

Finding: No, UWF Grid Connection is not directly connected to or necessary for the management of any European Site.

2.4 Screening: Description of the UWF Grid Connection Project

2.4.1 Overview of UWF Grid Connection

Mountphilips Substation: The new substation is proposed for a location adjacent to the existing Killonan - Nenagh 110kV overhead line in agricultural grassland in Mountphilips townland, 2km north of Newport, 4km south of Birdhill, 17km north east of Limerick City and 23km west of the Upperchurch Windfarm.

The new 110kV electrical substation will comprise a compound, measuring 10290m² in area, which will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightning protection monopoles and other electrical apparatus. The compound will be surrounded by a secure palisade fence. The substation compound will be located c.130m east of the Killonan – Nenagh 110kV overhead line, at its closest point. The new substation will also comprise 2 No. End Masts which will be constructed under the Killonan – Nenagh 110kV overhead line, these End Masts will be connected to the overhead line and will also connect to the electrical equipment in the compound via underground cable.

Mountphilips - Upperchurch 110kV UGC: The 110kV UGC will connect Mountphilips Substation to the Consented UWF Substation at the consented Upperchurch Windfarm, through the installation of underground cables. The 110kV UGC is 30.5km in length, and is **mostly located along the Regional Road R503 (Limerick to Thurles Road)**. The route follows the Local Road network from the entrance off the public road for Mountphilips Substation at Coole, to a point on the eastern outskirts of Newport Town at Newport GAA Club, thus avoiding Newport Town. From that point, the route follows the R503 eastwards for 22.1km as far as the turn-off at Knockmaroe townland, onto Local Road L2264-50 (Borrisoleigh Road). Then along the local road network, and then along a private paved road to the Consented UWF Substation in Knockcurraghbola Commons. This route west to east is through the townlands of Mountphilips, Coole, Freagh, Foildarrig, Oakhampton, Rockvale, Mackney (O'Brien), Mackney (Bourke), Ahane, Newross, Castlewaller, Carrowkeale, Tullow, Cooldrisla, Derryleigh, Kilnacappagh, Scraggeen, Derrygareen, Inchadrinagh, Knockancullenagh, Fanit, Lackamore, Tooreenbrien Upper, Tooreenbrien Lower, Reardnogy Beg, Reardnogy More, Shanballyedmond, Baurnadomeeny, Coonmore, Foildarragh, Kilcommon, Loughbrack, Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons.

The 110kV UGC will be installed in trenches, which will be laid with ducts through which the electrical cables and communications cables will be pulled. The cable lengths will be pulled through and joined together in joint bay chambers at 38 No. Joint Bay locations. The ducts will be surrounded by concrete and the trench backfilled with aggregate. Outside the Mountphilips Substation site the top of the trench will be reinstated with road surfacing material according to Local Authority specifications. The only surface expression of the 110kV UGC will be the man-hole type covers over the Joint Bays and the over-ground identification marker posts and marker plates.

Ancillary Works at Mountphilips Substation site will support the construction of UWF Grid Connection and will include the construction and use of a Temporary Compound at Mountphilips; construction of a new Permanent Entrance at Coole townland (including the provision of sightlines at an existing farm entrance) and the construction of a Permanent Access Road from the new entrance to the proposed substation at Mountphilips townland; ancillary works will also include replacement of watercourse crossing structures; installation of drainage systems at Mountphilips Substation, around the Temporary Compound and along the new Access Road; fencing; provision of electricity supply to Mountphilips substation; excavation and

reinstatement and disposal of spoil; hedgerow/tree removal at Mountphilips and hedgerow replanting and site reinstatement.

Relevant Figures: *(contained in Appendix A9 Accompanying Figures)*

AA Figure 1: Location of the UWF Grid Connection on OSI Discovery Mapping

AA Figure 2: Layout of the 110kV UGC outside of the Mountphilips Substation Site (Overview & Maps 1 to 4)

2.4.2 UWF Grid Connection: Overview of the Construction Stage

The construction process for the UWF Grid Connection is a relatively straightforward civil build. Construction personnel will work on a number of crews or teams, with one crew working at the Mountphilips Substation compound and a number of crews at different locations along the route of the 110kV UGC. The workers will arrive and depart daily to and from the temporary compound at Mountphilips Substation site, parking spaces will be provided at the temporary compound. The various crews will then be transported to the specific works location by means of 'crew-cab' 4x4 vehicles or similar. Bulk deliveries of materials will be delivered to the temporary compound and stored there until needed. Materials needed at works locations will be transported from the Temporary Compound by way rigid body vehicle or tractor and trailer. Aggregate and concrete will be delivered directly to works locations.

All construction works will take place within the construction works area boundary. The 'Mountphilips Substation site' located in the townlands of Mountphilips and Coole, consists of the area between the End Masts and the widened site entrance off the public road, and includes the proposed Mountphilips Substation Compound, End Masts, new access road, permanent entrance, the ancillary works and the western extent of the 110kV UGC within this area. The construction works area boundary at the Mountphilips Substation site will be an area larger than the permanent footprint. Outside of the Mountphilips Substation site, all 110kV UGC works will be carried out entirely in (or from) the road pavement/built environment, and with the exception of culvert replacement works, the construction works area boundary will not extend into the verges/natural environment. At culvert replacement works location; a minimal area of roadside vegetation may be required to be cleared, and then reinstated, to facilitate the replacement of the culvert. However, all works will take place from the road pavement.

2.4.3 UWF Grid Connection: Overview of the Operational Stage

Following commissioning, the UWF Grid Connection will be taken in charge by ESB Networks and both the Mountphilips Substation and the Mountphilips – Upperchurch 110kV UGC will become part of the national electricity network. The new asset will be managed and operated by ESB Networks.

Operational Personnel & Activities: It is expected that scheduled inspection and maintenance activities at Mountphilips Substation, testing of the 110kV UGC at joint bay locations (link boxes) and visual inspections along the route of the 110kV UGC route will be carried out by ESB Networks personnel (2 men crews) over a total of 13 days per year. Very infrequent planned maintenance or unplanned repairs may be required for the 110kV UGC, these are expected to comprise the opening of a number of joint bays to pull out/replace cables, these works are expected to involve the reopening of some (not all) Joint Bay chambers and may also include cable pulling activities from the joint bay chambers, and reinstatement of road surface over the chambers, following these works. It is expected that one crew with c.6 ESB Networks personnel would be required for 1 week – 2 weeks duration, depending on the nature of the repairs work.

Duration of the Operational stage: The UWF Grid Connection will be operated on a **permanent** basis by ESB Networks.

2.4.4 Application of Protection Measures in the Screening Evaluation

The Screening evaluation to inform the AA process, presented in Section 2.8 and Section 2.9 below is **carried out in the absence of any protective measures** for UWF Grid Connection which may be required or prescribed to avoid or reduce harmful effects on designated European Sites.

2.4.5 Other Projects included in Screening evaluations in relation to in-combination impacts

The following Other Projects are included in the Screening evaluation in relation to in-combination impacts with UWF Grid Connection:

All of the Other Element projects of the Whole UWF Project are included in the cumulative evaluations – i.e.

- Upperchurch Windfarm (consented),
- UWF Replacement Forestry (consented),
- UWF Related Works (currently under appeal to An Bord Pleanála), and
- UWF Other Activities (do not require planning).

and,

Other unrelated projects which are located within the water sub-catchments of the UWF Grid Connection or within 2km of the Slievefelim to Silvermines SPA boundary and which were scoped in for cumulative evaluation (see [Appendix A2 Scoping of Other Unrelated Projects](#)), these projects are:

- existing Rear Cross Quarry,
- existing Milestone Windfarm,
- consented Newport Town Park,
- consented Castlewaller Windfarm (and potential grid connection),
- *potential* Bunkimalta Windfarm (and consented grid connection),
- proposed Quarry at Curraghduff, *and*

the following **land-use activities** which occur in the surrounding area are also relevant to the cumulative evaluations:

- Agriculture
- Forestry
- Turf-Cutting.

2.5 European Sites under consideration

2.5.1 Distance of the Development to European Sites

For the UWF Grid Connection, a zone of impact, identified as the range of potential project effects extending from the proposed construction and operational elements, has been assigned. This takes account of all parts of the UWF Grid Connection project and the pathways of connectivity to designated European Sites within this zone.

Taking account of the project impact pathways and the sensitivities of designated European Sites in the wider area, it was determined that pathways for connectivity were limited to those sites occurring within a 15km radial distance. This has been applied around UWF Grid Connection and further is extended to include a 15km area around all of the Other Elements of the Whole UWF Project in order to establish whether or not the UWF Grid Connection either alone or in-combination with the Other Elements of the Whole UWF Project is likely, or has potential, to have a significant effect on a European Site.

There are 23 European Sites within the extended Study Area - nineteen Special Areas of Conservation (SAC) and four Special Protection Area (SPA for birds). The locations of these European Sites are illustrated in **AA Figure 3: European Sites within the extended Study Area for UWF Grid Connection**, with the distances from the Development provided in **Table 1**. Those distances presented which are greater than 15km refer to European Sites which come under consideration for cumulative/in combination effects with other elements of the Whole UWF Project.

Table 1: Proximity of European Sites to the UWF Grid Connection project

	European Site	Distance from UWF Grid Connection
1	Slievefelim to Silvermines Mountain SPA (004165)	0m
2	Lower River Shannon SAC (002165)	0 m
3	Lower River Suir SAC (002137)	4.3 km
4	Anglesey Road SAC (002125)	2.9 km
5	Bolingbrook Hill SAC (002124)	8.5 km
6	Keeper Hill SAC (001197)	4.3 km
7	Silvermine Mountain SAC (000939)	9.4 km
8	Silvermine Mountain West SAC (002258)	7.7 km
9	Philipston Marsh SAC (001847)	12.0 km
10	Kilduff, Devilsbit Mountain SAC (000934)	16.8 km
11	Clare Glen SAC (000930)	1.6 km
12	Glenstal Wood SAC (001432)	2.6 km
13	Slieve Bernagh Bog SAC (002312)	11.5 km
14	Lough Derg, North-East Shore SAC (002241)	26.3 km
15	Glenomra Wood SAC (001013)	11.3 km

	European Site	Distance from UWF Grid Connection
16	Tory Hill SAC (000439)	26 km
17	Ratty River Cave SAC (002316)	24.5 km
18	Askeaton Fen Complex SAC (002279)	31 km
19	Barrigone SAC (000432)	44 km
20	Curraghchase Woods SAC (000174)	33.4 km
21	Lough Derg (Shannon) SPA (004058)	10.2 km
22	River Shannon and River Fergus Estuaries SPA (004077)	16.9 km
23	Stack's to Mullaghareirk Mountains, West Limerick Hills & Mount Eagle SPA (004161)	50.9 km

The Qualifying Interests/Special Conservation Interests and locational context for each of the 23 European Sites examined in this Screening Report are provided in **Table 2**.

The Site Synopsis and Conservation Objectives for each site are available in full on the National Parks & Wildlife Service website at <https://www.npws.ie/protected-sites>

2.5.2 Description of European Sites under consideration

A brief description of the 23 no. European Sites within the extended study is provided in Table 2 below. The Site Synopsis and Conservation Objectives for each site are available in full on the National Parks & Wildlife Service website at <https://www.npws.ie/protected-sites>

Table 2: Description of European Sites within the study area for UWF Grid Connection

European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code * denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on
1 Slievefelim to Silvermines SPA (004165)	Hen Harrier (<i>Circus cyaneus</i>) (A082)	This SPA is an upland site located in Counties Tipperary and Limerick. It includes the peaks Keeper Hill, Slieve Felim, Knockstanna, Knockappul, Mother Mountain, Knockteige, Cooneen Hill and Silvermine Mountain. The site is underlain mainly by sandstones of Silurian age. Several important rivers rise within the site, including the Mulkear, Bilboa and Clare. The Slievefelim to Silvermines SPA is of ornithological importance because it provides nesting and foraging habitat for breeding Hen Harrier. The annex I species Merlin and Peregrine have also been recorded on site.	Sourced from NPWS Conservation Objectives for Slievefelim to Silvermines Mountains SPA [004165]. Generic Version 6.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 21/02/2018]
2 Lower River Shannon SAC (002165)	Alluvial Forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)* (91E0) Coastal Lagoons* (1150) Sandbanks which are slightly covered by sea water all the time (1110) Estuaries (1130) Mudflats and sand flats not covered by seawater at low tide (1140) Large shallow inlets and bays (1160) Reefs (1170)	This very large site stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head. The site encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allahaun, Owveg, Clydagh, Caher, Breanagh and Glenacarne. Rivers within the sub-catchment of the Mulkear include the	Sourced from NPWS Conservation Objectives: Lower River Shannon SAC 002165. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [Version dated 07/08/2012]

European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code * denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on 25/06/2019
	<p>Perennial Vegetation of stony banks (1220) Vegetated sea cliffs of the Atlantic and Baltic coasts (1230) <i>Salicornia</i> and other annuals colonizing mud and sand (1310) Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) (1330) Mediterranean salt meadows (<i>Juncetalia maritimi</i>) (1410) Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (3260) <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) (6410) Annex II Species: Freshwater Pearl-Mussel (<i>Margaritifera margaritifera</i>)(1029) Atlantic Salmon (<i>Salmo salar</i>) (only in fresh water) (1106) Sea Lamprey (<i>Petromyzon marinus</i>) (1095) Brook Lamprey (<i>Lampetra planeri</i>) (1096) River Lamprey (<i>Lampetra fluviatilis</i>) (1099) Bottlenose Dolphin (<i>Tursiops truncatus</i>) (1349) Otter (<i>Lutra lutra</i>) (1355)</p>	<p>Killeenagarriff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia. This site contains the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. This site supports more wintering wildfowl and waders than any other site in the country and supports a large number of migratory birds.</p>	

	European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on 25/06/2019
3	Lower River Suir SAC (002137)	<p>Alluvial Forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)* (91E0)</p> <p>Yew Woodlands <i>Taxus baccata</i> woods of the British Isles* (91J0)</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) (1330)</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) (1410)</p> <p>Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (3260)</p> <p>Hydrophilous tall herb fringe communities of plains and of the montane (6430)</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles (91A0)</p> <p>Freshwater Pearl-Mussel (<i>Margaritifera margaritifera</i>) (1029)</p> <p>White-clawed Crayfish (<i>Austropotamobius pallipes</i>)(1092)</p> <p>Sea Lamprey (<i>Petromyzon marinus</i>) (1095)</p> <p>Brook Lamprey (<i>Lampetra planeri</i>) (1096)</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) (1099)</p> <p>Twaites Shad (<i>Alosa fallax fallax</i>) (1103)</p> <p>Salmon (<i>Salmo salar</i>) (1106)</p> <p>Otter (<i>Lutra lutra</i>) (1355)</p>	<p>This SAC consists of the freshwater stretches of the River Suir immediately south of Thurles, the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford, and many tributaries including the Clodiagh in Co. Waterford, the Lingaun, Anner, Nier, Tar, Aherlow, Multeen and Clodiagh in Co. Tipperary. The Suir and its tributaries flow through the counties of Tipperary, Kilkenny and Waterford. The presence of two legally protected plants (Flora (Protection) Order, 1999) and the ornithological importance of the site adds to the ecological interest and importance of the site.</p>	<p>Sourced from NPWS Conservation Objectives: Lower River Suir SAC 002137. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 28/03/2017]</p>

European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on
4 Anglesey Road SAC (002125)	Species-rich <i>Nardus</i> Grassland on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)* (6230)	Anglesey Road is a steep-sided valley which extends approximately 1.8 km along the Multeen River to the north of Hollyford village, Co. Tipperary. It contains a range of habitats and species. It is of particular importance for the good quality examples of species rich, unimproved, upland grassland found.	Sourced from NPWS Conservation objectives for Anglesey Road SAC [002125]. Generic Version 6.0.. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 21/02/2018]
5 Bolingbrook Hill SAC (002124)	Species-rich <i>Nardus</i> Grassland on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)* (6230) Northern Atlantic Wet Heath with <i>Erica tetralix</i> (4010) European Dry Heaths (4030)	This upland SAC is approximately 6 km south-east of Silvermines village in Co. Tipperary. It comprises Bolingbrook Hill and the nearby eastern slopes of Silvermine Mountains in Curryquin and Mucklin townlands. Good quality examples of species-rich, unimproved upland grassland are present within this site	Sourced from NPWS Conservation objectives for Bolingbrook Hill SAC [002124]. Generic Version 6.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 05/07/2018]
6 Keeper Hill SAC (001197)	Blanket Bogs (* if active bog) (7130) Northern Atlantic Wet Heath with <i>Erica tetralix</i> (4010)	This SAC is situated between the Silvermines and Slieve Felim Mountains, 13 km south of Nenagh in Co. Tipperary. Consisting of a steep peak of Old Red Sandstone is notably higher than any of the surrounding upland areas. The site includes the summit and slopes above 250 m which have not yet been afforested. Peregrine Falcon, an Annex I species breeds within the site. Red Grouse occur amongst the tall heather east of the summit	Sourced from NPWS Conservation Objectives: Keeper Hill SAC 001197. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. [Version dated 17/10/2017]
7 Silvermine Mountain SAC (000939)	Species-rich <i>Nardus</i> Grassland on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)* (6230) Northern Atlantic Wet Heath with <i>Erica</i>	This small site is situated on the northern slopes of the Silvermine Mountains, 1 km south-east of Silvermines village in Co. Tipperary. The geology of the area is sandstone of different ages - older Silurian on the central part of the mountain, while	Sourced from NPWS Conservation objectives for Silvermine Mountains SAC [000939]. Generic Version 6.0. Department of Arts,

European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code * denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on
	<i>tetralix</i> (4010)	the outer parts are composed of yellowish and red sandstones of Devonian age. The rare Small-white Orchid is also present on site and adds significantly to the value of the site.	Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 05/07/2018]
8 Silvermine Mountain West SAC (002258)	Northern Atlantic Wet Heath with <i>Erica tetralix</i> (4010) European Dry Heath (4030) Calaminarian grasslands of the <i>Violetalia calaminariae</i> (6130)	This SAC is situated to the north of Keeper Hill, about 10 km south of Nenagh in Co. Tipperary. A ridge composed of Old Red Sandstone is visibly very prominent in the landscape when viewed from the Nenagh to Limerick road. The site is of conservation importance for its heath and grassland vegetation, and as a foraging area for Hen Harrier, and is one of the only extensive unplanted uplands remaining in north Tipperary.	Sourced from NPWS Conservation objectives for <i>Silvermines Mountains West SAC [002258]. Version 1</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 10/11/2017]
9 Philipston Marsh SAC (001847)	Transition mires and quaking bogs (7140)	This site is a small wetland and represents one of only two examples of calcareous fen and mire vegetation in the Mulkear River catchment.	Sourced from NPWS Conservation objectives for <i>Philipston Marsh SAC [001847]. Version 1.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 12/01/2018]
10 Kilduff, Devilsbit Mountain SAC (000934)	Species-rich <i>Nardus</i> Grassland on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)* (6230) European Dry Heaths (4030)	This upland site is situated approximately 6 km north-west of Templemore in Co. Tipperary. It comprises the summit of Devilsbit Mountain and much of the eastern side of the ridge which extends northwards to Kilduff Mountain. The rare and protected Small-white Orchid is also present on site and adds significantly to the value of the site.	Sourced from NPWS Conservation objectives for <i>Kilduff, Devilsbit Mountain SAC [000934]. Generic Version 6.0.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 05/07/2018]

	European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on
11	Clare Glen SAC (000930)	(Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles (91A0) (1421) Killarney Fern (<i>Trichomanes speciosum</i>)	This SAC lies on the Limerick - Tipperary border, in the western foothills of the Slievefelim Mountains, about 10 km north-west of Cappamore. The glen was formed by the action of the Clare River cutting into the Old Red Sandstone. The site comprises the wooded river valley. The woodland, although planted with many exotic trees, is mature and conforms to a type listed on Annex II of the E.U. Habitats Directive. The presence of a number of rare and scarce species including bryophytes and fungi adds further to its importance.	Sourced from NPWS (2016) <i>Site Synopsis for Clare Glen SAC [000930]. Generic Version 1.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 16/05/2018]
12	Glenstal Wood SAC (001432)	Killarney Fern (<i>Trichomanes speciosum</i>) (1421)	This SAC lies in the western foothills of the Slievefelim Mountains, about 8 km north-west of Cappamore, Co. Limerick. The glen has been cut into Old Red Sandstone and runs in a north-easterly direction for about 2 km, eventually becoming a steep-sided rocky ravine	Sourced from NPWS <i>Conservation Objectives for Glenstal Wood SAC [001432]. Version 1.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 15/05/2018]
13	Slieve Bernagh Bog SAC (002312)	Blanket Bogs (* if active bog) (7130) Northern Atlantic Wet Heath with <i>Erica tetralix</i> (4010) European Dry Heath (4030)	The Slieve Bernagh Bog is situated to the west of Lough Derg, Co. Clare. The site comprises the Slieve Bernagh mountain range, with the highest peaks at Moylussa (532 m) and Cragnamurragh (526 m), and the surrounding peatlands that flank its northern slopes.	Sourced from NPWS <i>Conservation Objectives: Slieve Bernagh Bog SAC 002312. Version 1.</i> National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 18/08/2016]
14	Lough Derg,	Calcareous fens with <i>Cladium mariscus</i> and	Lough Derg, the lowest order lake on the River Shannon, is one	Sourced from NPWS (2016)

	European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on
	North-East Shore SAC (002241)	species of the Caricion davallianae* (7210) Limestone Pavement* (8240) Alluvial Forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)* (91E0) Yew Woodlands <i>Taxus baccata</i> woods of the British Isles* (91J0) Alkaline Fens (7230) Juniper Scrub - <i>Juniperus communis</i> formations on heaths or calcareous grasslands (5130)	of the largest bodies of freshwater in Ireland. The site includes the northern shore of the lake from the mouth of the Cappagh River in the north-west to just below Black Lough at the north-eastern shore. The greater part of this site lies on Carboniferous limestone.	<i>Conservation objectives for Lough Derg, North-east Shore SAC [002241]. Generic Version 6.0.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [[Version dated 24/04/2019]]
15	Glenomra Wood SAC (001013)	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles (91A0)	Glenomra Wood is a deciduous semi-natural woodland located in south-east Co. Clare. The dominant tree is Downy Birch (<i>Betula pubescens</i>). This is mixed with Sessile Oak (<i>Quercus petraea</i>), Ash (<i>Fraxinus excelsior</i>) and Beech (<i>Fagus sylvatica</i>) throughout.	Sourced from NPWS <i>Conservation objectives for Glenomra Wood SAC [001013]. Generic Version 6.0.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 19/06/2018]
16	Tory Hill SAC (000439)	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) (6210) <i>Cladium</i> Fens - Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae* (7210) Alkaline Fens (7230)	Tory Hill is an isolated, wooded limestone hill situated about 2 km north-east of Croom, Co. Limerick. It is a prime example of a limestone hill set amongst a region of volcanic intrusions. The hill is of geomorphological interest for the end-moraine and for icemarks visible on the solid rock. The site includes Lough Nagirra and its associated wetland vegetation, located to the north and north-east of Tory Hill.	Sourced from NPWS <i>Conservation objectives for Tory Hill SAC [000439]. Generic Version 6.0.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 03/08/2018]
17	Ratty River	Caves not open to the public (8310)	This site includes a cave that is an annex I habitat and provides	Sourced from NPWS (2016)

	European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on
	Cave SAC (002316)	Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) (1303)	winter hibernation conditions for an internationally important number of Lesser Horseshoe Bat. There is also a summer roost for Lesser Horseshoe bats within this site.	<i>Conservation objectives for Ratty River Cave SAC [002316]. Generic Version 6.0.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 30/07/2018]
18	Askeaton Fen Complex SAC (002279)	<i>Cladium</i> Fens - Calcareous fens with <i>Cladium mariscus</i> species of the Caricion davallianae * (7210) Alkaline Fens (7230)	Askeaton Fen Complex consists of a number of small fen areas to the east and southeast of Askeaton in Co. Limerick. This area has a number of undulating hills underlain by Lower Carboniferous Limestone. At the base of the hills a series of fens/reedbeds/loughs can be found, often in association with marl or peat deposits. At the south-east of Askeaton, both Cappagh and Ballymorisheen fens are surrounded by large cliff-like rocky limestone outcrops.	Sourced from NPWS <i>Conservation objectives for Askeaton Fen Complex SAC [002279]. Version 1.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 18/05/2018]
19	Barrigone SAC (000432)	Orchid-rich Calcareous Grassland - Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)* (6210) Limestone Pavement* (8240) Juniper Scrub- <i>Juniperus communis</i> formations on heaths or calcareous grasslands (5130) (1065) Marsh Fritillary (<i>Euphydryas aurinia</i>)	This SAC is situated approximately 5 km west of Askeaton, Co. Limerick. The site comprises an area of dry, species-rich, calcareous grassland. The underlying limestone outcrops occasionally, and the proximity of the site to the Shannon Estuary adds a maritime influence. A range of scrub types are present including Juniper Scrub. A number of factors, including substrate, bedrock, microclimate and maritime influence, contribute to the floristic richness at Barrigone. The presence of rare species of plant and invertebrate highlight the site's conservation value.	Sourced from NPWS <i>Conservation objectives for Barrigone SAC [000432]. Generic Version 6.0.</i> Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 15/02/2019]

	European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code *denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on
20	Curragh-chase Woods SAC (000174)	Alluvial Forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)* (91E0) Yew Woodlands <i>Taxus baccata</i> woods of the British Isles* (91J0) Lesser Horseshoe Bat <i>Rhinolophus hipposideros</i> (1303)	This site is situated approximately 7 km east of Askeaton in Co. Limerick. The area is characterised by glacial drift deposits over Carboniferous limestone. The site consists of mixed woodland and a series of wetlands. The site provides hibernation opportunities and foraging habitat for Lesser Horseshoe bat.	Sourced from NPWS Conservation Objectives for Curraghchase Woods SAC [000174]. Generic Version 6.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 30/07/2018]
21	Lough Derg (Shannon) SPA (004058)	Cormorant (<i>Phalacrocorax carbo</i>) (A017) Tufted Duck (<i>Aythya fuligula</i>) (A061) Goldeneye (<i>Bucephala clangula</i>) (A067) Common Tern (<i>Sterna hirundo</i>) (A193) Wetland and Waterbirds (A999)	Lough Derg lies within counties Tipperary, Galway and Clare and is the largest of the River Shannon Lakes. The greater part of the lake lies on Carboniferous limestone while the narrow southern section is underlain by Silurian strata. The site is of high ornithological importance as it supports nationally important breeding populations of Cormorant and Common Tern. In winter, it has nationally important populations of Tufted Duck and Goldeneye. The annex 1 species Whooper Swan, Greenland White-fronted Goose, Hen Harrier and Common Tern have also been recorded on site.	Sourced from NPWS Conservation Objectives for Lough Derg (Shannon) SPA [004058]. Generic Version 6.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 21/02/2018]
22	River Shannon and Fergus Estuaries SPA (004077)	Cormorant (<i>Phalacrocorax carbo</i>) (A017) Whooper Swan (<i>Cygnus cygnus</i>) (A038) Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) (A046) Shelduck (<i>Tadorna tadorna</i>) (A048) Wigeon (<i>Anas penelope</i>) (A050) Teal (<i>Anas crecca</i>) (A052) Pintail (<i>Anas acuta</i>) (A054) Shoveler (<i>Anas clypeata</i>) (A056)	The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry. This site is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of four species; Light-bellied Brent Goose, Dunlin, Black-tailed Godwit and Redshank. Furthermore 17 species have wintering populations of national importance.	Sourced from NPWS Conservation Objectives: River Shannon and River Fergus Estuaries SPA 004077. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [Version dated 17/09/2012]

	European Site Name and Code	Qualifying Interest /Special Conservation Interest and Code * denotes a priority habitat	Summary Description (from Site Synopsis)	Data Source Last accessed online on 25/06/2019
		<p>Scaup (<i>Aythya marila</i>) (A062) Ringed Plover (<i>Charadrius hiaticula</i>) (A137) Golden Plover (<i>Pluvialis apricaria</i>) (A140) Grey Plover (<i>Pluvialis squatarola</i>) (A141) Lapwing (<i>Vanellus vanellus</i>) (A142) Knot (<i>Calidris canutus</i>) (A143) Dunlin (<i>Calidris alpina</i>) (A149) Black-tailed Godwit (<i>Limosa limosa</i>) (A156) Bar-tailed Godwit (<i>Limosa lapponica</i>) (A157) Curlew (<i>Numenius arquata</i>) (A160) Redshank (<i>Tringa totanus</i>) (A162) Greenshank (<i>Tringa nebularia</i>) (A164) Black-headed Gull (<i>Chroicocephalus ridibundus</i>) (A179) Wetland and Waterbirds (A999)</p>	<p>The site holds a nationally important breeding population of Cormorant. Three annex I species are listed regularly; Whooper Swan, Golden Plover and Bar-tailed Godwit. Parts of the River Shannon and River Fergus Estuaries SPA are Wildfowl Sanctuaries.</p>	
23	Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	<p>Hen Harrier (<i>Circus cyaneus</i>) (A082)</p>	<p>This is a very large site centred on the borders between the counties of Cork, Kerry and Limerick. The mountains; Knockfeha, Mount Eagle, Knockanefune, Garraunbaun, Taur, Rock Hill, Knockacummer, Mullaghmuish, Knight's Mt, Ballincollig Hill, Beennageeha Mt, Sugar Hill, Knockanimpuba and Knockathea, amongst others are included in this site. Many rivers rise within the site, notably the Blackwater, Owentaragin, Owenkeal, Glenlara, Feale, Clydagh, Allaghaun, Allow, Oolagh, Galey and Smerlagh. The site is of ornithological importance because it provides nesting and foraging habitat for breeding Hen Harrier. The annex I species Merlin and Short-eared Owl have also been recorded on site.</p>	<p>Sourced from NPWS Conservation Objectives for Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA [004161]. Generic Version 6.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 21/02/2018]</p>

2.6 Sources of Information & Consultation

2.6.1 Consultation

Consultation (including in relation to scoping) with statutory consultees and other relevant bodies between January 2019 and July 2019. Consultees included the Developments Application Unit (the Manager), National Parks & Wildlife Services (Ms. Aine Lynch) and Inland Fisheries Ireland (Michael Fitzsimmons and Jane Gilleran). Consultation with these statutory bodies, including the information provided and feedback received, is summarised in Table 3:

Table 3: Consultation with Statutory Bodies

Date	Consultees	Action
18/01/2019	NPWS	Phone call to Áine Lynch (NPWS) on Jan 18 th responded to on January 22 nd , 2019 regarding any possible Hen Harrier nest locations along the new proposed route of the 110kV UGC or near to the consented Upperchurch Windfarm or UWF Related Works.
13/03/2019	Development Applications Unit (DAU)	Consultation letter describing the proposed revised UWF Grid Connection development and associated mapping sent to Development Applications Unit.
13/03/2019	Inland Fisheries Ireland (IFI)	Consultation letter describing the proposed revised UWF Grid Connection development and associated mapping sent to Development Applications Unit.
19/03/19	Inland Fisheries Ireland (IFI)	Email exchange of maps with Mike Fitzsimons (IFI), detailing watercourse crossing methods and Outline Construction Methodologies (OCMs).
21/03/2019	Inland Fisheries Ireland (IFI)	Onsite meeting with Mike Fitzsimons (IFI), methodology for watercourse crossing works discussed, watercourse crossing points visit with particular focus on bridge crossings along the 110kV UGC route.
22/05/2019	Development Applications Unit (DAU)/IFI	Consultation letter describing the final route of the 110kV UGC with the 110kV UGC avoiding the Newport town and map showing same, sent to Jane Gilleran & Michael Fitzsimons, Inland Fisheries Ireland.
05/06/2019	Development Applications Unit (DAU)	Email sent to DAU requesting confirmation of receipt of consultation letter originally sent on 22/05/2019
06/06/2019	Inland Fisheries Ireland (IFI)	Consultation letter describing the final route of the 110kV UGC with the 110kV UGC avoiding the Newport town and map showing same, sent to Jane Gilleran & Michael Fitzsimons, Inland Fisheries Ireland.
09/08/19	Inland Fisheries Ireland (IFI)	Consultation letter describing the final route of the 110kV UGC with the 110kV UGC avoiding the Newport town and map showing same, sent to Jane Gilleran & Michael Fitzsimons, Inland Fisheries Ireland.

2.6.2 Sources of Information

In addition to consultation with NPWS and IFI, other sources of Information, which were considered during this Screening evaluation, included both desktop studies and fieldwork:

- Conservations Objectives, Site Synopsis and Site boundary information for the European Sites within with study area;
- Location and layout mapping for the UWF Grid Connection project;
- Detailed description of the UWF Grid Connection project, and a review of the descriptions of the Other Elements of the Whole UWF Project, including construction methodologies;
- EPA online mapping for watercourse features (<https://gis.epa.ie/EPAMaps/>);
- Supporting ecological receptor information described in full in **Volume C2 Chapter 8: Biodiversity** of the UWF Grid Connection EIA Report October 2019.
- Mitigation Measures for UWF Grid Connection (including the Project Design Measures, Surface Water Management Plan, Invasive Species Management Plan, Environmental Emergency Response Procedures, Best Practice Measures, along with a review of the Best Practice Survey Methods used to inform the Biodiversity evaluation (considered at Stage 2 of this Appropriate Assessment process)
- **Volume D: Environmental Management Plan** for UWF Grid Connection, along with
- Site visits and field surveys for the UWF Grid Connection site, and
- Review of the descriptions of the Other Elements of the Whole UWF Project, including and
- Review of planning documentation and environmental reports (including Appropriate Assessment reporting; construction methodologies; supporting survey information from the Upperchurch Windfarm (2013), and from the previous (since refused) UWF Grid Connection (2018), and from the UWF Related Works appeal to An Bord Pleanála documentation (February 2019)) for the Other Elements of the UWF Grid Connection (**Volume F: Reference Documents**)
- Review of planning documentation and environmental reports for other unrelated projects i.e. Milestone Windfarm, Newport Town Park, Rearcross Quarry, Curraghduff Quarry, Castlewaller Windfarm, and Bunkimalta Windfarm, available on Tipperary County Council website, planning reference numbers for unrelated projects are listed in **Appendix A2 Scoping of Other Unrelated Projects**.

2.7 Potential Sources, Pathways and Timing of Impacts to European Sites (SACs & SPAs)

The Screening evaluation is based on a conceptual site model which identifies potential impact source-pathways between the UWF Grid Connection project and European Sites.

This Section 2.7 sets out the potential sources, pathways and timings for impacts to SAC and SPA European Sites, the potential impact/pathway connectivity of the UWF Grid Connection to the SAC and SPA sites, and the other projects which are included in the screening evaluations in relation to potential in-combination effects to SAC and SPA sites with UWF Grid Connection. These impact/pathways are then evaluated for each SAC and SPA in Section 2.8 and 2.9.

2.7.1 Potential Sources, Pathways and Timing of Impacts to SAC Qualifying Interest

2.7.1.1 Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC

Impact Sources: instream works; culvert replacement works, parapet works; movement of soils and machinery; excavation works; use of hydrocarbons & cement-based compounds; reinstatement works.

Pathway: soils, surface water, water flowpaths, movement of soils and machinery, direct contact

Potential Impact/Pathway Connectivity: Direct effects to Qualifying Interest habitats within an SAC can only occur if the UWF Grid Connection location occurs within the boundary of the SAC and overlaps the extent of the Qualifying Interest habitat.

Timing of Impacts: The potential for impact relates to the construction stage, when groundworks and use of machinery will take place for a limited duration. This stage is therefore screened in.

Once constructed, the UWF Grid Connection project will require minimal maintenance, mainly involving scheduled maintenance within the Mountphilips Substation compound along with annual visual inspections of underground 110kV UGC route and periodic testing from link box chambers at joint bay locations, along exiting roadways. Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) joint bay locations and reinstatement of road surface over the joint bay chambers following works in joint bay chambers.

Due to the negligible and generally non-intrusive nature of operational activities, and the absence of overlap of the operational UWF Grid Connection with Qualifying Interest habitats within any SAC, it is considered that there is no potential for the operational UWF Grid Connection to cause significant direct effects to Qualifying Interest Habitats, within any SAC Site. The operational stage is therefore screened out in relation to direct effects.

2.7.1.2 Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC

Impact Sources: instream works; culvert replacement works; movement of soils and machinery; excavation works; use of hydrocarbons & cement-based compounds; reinstatement works.

Pathway: soils, surface water, water flowpaths, movement of soils and machinery, direct contact

Potential Impact/Pathway Connectivity: Indirect effects via reductions in water quality has potential to occur to any SAC sites downstream within the catchments associated with the UWF Grid Connection.

Invasive species can also be spread downstream or upstream within a catchment, and via machinery/vehicle movements along transport routes, with potential to affect habitats within SAC sites.

Timing of Impacts:

The potential for impact relates to the construction stage, when groundworks, use of machinery and transport of materials will take place for a limited duration. This stage is therefore screened in.

Once constructed, the UWF Grid Connection project will require minimal maintenance, mainly involving scheduled maintenance within the Mountphilips Substation compound along with annual visual inspections of the underground 110kV UGC route and periodic testing from link box chambers at joint bay locations along existing roadways. Effects from the maintenance of Mountphilips Substation and annual inspections/testing along the 110kV UGC are screened out due to the negligible and non-intrusive nature of these operational activities, which will all occur from hard surfaces.

Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) Joint Bay chambers and reinstatement of road surface over the chambers, following works at joint bays. Possible effects from these operational works along the 110kV UGC are screened in for evaluation.

2.7.1.3 Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC

Impact Sources (*all outside SAC boundaries*): instream works; culvert replacement works; movement of soils and machinery; excavation works; use of hydrocarbons & cement-based compounds; reinstatement works

Pathway: soils, surface water, water flowpaths, movement of soils and machinery, direct contact

Potential Impact/Pathway Connectivity: Indirect effects via reductions in water quality have potential to occur ex-situ to any SAC sites downstream within the catchments associated with the UWF Grid Connection. Invasive species can also be spread downstream or upstream within a catchment, and via machinery/vehicle movements along transport routes, with potential to affect habitats ex-situ of SAC sites.

Timing of Impacts:

The potential for impact relates to the construction stage, when groundworks and use of machinery will take place for a limited duration. Possible effects during the construction stage are therefore screened in.

For the reasons outlined in Section 2.7.1.2 above, effects from the scheduled maintenance of the Mountphilips Substation site and annual testing/inspection along the 110kV UGC are screened out as it is considered that these operational activities have no potential to cause ex-situ significant effects to an SAC.

Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) joint bay locations and reinstatement of road surface over the joint bay chambers, following works in joint bay chambers. Possible ex-situ effects from these operational works along the 110kV UGC are screened in for evaluation.

2.7.1.4 Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or *ex-situ* the SAC

Impact Sources: instream works; culvert replacement works; operating machinery; excavation works; reinstatement works

Pathway: direct contact;

Potential Impact/Pathway Connectivity: Direct effects via mortality of Qualifying Interest species has potential to occur within SAC where animal species may be present within the SAC boundary (but not within Qualifying Interest habitats) and exposed to potential mortality through contact with moving vehicles or active construction works. As there are no instream works within any SAC boundary, there is no potential for direct mortality to aquatic species within their natural location within the designated site, however ex-situ effects require consideration either at locations upstream which are hydrologically connected, or at locations such as bridge crossings where, whilst outside the natural location of animals, some pathways exist for mortality through contact with operational machinery or traffic. The latter is pertinent only for Otter.

Timing of Impacts: The potential for impact relates to the construction stage, when groundworks, traffic movements and use of machinery will take place for a limited duration. This stage is therefore screened in.

Once constructed, the UWF Grid Connection project will require minimal maintenance, mainly involving scheduled maintenance within the Mountphilips Substation compound along with annual visual inspections of the underground 110kV UGC route and periodic testing from link box chambers at joint bay locations along existing roadways. Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) joint bay locations and reinstatement following works. No instream works will be required. Due to the negligible and generally non-intrusive nature of operational activities, which will all occur from hard surfaces, with traffic movements negligible in the context of existing baselines, it is considered that there is no potential for the operational UWF Grid Connection to cause significant direct (mortality) effects to Qualifying Interest species within any SAC Site. Therefore the operational stage is screened out for this impact pathway.

2.7.1.5 Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within an SAC Site

Impact Sources: instream works; culvert replacement works; parapet works; operating machinery; drilling works; reinstatement works; noise and human disturbance; visual intrusion.

Pathway: direct contact; ground and air vibrations, air, visibility

Potential Impact/Pathway Connectivity: Species of Qualifying Interest, or supporting species of Qualifying Interests, present within close proximity to construction works have potential to be disturbed/displaced by the works and presence of construction personnel.

Timing of Impacts: The potential for impact relates to the construction stage, when construction works, use of machinery and presence of construction personnel will occur for a limited duration. Possible effects during this stage are therefore screened in.

Once constructed, the UWF Grid Connection project will require minimal maintenance, mainly involving scheduled maintenance within the Mountphilips Substation compound along with annual visual inspections of the underground 110kV UGC route and periodic testing from link box chambers at joint bay locations along existing roadways. Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) joint bay locations and reinstatement following works. Due to the negligible and generally non-intrusive nature of operational activities, which will all occur from hard surfaces, and in locations where animal species will be habituated to noise and/or visual intrusion, it is considered that there is no potential for the operational UWF Grid Connection to cause significant indirect effects to Qualifying Interest species, or their supporting species, within any SAC Site. Possible effects during this stage are therefore screened out.

2.7.1.6 Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an SAC Site

Impact Sources:, instream works; culvert replacement works; movement of soils and machinery; excavation works; use of hydrocarbons & cement-based compounds; reinstatement works

Pathway: soils, surface water, water flowpaths, movement of soils and machinery, direct contact

Potential Impact/Pathway Connectivity: Indirect effects to Qualifying Interest species via habitat effects has potential to occur where UWF Grid Connection overlaps the boundary of the SAC and overlaps or occurs in close proximity to the Qualifying Interest habitat. Invasive species can also be spread downstream or upstream within a catchment, and via machinery/vehicle movements along transport routes, with potential to affect the habitat of Qualifying Interest species within an SAC site.

Timing of Impacts: The potential for impact relates to the construction stage, when construction works, use of machinery and presence of construction personnel will occur for a limited duration. Possible effects during the construction stage are therefore screened in.

Once constructed, the UWF Grid Connection project will require minimal maintenance, mainly involving scheduled maintenance within the Mountphilips Substation compound along with annual visual inspections of the underground 110kV UGC route and periodic testing from link box chambers at joint bay locations along existing roadways. Secondary effects from the maintenance of Mountphilips Substation and annual inspections/testing along the 110kV UGC on QI Species via habitat related effects are screened out due to the negligible and non-intrusive nature of these operational activities, which will all occur from hard surfaces.

Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) joint bay locations and reinstatement of road surface over the joint bay chambers, following works in joint bay chambers. Possible effects from these operational works along the 110kV UGC are screened in for evaluation.

2.7.1.7 Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) ex-situ to an SAC Site

Impact Sources: instream works; culvert replacement works; parapet works operating machinery; drilling works; reinstatement works; noise and human disturbance; visual intrusion

Pathway: direct contact; ground and air vibrations, air, visibility;

Potential Impact/Pathway Connectivity: Species of Qualifying Interest ex-situ to an SAC, or supporting species of Qualifying Interests, present within close proximity to construction works have potential to be disturbed/displaced by the works and/or the presence of construction personnel.

Timing of Impacts: The potential for impact relates to the construction stage, when construction works, use of machinery and presence of construction personnel will occur for a limited duration. Possible effects during the construction stage are therefore screened in.

Once constructed, the UWF Grid Connection project will require minimal maintenance, mainly involving scheduled maintenance within the Mountphilips Substation compound along with annual visual inspections of the underground 110kV UGC route and periodic testing from link box chambers at joint bay locations along existing roadways. Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) joint bay locations and reinstatement following works. Due to the negligible and generally non-intrusive nature of operational activities, which will all occur from hard surfaces, and in locations where Qualifying

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Interest species will be habituated to noise and/or visual intrusion, it is considered that there is no potential for the operational UWF Grid Connection to cause significant indirect effects to Qualifying Interest species, or their supporting species, ex-situ any SAC Site. Possible effects during the operational stage are therefore screened out.

2.7.1.8 Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site

Impact Sources: instream works; culvert replacement works; movement of soils and machinery; excavation works; use of hydrocarbons & cement-based compounds; reinstatement works

Pathway: soils, surface water, water flowpaths, movement of soils and machinery, direct contact

Potential Impact/Pathway Connectivity: Indirect effects to Qualifying Interest species via habitat effects has potential to occur where UWF Grid Connection occurs outside the boundary of the SAC but in close proximity to the Qualifying Interest Species’ habitat or where the UWF Grid Connection occurs hydrologically upstream of an SAC. Invasive species can be spread downstream or upstream within a catchment, and via machinery/vehicle movements along transport routes, with potential to affect the habitat of Qualifying Interest species within an SAC site. Other pathways may lead to degradation of the supporting habitat for the Qualifying Interest Species.

Timing of Impacts: The potential for impact relates to the construction stage, when construction works, use of machinery and presence of construction personnel will occur for a limited duration. Possible effects during the construction stage are therefore screened in.

Once constructed, the UWF Grid Connection project will require minimal maintenance, mainly involving scheduled maintenance within the Mountphilips Substation compound along with annual visual inspections of the underground 110kV UGC route and periodic testing from link box chambers at joint bay locations along existing roadways. Secondary ex-situ effects from the maintenance of Mountphilips Substation and annual inspections/testing along the 110kVUGC on QI Species via habitat related effects are screened out due to the negligible and non-intrusive nature of these operational activities, which will all occur from hard surfaces.

Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) joint bay locations and reinstatement following works. Possible effects from scheduled maintenance/unscheduled repairs of the 110kV UGC ex-situ SAC sites are screened in for evaluation.

2.7.1.9 Other Projects considered for their potential to cause in-combination effects to SAC sites with UWF Grid Connection

There is potential for other projects cause effects to SAC Sites in-combination with the UWF Grid Connection, where other projects occur within the same catchments as the UWF Grid Connection, or within the zone of in-combination effects.

These other projects are:

All of the Other Element projects of the Whole UWF Project are included in the cumulative evaluations – i.e.

- Upperchurch Windfarm (consented),
- UWF Replacement Forestry (consented),
- UWF Related Works (currently under appeal to An Bord Pleanála), and
- UWF Other Activities (do not require planning).

and,

- Other unrelated projects: existing Rearcross Quarry; proposed Curraghduff Quarry, consented Newport Town Park, and forestry, agricultural and turf-cutting activities.
- While no overlap of construction stage with UWF Grid Connection is expected to occur, the following other unrelated projects are included on precautionary basis: consented Castlewaller Windfarm and *potential* grid connection; and the *potential* Bunkimalta Windfarm and consented grid connection.

The following other projects or activities do not have potential to cause significant cumulative effects with UWF Grid Connection:

- existing Milestone Windfarm (already constructed, very low level of operational activities).

2.7.2 Potential Sources, Pathways and Timing of Impacts to SPAs

2.7.2.1 Direct effects to Special Conservation Interest Species within an SPA (i.e. Disturbance, Mortality)

Impact Sources: noise and visual intrusion; operating machinery; presence of construction personnel.

Pathway: contact, visibility, air

Potential Impact/Pathway Connectivity: Direct effects via disturbance have potential to occur within an SPA where Special Conservation Interest bird species may be present in close proximity to construction works or construction personnel. Direct effects via mortality has potential to occur within an SPA where Special Conservation Interest bird species may be present within the SPA boundary and exposed to potential mortality through contact with moving machinery and earthworks. Mortality due to collision with moving vehicles during construction is considered extremely unlikely with no precedent in the literature for this resulting in population level/significant effects, therefore this impact pathway (mortality due to collision with moving vehicles) is screened out.

Timing of Impacts: Due to the presence of construction works, operating construction machinery and the presence of personnel, the construction stage is screened in for evaluation in respect of disturbance related effects.

In relation to the operational stage of the UWF Grid Connection, all operational stage activities and works (both scheduled and unscheduled) will take place from built surfaces, mainly hardcore surfaces at the Mountphilips Substation site and public road pavements outside of the Mountphilips Substation site, this puts works outside of any suitable nesting or winter roosting bird habitat and in locations where background sources of noise and visual intrusion already exist; therefore there is no potential for direct mortality or disturbance during any maintenance/repair works close to nest or roost sites, and therefore the operational stage is screened out.

2.7.2.2 Indirect effects to Special Conservation Interest Species within an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or reduction/loss of connectivity, or through a reduction in prey item species)

Impact Sources: Land cover change, vegetation clearance, noise and visual intrusion; operating machinery; presence of construction personnel, earthworks, movement of material

Pathway: land cover, visibility, air, surface water flowpaths, watercourses.

Potential Impact/Pathway Connectivity: Indirect effects to Special Conservation Interest species via habitat effects has potential to occur where UWF Grid Connection overlaps or occurs in close proximity to suitable (positively selected) nesting, roosting or foraging habitat for Special Conservation Interest Species or their prey items within an SPA. Habitat loss of Prey Item Species nesting or foraging habitat within an SPA (through physical land cover change, habitat degradation or through disturbance or displacement) has potential to reduce Prey Item species numbers and causing secondary effects to foraging Special Conservation Interests, where these Prey Item Species occur within any positively selected foraging habitat of the Special Conservation Interest.

Timing of Impacts: Due to the occurrence of earthworks, vegetation clearance and other construction works, the use of machinery, the occurrence of construction noise and the presence of personnel, the construction stage is screened in for evaluation.

Once constructed, the UWF Grid Connection project will require minimal maintenance, mainly involving scheduled maintenance within the Mountphilips Substation compound along with annual visual inspections

of the underground 110kV UGC route and periodic testing from link box chambers at joint bay locations along existing roadways. Secondary effects from the maintenance of Mountphilips Substation and annual inspections/testing along the 110kV UGC on Special Conservation Interest Species via habitat related effects are screened out due to the negligible and non-intrusive nature of these operational activities, which will all occur from hard surfaces.

Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) joint bay locations and reinstatement following works. Possible effects from these operational works where they occur within an SPA along the 110kV UGC route are screened in for evaluation.

2.7.2.3 Indirect effects to Special Conservation Interest Species **ex-situ** an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or loss/reduction in connectivity, reductions in prey item species, or through disturbance or mortality effects to Special Conservation Interest bird species outside their respective SPA)

Impact Sources: Land cover change, vegetation clearance, noise and visual intrusion; operating machinery; presence of construction personnel, earthworks, movement of material

Pathway: land cover, visibility, air, surface water flowpaths, watercourses

Potential Impact/Pathway Connectivity: Habitat loss of suitable (positively selected) nesting or foraging habitat ex-situ to an SPA may reduce species numbers within an SPA through reduced nest success (in respect of a reduction in utilised foraging habitat) or reductions in supporting source populations outside the SPA. Habitat loss or degradation may reduce the availability of prey items for Special Conservation Interest species where SCI Species foraging overlaps suitable habitat outside but not included in the SPA. Disturbance effects to Special Conservation Interest species (such as when foraging or on migration) outside SPA's may affect in turn breeding success or general survival rates for these species once within SPA Sites. Indirect effects via mortality of Special Conservation Interest species outside of an SPA could occur where works/ground clearance associated with the UWF Grid Connection occurs in suitable nesting, roosting or foraging habitat or inadvertently through contact with moving vehicles or traffic. Indirect habitat effects to Special Conservation Interest species via reductions in water quality has potential to occur downstream within SPA catchments associated with the UWF Grid Connection. Habitat effects via the spread of invasive species has potential to occur downstream or upstream within a catchment, and via machinery/vehicle movements along transport routes.

Timing of Impacts: Due to the occurrence of earthworks, vegetation clearance and other construction works, the use of machinery, the occurrence of construction noise and the presence of personnel, the construction stage is screened in for evaluation.

Once constructed, the UWF Grid Connection project will require minimal maintenance, mainly involving scheduled maintenance within the Mountphilips Substation compound along with annual visual inspections of the underground 110kV UGC route and periodic testing from link box chambers at joint bay locations along existing roadways. Maintenance of Mountphilips Substation and annual inspections/testing along the 110kV UGC are screened out due to the negligible and non-intrusive nature of these operational activities, which will all occur from hard surfaces, and in locations such as public roads where birds will be habituated to a background trend of existing noise and visual instruction, in instances where any contrast is unlikely to be noticeable and where no excavations are required. The magnitude of traffic associated with these activities is insufficient to warrant screening in for collision risk. In addition, the constructed

Mountphilips Substation structures will not pose a significant collision risk to Special Conservation Interests ex-situ of SPA sites and Collision mortality during operation is screened out.

Scheduled maintenance or unscheduled repairs of the 110kV UGC may occur infrequently, if at all, during operation, these works are expected to involve the reopening of some (not all) joint bay locations and reinstatement following works. These operational works along the 110kV UGC are screened in on a precautionary basis for evaluation due to the possibility of ex-situ disturbance to Special Conservation Interest Species or secondary effects via water pathways on supporting habitats as a result of excavation and reinstatement.

2.7.2.4 Other Projects considered for their potential to cause in-combination effects to SPA sites with UWF Grid Connection

There is potential for other projects cause effects to SPA Sites in-combination with the UWF Grid Connection, where other projects occur within the same catchments as the UWF Grid Connection, or within the zone of in-combination effects.

These other projects are:

All of the Other Element projects of the Whole UWF Project are included in the cumulative evaluations – i.e.

- Upperchurch Windfarm (consented),
- UWF Replacement Forestry (consented),
- UWF Related Works (currently under appeal to An Bord Pleanála), and
- UWF Other Activities (do not require planning).

and,

- Other unrelated projects: existing Rearcross Quarry; existing Milestone Windfarm, proposed Curraghduff Quarry, and forestry, agricultural and turf-cutting activities.
- While no overlap of construction stage with UWF Grid Connection is expected to occur, the following other unrelated projects are included on a precautionary basis: consented Castlewaller Windfarm and *potential* grid connection; and the *potential* Bunkimalta Windfarm and consented grid connection.

The following projects do not have potential to cause significant cumulative effects with UWF Grid Connection:

- consented Newport Town Park (implementation of planning conditions will ensure no adverse effects on European Sites, location within an urban center).

2.8 Screening Evaluation of the Potential for Effects on European Sites (SACs & SPAs)

19 SACs and 4 SPAs have previously been identified and are included in this Screening evaluation. This section 2.8, examines whether the UWF Grid Connection source impact pathways, described in Section 2.7, have potential to cause impacts to the SAC and SPA sites, either directly, indirectly or in-combination with other projects. The evaluation takes account of the timing and connectivity of each impact pathway, along with the other projects with potential to cause in-combination effects, as set out in Section 2.7.

The following impact pathways for the 19 SAC sites are evaluated during the screening exercise:

- SAC Pathway 1:** Direct effects to **Qualifying Interest habitats** of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) **within the SAC**
- SAC Pathway 2:** Indirect Effects to **Qualifying Interest habitats** of an SAC Site (i.e. via reductions in water quality or spread of invasive species) **within the SAC**
- SAC Pathway 3:** Indirect Effects to **Qualifying Interest habitats**, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) **ex-situ** the SAC
- SAC Pathway 4:** Direct effects to **Qualifying Interest species** of an SAC Site (i.e. mortality) **within or ex-situ** the SAC
- SAC Pathway 5:** Indirect effects to **Qualifying Interest species** of an SAC Site (i.e. disturbance /displacement) **within** the SAC
- SAC Pathway 6:** Indirect effects to **Qualifying Interest species** of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) **within** the SAC
- SAC Pathway 7:** Indirect effects to **Qualifying Interest species** of the SAC Site (i.e. disturbance /displacement) **ex-situ** to the SAC
- SAC Pathway 8:** Indirect effects to **Qualifying Interest species** of the SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) **ex-situ** the SAC.

The following impact/pathways for the 4 SPA sites are evaluated during the screening exercise:

- SPA Pathway 1:** Direct effects to Special Conservation Interest Species **within an SPA** (i.e. Disturbance, Mortality)
- SPA Pathway 2:** Indirect effects to Special Conservation Interest Species **within an SPA** (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or reduction/loss of connectivity, or through a reduction in prey item species)
- SPA Pathway 3:** Indirect effects to Special Conservation Interest Species **ex-situ** an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or loss/reduction in connectivity, reductions in prey item species, or through disturbance or mortality effects to Special Conservation Interest bird species outside their respective SPA).

Table 4: SAC Sites Screened out from Further Evaluation at Stage 2: Appropriate Assessment

The 16 SAC sites listed in the left-hand column in the table below are screened out from further evaluation because it was evaluated that there is no potential for UWF Grid Connection to impact any of these SAC sites.

European Site	Separation Distance to UWF Grid Connection	The SAC Sites listed in the first column are screened out from further consideration because UWF Grid Connection (either directly, indirectly or in-combination) has no potential to adversely affect the SPA Site, for the reasons outlined below:
Anglesey Road SAC (002125)	2.9 km	<ul style="list-style-type: none"> UWF Grid Connection is not located within the boundary of the SAC and therefore has no potential for effects via SAC Pathway 1: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; UWF Grid Connection is not hydrologically connected to the SAC, nor located in close proximity to the SAC, nor do any transport routes for construction materials pass through or close to the SAC, and therefore UWF Grid Connection has no potential for effects via SAC Pathway 2 or SAC Pathway 3: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC or ex-situ the SAC; All Qualifying Interests of these SAC Sites are either habitats or plant species, there are <i>no animal species are listed as Qualifying Interests</i>, therefore UWF Grid Connection has no potential for effects via SAC Pathway 4, SAC Pathway 5, SAC Pathway 6, SAC Pathway 7 or SAC Pathway 8, which all relate to impact pathway connectivity to animal species of Qualifying Interest of an SAC. As stated above there are <i>no animal species are listed as Qualifying Interests</i> for any of these ten SAC sites.
Silvermine Mountain West SAC (002258)	7.7 km	
Philipston Marsh SAC (001847)	12.0 km	
Kilduff, Devilsbit Mountain SAC (000934)	16.8 km	
Glenstal Wood SAC (001432)	2.6 km	
Slieve Bernagh Bog SAC (002312)	11.5 km	
Lough Derg, North-East Shore SAC (002241)	26.3 km	
Glenomra Wood SAC (001013)	11.3 km	
Tory Hill SAC (000439)	26 km	
Askeaton Fen Complex SAC (002279)	31 km	
Bolingbrook Hill SAC (002124)	8.5 km	<ul style="list-style-type: none"> UWF Grid Connection is not located within the boundary of the SAC and therefore has no potential for effects via SAC Pathway 1: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; UWF Grid Connection is not hydrologically connected to the SAC (<i>each of these SAC sites are located upstream in the Newport River catchment</i>), nor located in close proximity to the SAC, nor do any transport routes for construction materials pass through or close to the SAC, and therefore UWF Grid Connection has no potential for effects via SAC Pathway 2 or SAC Pathway 3: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC or ex-situ the SAC; All Qualifying Interests of these SAC Sites are either habitats or plant species, there are <i>no animal species are listed as Qualifying Interests</i>, therefore UWF Grid Connection has no potential for effects via SAC Pathway 4, SAC Pathway 5, SAC Pathway 6, SAC Pathway 7 or SAC Pathway 8, which all relate to impact pathway connectivity to animal species of Qualifying Interest of an SAC. As stated above there are <i>no animal species are listed as Qualifying Interests</i> for any of
Keeper Hill SAC (001197)	4.3 km	
Silvermine Mountain SAC (000939)	9.4 km	

		these three SAC sites.
Ratty River Cave SAC (002316)	24.5 km	<ul style="list-style-type: none"> • UWF Grid Connection is not located within the boundary of the SAC and therefore has no potential for effects via SAC Pathway 1: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC, and for the same reasons UWF Grid Connection has no potential for effects via SAC Pathway 4: Direct effects to Qualifying Interest species of an SAC Site, i.e. mortality of Lesser Horseshoe Bat within Ratty River Cave SAC or within Curraghchase Woods SAC, or mortality of Marsh Fritillary butterfly within Barrigone SAC; • UWF Grid Connection is not hydrologically connected to the SAC nor is the project located in close proximity to the SAC, nor do any transport routes for construction materials pass through or close to the SAC, and therefore UWF Grid Connection has no potential for effects via SAC Pathway 2 or SAC Pathway 3: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC or ex-situ the SAC; • UWF Grid Connection is not located within the boundary of the SAC nor is the project located in close proximity, and therefore has no potential for effects via SAC Pathway 5 or SAC Pathway 7: Indirect effects to Qualifying Interest species of the SAC Site, i.e. disturbance /displacement of Lesser Horseshoe Bat within or ex-situ Ratty River Cave SAC and Curraghchase Woods SAC, or Marsh Fritillary butterfly within or ex-situ Barrigone SAC.
Curraghchase Woods SAC (000174)	33.4 km	
Barrigone SAC (000432)	44 km	

The 3 SPA sites listed in the left-hand column in the table below are screened out from further evaluation because it was evaluated that there is no potential for UWF Grid Connection to impact any of these SPA sites.

Table 5: SPA Sites Screened out from Further Evaluation at Stage 2: Appropriate Assessment

European Site	Separation Distance to UWF Grid Connection	The SPA Sites listed in the first column are screened out from further consideration because UWF Grid Connection (either directly, indirectly or in-combination) has no potential to adversely affect the SPA Site, for the reasons outlined below:
Lough Derg (Shannon) SPA (004058)	10.2 km	<ul style="list-style-type: none"> • UWF Grid Connection is not located within the boundary of the SPA and therefore has no potential for effects via SPA Pathway 1: Direct effects to Special Conservation Interest Species within an SPA (i.e. Disturbance, Mortality); • UWF Grid Connection is not located within, or in close proximity to, the SPA, nor is the project hydrologically connected to the SPA, nor do any transport routes for construction materials pass through or close to the SPA, and therefore due to separation distance and absence of hydrological connectivity, it is evaluated that UWF Grid Connection has no potential to cause SPA Pathway 2: Indirect effects to Special Conservation Interest Species within an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or reduction/loss of connectivity, or through a reduction in prey item species);
Stack's to Mullaghareirk Mountains, West Limerick Hills & Mount Eagle SPA (004161)	50.9 km	<ul style="list-style-type: none"> • UWF Grid Connection is not located within, or in close proximity to, the SPA, nor is the project hydrologically connected to the SPA, nor do any transport routes for construction materials pass through or close to the SPA. There is no source of collision risk associated with the proposed Grid Connection (in particular no overhead wires likely to affect wildfowl or Hen Harriers). In relation to disturbance to SCI species for these SPA's ex-situ their respective sites, the separation distance precludes effects in relation to disturbance. Any passage wildfowl (SCI for 004058) will only transit over works and there are no defined feeding or roosting sites along the grid route where they would experience disturbance/displacement effects whilst resting on migration. For Hen Harrier (SCI for 004161), whilst wintering individuals from the Mullaghareirks SPA may occur in proximity to UWF Grid Connection works, there is significant separation distance, demonstrated numbers in the vicinity of the UWF Grid Connection are low from baseline studies, effects will be momentary-brief in duration; unlikely to affect any individual >150m from source; and Highly reversible once any individual moves beyond 150m, given the extent of suitable foraging habitats available, with no probability of resultant effects on breeding birds or the reference population of the SPA . Therefore due to separation distances, absence of hydrological connectivity and other reasons as outlined above, it is evaluated that UWF Grid Connection has no potential for effects via SPA Pathway 3: Indirect effects to Special Conservation Interest Species ex-situ an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or loss/reduction in connectivity, reductions in prey item species, or through disturbance or mortality effects to Special Conservation Interest bird species outside their respective SPA).

<p>River Shannon and River Fergus Estuaries SPA (004077)</p>	<p>16.9 km (down-stream distance is 31.8km)</p>	<ul style="list-style-type: none"> • UWF Grid Connection is not located within the boundary of the SPA and therefore has no potential for effects via SPA Pathway 1: Direct effects to Special Conservation Interest Species within an SPA (i.e. Disturbance, Mortality); • UWF Grid Connection is not located within or in close proximity to the SPA, and while there is hydrological connectivity with the project location, the large downstream distance and dilution factors preclude any downstream effects, and therefore due to separation distance, the large downstream distance and the dilution factor, it is evaluated that UWF Grid Connection has no potential for effects along SPA Pathway 2: Indirect effects to Special Conservation Interest Species within an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or reduction/loss of connectivity, or through a reduction in prey item species); • UWF Grid Connection is not located within or in close proximity to the SPA, and while there is hydrological connectivity with the project location, the large downstream distance, absence of records of SCI species from UGC works locations, and dilution factors preclude any downstream effects, including disturbance and therefore due to separation distance, the large downstream distance and the dilution factor, it is evaluated that UWF Grid Connection has no potential for effects along SPA Pathway 3: Indirect effects to Special Conservation Interest Species ex-situ an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or loss/reduction in connectivity, reductions in prey item species, or through disturbance or mortality effects to Special Conservation Interest bird species outside their respective SPA).
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2.8.1 European Sites brought forward for detailed screening

Because of the hydrological connectivity, proximity and/or location of UWF Grid Connection within the boundary of the European Site, the following Sites are subject to detailed screening Section 2.9.

- Lower River Shannon SAC (002165)
- Lower River Suir SAC (002137)
- Clare Glen SAC (000930)
- Slievefelim to Silvermines Mountain SPA (004165)

2.9 Screening of 4 European Sites with potential for effects

Following the initial screening, 4 European sites (Lower River Shannon SAC, Lower River Suir SAC, Clare Glens SAC and Slievefelim to Silvermines Mountain SPA) are brought forward for further detailed screening, to establish whether or not impact pathways or interactions exist between UWF Grid Connection and the Qualifying Interests or Special Conservation Interests of these four Sites.

2.9.1 Screening Exercise for the Lower River Shannon SAC (002165)

The Lower River Shannon SAC is a very large site, which stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head. The site encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), **the freshwater stretches of much of the Feale and Mulkear catchments** and the marine area between Loop Head and Kerry Head (*authors emphasis*). There are numerous tributary rivers within the freshwater stretches of the Feale and Mulkear catchments. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarne. Rivers within the sub-catchment of the Mulkear include the Killeenagarrieff, Annagh (Clare), Newport, Dead, Bilboa (*authors emphasis*), Glashacloonaraveela, Gortnageragh and Cahernahallia.

This site contains the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. This site supports more wintering wildfowl and waders than any other site in the country and supports a large number of migratory birds.

2.9.1.1 Screening of the Potential for UWF Grid Connection to cause effects to Qualifying Interests of the Lower River Shannon SAC

The potential for impact pathways between UWF Grid Connection (either directly, indirectly or in-combination with other projects) and the Qualifying Interests of the Lower River Shannon SAC are further examined in the Table 6 below.

In summary, the findings are that:

There is potential for UWF Grid Connection to impact the following Qualifying Interests:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260]
- Alluvial Forests (91E0)* (priority habitat)
- Atlantic Salmon [1106]
- Sea Lamprey [1095]
- Brook Lamprey [1096]
- River Lamprey [1099]
- Otter [1355]

The SAC and above listed Qualifying Interests are brought forward for Stage 2 Appropriate Assessment.

All of the other Qualifying Interests are screened out from further evaluation because there is no potential for UWF Grid Connection (either directly, indirectly or in-combination with other projects) to cause any significant effect to these Qualifying Interests.

Table 6: Screening Exercise for the Lower River Shannon SAC

Qualifying Interests (QI) of the Lower River Shannon SAC Site Code: 002165	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Shannon SAC	Potential effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
<p>Water courses of plain to montane levels with the Ranuncullion fluitantis and Callitricho-Batrachion vegetation [3260]</p>	<p>The description of this Qualifying Interest habitat is broad, covering rivers from upland bryophyte and macroalgal dominated stretches, to lowland depositing rivers with pondweeds and starworts.</p> <p>A rich bryophyte flora has been recorded from the Bilboa River. The bryophyte-rich habitat was found in mature river stretches of 10-12 m, occasionally up to 20 m, wide, which varied from riffles and cascades to pools.</p> <p>In addition to these known important bryophyte-rich streams and rivers in the site, there are likely to be other stretches with bryophyte-rich sub-types.</p>	<p><u>SAC Pathway 1</u>: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC;</p> <p><u>SAC Pathway 2</u>: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC</p> <p><u>SAC Pathway 3</u>: Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC</p>	<p>There is connectivity of impact pathways with this Qualifying Interest where the 110KV UGC crosses through the SAC boundary over Bilboa River (in the structure of the Anglesey Bridge). There is also potential connectivity also via hydrological pathways and transport routes.</p>	<p>Screened In for further evaluation at Stage 2 for SAC Pathways 1, 2 & 3</p>

Qualifying Interests (QI) of the Lower River Shannon SAC Site Code: 002165	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Shannon SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
<p>Atlantic Salmon [1106] Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099]</p>	<p>Five species of fish listed on Annex II of the E.U. Habitats Directive are found within this SAC site. These are Sea Lamprey, Brook Lamprey, River Lamprey, Twaité Shad and Salmon. The three lampreys and Salmon have all been observed spawning in the lower Shannon or its tributaries. The Mulkear catchment excels as a grilse fishery. Twaité Shad is not thought to spawn within the site and is not listed as a Qualifying Interest in this SAC.</p>	<p><u>SAC Pathway 4:</u> Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC <u>SAC Pathway 5:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within a SAC Site <u>SAC Pathway 6:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an SAC Site <u>SAC Pathway 7:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) ex-situ to an SAC Site <u>SAC Pathway 8:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site</p>	<p>There is connectivity of impact pathways at crossing locations of the 110kV UGC over the SAC in the structure of existing Rockvale Bridge and Anglesey Bridge, and at the other watercourse crossing locations at Mountphilips Substation site and along the 110kV UGC route within the catchment. There is also potential connectivity also via hydrological pathways and transport routes.</p>	<p>Screened In for further evaluation at Stage 2 for SAC Pathways 4 to 8</p>
<p>Otter [1355]</p>	<p>Otter is commonly found in the SAC. Otters will utilise freshwater habitats from estuary to headwaters.</p>	<p><u>SAC Pathway 4:</u> Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC <u>SAC Pathway 5:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within a SAC Site <u>SAC Pathway 6:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an</p>	<p>There is connectivity of impact pathways where the 110kV UGC is located within the boundary of the SAC, at crossing locations over the SAC in the structure of existing Rockvale Bridge and Anglesey Bridge, and at the other watercourse crossing locations at Mountphilips</p>	<p>Screened In for further evaluation at Stage 2 for SAC Pathways 4 to 8</p>

Qualifying Interests (QI) of the Lower River Shannon SAC Site Code: 002165	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Shannon SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
Alluvial Forests (91EO)* (* priority habitat)	Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The valley sides of the Bilboa and Gortnageragh Rivers, on higher ground north-east of Cappamore, support patches of semi-natural broadleaf woodland dominated by Ash, Hazel, oak and birch. Further areas are likely to be present within the SAC	SAC Site <u>SAC Pathway 7</u> : Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) ex-situ to an SAC Site <u>SAC Pathway 8</u> : Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site	Substation site and along the 110kV UGC route within the catchment. There is also potential connectivity also via hydrological pathways and transport routes.	
		SAC Pathway 1: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; <u>SAC Pathway 2</u> : Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC <u>SAC Pathway 3</u> : Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC	The UWF Grid Connection is located at a distance from the cited locations where these habitats occur, and no alluvial forest habitat was recorded within 50m of the UWF Grid Connection project. Therefore, there is no potential for direct effects. However the potential for indirect effects via hydrological connection or spread of invasive species does exist.	Screened Out – for Direct Impacts (SAC Pathway 1) Screened In for further evaluation at Stage 2 for SAC Pathway 2 and 3

Qualifying Interests (QI) of the Lower River Shannon SAC Site Code: 002165	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Shannon SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
<p><i>Molinia</i> Meadows [6410]</p>	<p>This habitat has been recorded on the eastern bank of the Shannon, just north of Castleconnell, Co. Limerick. Full distribution of this habitat in this site is currently unknown and it almost certainly occurs elsewhere.</p>	<p><u>SAC Pathway 1</u>: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; <u>SAC Pathway 2</u>: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC <u>SAC Pathway 3</u>: Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC</p>	<p>The UWF Grid Connection is located at a distance from the cited locations where these habitats occur, and no <i>Molinia</i> Meadows habitat was recorded within 50m of the UWF Grid Connection project. Therefore, there is no potential for direct effects. Separation distance and the absence of pathways to terrestrial habitats at this downstream distance precludes secondary effects.</p>	<p>Screened Out – for Direct Impacts (SAC Pathway 1)</p> <p>Screened Out for further evaluation at Stage 2 for SAC Pathway 2 and 3</p>
<p>Freshwater Pearl Mussel [1029]</p>	<p>The cited Qualifying Interest population is in the Cloon River in County Clare only, to the north of the River Shannon Estuary.</p>	<p><u>SAC Pathway 4</u>: Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC <u>SAC Pathway 5</u>: Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within a SAC Site <u>SAC Pathway 6</u>: Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an SAC Site <u>SAC Pathway 7</u>: Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement)</p>	<p>The UWF Grid Connection is located at a substantial separation distance from the cited population. In addition, UWF Grid Connection is not hydrologically connected with the location of the cited population is in the Cloon River in County Clare, to the north of the River Shannon Estuary. Therefore it is evaluated that UWF Grid Connection has no likelihood of adversely affecting Freshwater Pearl Mussel, or their</p>	<p>Screened Out – Grid Connection has no likelihood of causing effects to this Qualifying Interest species</p>

Qualifying Interests (QI) of the Lower River Shannon SAC Site Code: 002165	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Shannon SAC	Potential for effects? Yes – Screened in further evaluation at Stage 2, or No – Screened out
		<p>ex-situ to an SAC Site</p> <p><u>SAC Pathway 8:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site</p>	<p>supporting species.</p>	
<p>Bottlenose Dolphin [1349]</p> <p>There is a resident population of Bottlenosed Dolphin in the Shannon Estuary, west of Limerick</p>		<p><u>SAC Pathway 4:</u> Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC</p> <p><u>SAC Pathway 5:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within a SAC Site</p> <p><u>SAC Pathway 6:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an SAC Site</p> <p><u>SAC Pathway 7:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) ex-situ to an SAC Site</p> <p><u>SAC Pathway 8:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site</p>	<p>The UWF Grid Connection is located at a substantial separation distance from the cited population. Therefore it is evaluated that UWF Grid Connection has no likelihood of causing effects to <i>Bottlenose Dolphin</i> based on separation distance, the substantial dilution and dispersion within the sub-catchment.</p>	<p>Screened Out - UWF Grid Connection has no likelihood of causing effects to this Qualifying Interest species.</p>

Qualifying Interests (QI) of the Lower River Shannon SAC Site Code: 002165	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Shannon SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
<p>Sandbanks which are slightly covered by sea water all the time [1110] Estuaries (1130) Mudflats and Sandflats not covered by seawater all the time (1140) Coastal Lagoons (1150) Large shallow inlets and bays (1160) Reefs (1170) <i>Salicornia</i> and other annuals colonizing mud and sand [1310] Atlantic Salt Meadows (1330) Mediterranean Salt Meadows (1410) Perennial Vegetation of Stony Banks (1220) Vegetated Sea Cliffs (1230)</p>	<p>These Qualifying Interests are either coastal habitats or located in coastal or transitional waters.</p>	<p><u>SAC Pathway 1</u>: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; <u>SAC Pathway 2</u>: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC <u>SAC Pathway 3</u>: Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC</p>	<p>No impact pathway - The UWF Grid Connection is located at a distance from the part of the SAC where these habitats occur, therefore no impact pathway for direct effects exists. In relation to indirect effects, while the UWF Grid Connection is located upstream of these habitats, it is evaluated that there is no likelihood of UWF Grid Connection causing effects to these Qualifying Interest habitats.</p>	<p>Screened Out - UWF Grid Connection has no likelihood of causing effects to these Qualifying Interest habitats.</p>

2.9.2 Screening Exercise for the Lower River Suir SAC (002137)

Lower River Suir SAC consists of the **freshwater stretches of the River Suir immediately south of Thurles**, the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford, **and many tributaries** including the Clodiagh in Co. Waterford, the Lingaun, Anner, Nier, Tar, Aherlow, **Multeen and Clodiagh in Co. Tipperary** (*authors emphasis*). The Suir and its tributaries flow through the counties of Tipperary, Kilkenny and Waterford.

2.9.2.1 Screening of the Potential for UWF Grid Connection to cause effects to Qualifying Interests of the Lower River Suir SAC

The potential for impact pathways between UWF Grid Connection and the Qualifying Interests of the Lower River Suir SAC are further examined in table 7 below.

In summary, the findings are that:

There is potential for UWF Grid Connection to impact the following Qualifying Interests:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260]
- Alluvial Forests (91E0)* (priority habitat)
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]
- Yew Woodlands* Taxus baccata woods of the British Isles [91J0] (priority habitat)
- Old sessile oak woods with Ilex and Blechnum in the British Isles
- Freshwater Pearl Mussel [1029]
- White-clawed Crayfish [1092]
- Sea Lamprey [1095]
- Brook Lamprey [1096]
- River Lamprey [1099]
- Atlantic Salmon [1106]
- Otter [1355]

The SAC and above listed Qualifying Interests are brought forward for Stage 2 Appropriate Assessment.

All of the other Qualifying Interests are screened out from further evaluation because there is no potential for UWF Grid Connection (either directly, indirectly or in-combination with other projects) to cause any effect to these Qualifying Interests.

Table 7: Screening Exercise for the Lower River Suir SAC (002137)

Qualifying Interests (QI) of the Lower River Suir SAC Site Code: 002137	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Suir SAC	Potential for effects? Yes – Screened in for further evaluation at Stage 2, or No – Screened out
<p>Water courses of plain to montane levels with the Ranunculus fluitans and Callitriche-Batrachion vegetation [3260]</p>	<p>The description of habitat 3260 covers upland rivers with bryophytes and macroalgae to lowland depositing rivers with pondweeds and starworts. The selection of Lower River Suir SAC used this broad interpretation. Conservation objectives for habitat 3260 concentrate on the high conservation value sub-types, however, little is known of the habitat's distribution or its sub-types in Lower River Suir SAC. There is a large number of lowland and tidal rivers in the SAC, as well as faster-flowing tributaries.</p>	<p><u>SAC Pathway 1:</u> Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; <u>SAC Pathway 2:</u> Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC <u>SAC Pathway 3:</u> Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC</p>	<p>The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC, therefore there is no potential for direct effects to this Qualifying Interest habitat. However the potential for indirect effects via hydrological connection or spread of invasive species does exist.</p>	<p>Screened Out – for Direct Impacts (SAC Pathway 1) Screened In for further evaluation at Stage 2 for SAC Pathways 2 and 3</p>
<p>Alluvial Forests (91E0)* (* priority habitat)</p>	<p>Alluvial forest was surveyed in Lower River Suir SAC at Fiddown Mountbolton and Ballycanvan Big. Further unsurveyed areas of alluvial forest are present within the SAC, for example at islands below Carrick-on-Suir, at Shanbally, Tibberaghny Marshes, along the lower stretches of the more westerly of the Suir tributaries and along both banks of the Suir as far east as the Dawn River.</p>	<p><u>SAC Pathway 1:</u> Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; <u>SAC Pathway 2:</u> Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC <u>SAC Pathway 3:</u> Indirect Effects to Qualifying Interest habitats, of an SAC Site</p>	<p>The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC, therefore there is no potential for direct effects to this Qualifying Interest habitat. Although the cited locations of this Qualifying Interest habitat are at a substantial separation distance from UWF Grid Connect, there exists the potential for indirect effects via hydrological</p>	<p>Screened Out – for Direct Pathways (SAC Pathway 1) Screened In for further evaluation at Stage 2 for SAC Pathways 2 and 3</p>

Stage 1: Screening for Appropriate Assessment

Qualifying Interests (QI) of the Lower River Suir SAC Site Code: 002.137	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Suir SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]	The total area of the qualifying habitat in the SAC is unknown. The lowland type communities of the habitat are considered to occur in association with the various areas of alluvial forest within the SAC, notably at Fiddown, below Carrick-on-Suir and at Tibberaghy Marshes. This habitat type would also be expected to occur in association with other woodland types in fringe areas along the river and with areas of open marsh or wet grassland within the SAC.	(i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC. SAC Pathway 1: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; SAC Pathway 2: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC SAC Pathway 3: Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC.	connection or spread of invasive species. The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC, therefore there is no potential for direct effects to this Qualifying Interest habitat. Although the cited locations of this Qualifying Interest habitat are at a substantial separation distance from UWF Grid Connection, this habitat may occur at other locations, and there exists the potential for indirect effects via hydrological connection or spread of invasive species.	Screened Out – for Direct Impacts (SAC Pathway 1) Screened In for further evaluation at Stage 2 for SAC Pathways 2 and 3
Yew Woodlands* <i>Taxus baccata</i> woods of the British Isles [91J0] (* priority habitat)	<i>Taxus baccata</i> woods of the British Isles habitat has not been mapped in detail for Lower River Suir SAC and thus the total area of the qualifying habitat is unknown. Yew (<i>Taxus baccata</i>) woodland is known to occur at Cahir Park and at Shanbally.	SAC Pathway 1: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; SAC Pathway 2: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC SAC Pathway 3: Indirect Effects to	The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC, therefore there is no potential for direct effects to this Qualifying Interest habitat. Although the cited locations of this Qualifying Interest habitat are at a substantial separation distance from UWF Grid Connection, this habitat may	Screened Out – for Direct Impacts (SAC Pathway 1) Screened In for further evaluation at Stage 2 for SAC Pathways 2 and 3

Qualifying Interests (QI) of the Lower River Suir SAC Site Code: 002.137	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Suir SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
		Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC.	occur at other locations, and there exists the potential for indirect effects via hydrological connection or spread of invasive species.	
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	The best examples of old sessile oak woods are seen in Portlaoigh Wood which lies on both sides of the Clodiagh River (in County Waterford). Old sessile oak wood habitat also occurs in Inchinsquillib Wood (in County Tipperary) which consists of three small separate sloping blocks of woodland in a valley cut by the young Multeen River and its tributaries. Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> were surveyed in Lower River Suir SAC at Lyranealia and Inchinsquillib Wood. It is important to note that further unsurveyed areas are present within the SAC, including at Portlaoigh Wood within the Curraghmore Estate and other small pockets within the SAC.	<u>SAC Pathway 1</u> : Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC; <u>SAC Pathway 2</u> : Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC <u>SAC Pathway 3</u> : Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC.	The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC, therefore there is no potential for direct effects to this Qualifying Interest habitat. Although the cited locations of this Qualifying Interest habitat are at a substantial separation distance from UWF Grid Connection, this habitat may occur at other locations, and there exists the potential for indirect effects via hydrological connection or spread of invasive species.	Screened Out – for Direct Impacts (SAC Pathway 1) Screened In for further evaluation at Stage 2 for SAC Pathways 2 and 3
Freshwater Pearl Mussel [1029]	The conservation objective for Freshwater Pearl Mussel applies to the Clodiagh freshwater pearl mussel (Margaritifera	<u>SAC Pathway 4</u> : Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within the SAC <u>SAC Pathway 5</u> : Indirect effects to	The UWF Grid Connection works are located approximately 17km upstream at their closest point from the nearest Freshwater	Screened Out – for Direct Impacts (SAC Pathway 4)

Qualifying Interests (QI) of the Lower River Suir SAC Site Code: 002137	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Suir SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
	<p><u>margaritifera</u>) population. <u>This population is in the Clodiagh River in Portlaoigh, County Waterford and not the Clodiagh River in County Tipperary.</u> These two rivers are not hydrologically connected.</p> <p>The nearest Freshwater Pearl Mussel (FPM) population to the UWF Grid Connection is in the Clodiagh (Tipperary) and Multeen Rivers.</p>	<p>Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within a SAC Site</p> <p><u>SAC Pathway 6:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an SAC Site</p> <p><u>SAC Pathway 7:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) ex-situ to an SAC Site</p> <p><u>SAC Pathway 8:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site.</p>	<p>Pearl Mussel (FPM) population in the Clodiagh (Tipperary).</p> <p>The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC and does not overlap the extent of any FPM populations; therefore there is no potential for direct effects or ex-situ effects to this Qualifying Interest species.</p> <p>Although the population of FPM to which the Conservation Objectives relate are in a watercourse which is not hydrologically connected with UWF Grid Connection, and therefore impact pathways do not exist, there are extant populations of FPM downstream (17km) of UWF Grid Connection, and populations may also exist at other locations in the catchment, and there exists the potential for indirect effects via hydrological connection or spread of invasive species either upstream or downstream, or along transport routes associated with UWF Grid Connection.</p>	<p>Screened In for further evaluation at Stage 2 for SAC Pathways 5 to 8</p>

Qualifying Interests (QI) of the Lower River Suir SAC Site Code: 002.137	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Suir SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
<p>White-clawed Crayfish [1092]</p>	<p>White-clawed crayfish occurs extensively on the River Suir and on many of its tributaries.</p>	<p><u>SAC Pathway 4:</u> Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC</p> <p><u>SAC Pathway 5:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within a SAC Site</p> <p><u>SAC Pathway 6:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an SAC Site</p> <p><u>SAC Pathway 7:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) ex-situ to an SAC Site</p> <p><u>SAC Pathway 8:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site.</p>	<p>The UWF Grid Connection is located in the Clodiagh (Tipperary) catchment area which supports this species.</p> <p>The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC and will not involve any instream works in watercourses with fisheries value where white clawed crayfish may occur; while it is unlikely that direct effects could occur to this Qualifying Interest species, screened in on a precautionary basis for ex-situ effects in relation to mortality effects</p> <p>However, this Qualifying Interest species occurs extensively in the Suir catchment, and the potential exists for indirect effects via hydrological connection or spread of invasive species to populations of this Qualifying Interest either upstream or downstream, or along transport routes associated with UWF Grid Connection or through disturbance/displacement related effects to upstream ex-situ populations.</p>	<p>Screened In for further evaluation at Stage 2 for SAC Pathways 4, 5, 6, 7 and 8</p>

Qualifying Interests (QI) of the Lower River Suir SAC Site Code: 002137	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Suir SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
<p>Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099] Atlantic Salmon [1106]</p>		<p><u>SAC Pathway 4:</u> Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC</p> <p><u>SAC Pathway 5:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within a SAC Site</p> <p><u>SAC Pathway 6:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an SAC Site</p> <p><u>SAC Pathway 7:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) ex-situ to an SAC Site</p> <p><u>SAC Pathway 8:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site.</p>	<p>The UWF Grid Connection is located in the Clodiagh (Tipperary) catchment which supports this species.</p> <p>The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC and will not involve any instream works in watercourses with fisheries value; however a precautionary approach is taken.</p> <p>However, these Qualifying Interest species occur within the Suir catchment, and the potential exists for indirect effects via hydrological connection or spread of invasive species either upstream or downstream, or along transport routes associated with UWF Grid Connection.</p>	<p>Screened In – for Direct Impacts (SAC Pathway 4)</p> <p>Screened In for further evaluation at Stage 2 for SAC Pathways 5 to 8</p>

Qualifying Interests (QI) of the Lower River Suir SAC Site Code: 002137	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Suir SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
Otter [1355]		<p><u>SAC Pathway 4</u>: Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC</p> <p><u>SAC Pathway 5</u>: Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within a SAC Site</p> <p><u>SAC Pathway 6</u>: Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an SAC Site</p> <p><u>SAC Pathway 7</u>: Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) ex-situ to an SAC Site</p> <p><u>SAC Pathway 8</u>: Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site.</p>	<p>The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC and will not involve any instream works in watercourses with fisheries value; screened in on a precautionary basis for ex-situ effects in relation to mortality effects.</p> <p>However, this Qualifying Interest species is expected to occur throughout the Suir catchment, and the potential exists for indirect effects via hydrological connection or spread of invasive species to either upstream or downstream, or along transport routes associated with UWF Grid Connection.</p>	<p>Screened In for further evaluation at Stage 2 for SAC Pathway 4 (ex-situ only) and SAC Pathways 5 to 8</p>

Qualifying Interests (QI) of the Lower River Suir SAC Site Code: 002137	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Suir SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
Atlantic salt meadows [1330] Mediterranean salt meadows [1410]	These Qualifying Interests habitats are either coastal habitats or located in coastal or transitional waters.	<p><u>SAC Pathway 1:</u> Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC;</p> <p><u>SAC Pathway 2:</u> Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC</p> <p><u>SAC Pathway 3:</u> Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC</p>	<p>No impact pathway - The UWF Grid Connection is located at a substantial distance (c.130km) from the part of the SAC where these habitats occur, therefore no impact pathway for direct effects exists.</p> <p>In relation to indirect effects, while the UWF Grid Connection is located upstream of these habitats, it is evaluated that there is no likelihood of UWF Grid Connection causing effects to these habitats based on separation distance, the limited footprint of works the substantial dilution and dispersion within the sub-catchment, and the location of these Qualifying Interests in coastal or transitional waters.</p>	<p>Screened Out – for SAC Pathways 1 to 3, no likelihood of significant effects to this Qualifying Interest.</p>

Qualifying Interests (QI) of the Lower River Suir SAC Site Code: 002137	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity between UWF Grid Connection and Lower River Suir SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
Twaiite Shad [1103]	<p>The SAC is one of only three known spawning grounds in the country for Twaiite Shad.</p> <p>Twaiite Shad spawn in calm waters about 1km upstream of the old bridge in Carrick-on-Suir</p>	<p><u>SAC Pathway 4:</u> Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC</p> <p><u>SAC Pathway 5:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within a SAC Site</p> <p><u>SAC Pathway 6:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within an SAC Site</p> <p><u>SAC Pathway 7:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) ex-situ to an SAC Site</p> <p><u>SAC Pathway 8:</u> Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ an SAC Site.</p>	<p>The location of the UWF Grid Connection does not overlap the boundary of the Lower River Suir SAC and will not involve any instream works in watercourses with fisheries value; therefore there is no potential for direct effects to this Qualifying Interest species.</p> <p>In relation to indirect effects, Twaiite Shad is known to spawn c.100km downstream in Carrick-on-Suir, the UWF Grid Connection is located at a substantial separation distance from the cited population. Therefore it is evaluated that UWF Grid Connection has no likelihood of causing effects to <i>Twaiite Shad</i> based on separation distance, the substantial dilution and dispersion within the sub-catchment.</p>	<p>Screened Out – for SAC Pathways 4 to 8, no likelihood of significant effects to this Qualifying Interest.</p>

2.9.3 Screening Exercise for the Clare Gen SAC (000930)

Clare Glen lies on the Limerick - Tipperary border, in the western foothills of the Slievefelim Mountains, about 10 km north-west of Cappamore. The glen was formed by the action of the Clare River cutting into the Old Red Sandstone. The site comprises the wooded river valley about 2km above the Clare Bridge.

2.9.3.1 Screening of the Potential for UWF Grid Connection to cause effects to Qualifying Interests of the Clare Glen SAC

The potential for impact pathways between UWF Grid Connection and the Qualifying Interests of the Clare Glen SAC are examined in the table below.

In summary, the findings are that:

There is potential for UWF Grid Connection to impact the following Qualifying Interests:
 Old Oak Woodlands [91A0]
 Killarney Fern (*Trichomanes speciosum*) [1421]

The SAC and above listed Qualifying Interests are brought forward for Stage 2 Appropriate Assessment.

No Qualifying Interests have been screened out.

Table 8: Screening Exercise for the Clare Glen SAC (000930)

Qualifying Interests (QI) of the Clare Glen SAC Site Code: 000930	Notes on Qualifying Interest	Potential Effect(s) On Qualifying Interests	Examination of Connectivity UWF Grid and Clare Glen SAC	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
Old Oak Woodlands [91A0]	<p>The woodland in Clare Glen SAC occurs along the Clare River valley and is of mixed composition with native broadleaves and non-native conifers and beech (<i>Fagus sylvatica</i>). The woodland, although planted with many exotic trees, is mature and conforms to a type listed on Annex II of the E.U. Habitats Directive.</p> <p>A rich bryophyte flora is associated with the river and the wet rocks around it. The site is also notable for the presence of several rare species of Myxomycete fungus.</p>	<p><u>SAC Pathway 1:</u> Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC;</p> <p><u>SAC Pathway 2:</u> Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC</p> <p><u>SAC Pathway 3:</u> Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC</p>	<p>The location of the UWF Grid Connection does not overlap the boundary of the Clare Glen SAC, therefore there is no potential for direct effects to this Qualifying Interest habitat.</p> <p>However the potential for indirect effects to QI Habitats via hydrological connection or spread of invasive species does exist.</p>	<p>Screened Out – for Direct Impacts (SAC Pathway 1)</p> <p>Screened In for further evaluation at Stage 2 for SAC Pathways 2 and 3</p>
Killarney Fern (<i>Trichomanes speciosum</i>) [1421]	<p>The population of rare and legally protected (Flora (Protection) Order, 1999) Killarney Fern (<i>Trichomanes speciosum</i>) is currently known from several locations in Clare Glen SAC.</p>	<p><u>SAC Pathway 1:</u> Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC;</p> <p><u>SAC Pathway 2:</u> Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC</p> <p><u>SAC Pathway 3:</u> Indirect Effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC.</p>	<p>The location of the UWF Grid Connection does not overlap the boundary of the Clare Glen SAC, therefore there is no potential for direct effects to this Qualifying Interest plant species.</p> <p>However the potential for indirect impacts via hydrological connection or spread of invasive species exists.</p>	<p>Screened Out – for Direct Impacts (SAC Pathway 1)</p> <p>Screened In for further evaluation at Stage 2 for SAC Pathways 2 and 3</p>

2.9.4 Slievefelim to Silvermines Mountain SPA (004165)

This SPA is an upland site located in Counties Tipperary and Limerick. It includes the peaks Keeper Hill, Slieve Felim, Knockstanna, Knockappul, Mothe Mountain, Knockteige, Cooneen Hill and Silvermine Mountain. The site is underlain mainly by sandstones of Silurian age. Several important rivers rise within the site, including the Mulkear, Bilboa and Clare. The Slievefelim to Silvermines SPA is of ornithological importance because it provides nesting and foraging habitat for breeding Hen Harrier. The annex I species Merlin and Peregrine have also been recorded on site.

2.9.4.1 Screening of the Potential for UWF Grid Connection to cause effects to Special Conservation Interests of the Slievefelim to Silvermines Mountain SPA

The potential for impact pathways between UWF Grid Connection and the Special Conservation Interests of the Slievefelim to Silvermines Mountain SPA are further examined in table 9 below.

In summary, the findings are that:

There is potential for UWF Grid Connection to impact the following Special Conservation Interests:

Hen Harrier [A082]

The SPA/ Special Conservation Interest is brought forward for Stage 2 Appropriate Assessment.

No Special Conservation Interests have been screened out.

Table 9: Screening Exercise for the Slievefelim to Silvermines Mountain SPA (004165)

Special Conservation Interests (SCI) of the Slievefelim to Silvermines Mountain SPA Site Code: 004165	Notes on Special Conservation Interest	Potential Effect(s) On Special Conservation Interest	Examination of Connectivity between UWF Grid Connection and Slievefelim to Silvermines Mountain SPA	Potential for effects? Yes – Screened In for further evaluation at Stage 2, or No – Screened out
Hen Harrier	<p>The Slievefelim to Silvermines Mountains SPA is of ornithological importance because it provides excellent nesting and foraging habitat for breeding Hen Harrier and is one of the top sites in the country for the species</p>	<p><u>SPA Pathway 1:</u> Direct effects to Special Conservation Interest Species within an SPA (i.e. Disturbance, Mortality)</p> <p><u>SPA Pathway 2:</u> Indirect effects to Special Conservation Interest Species within an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or reduction/loss of connectivity, or through a reduction in prey item species).</p> <p><u>SPA Pathway 3:</u> Indirect effects to Special Conservation Interest Species ex-situ an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or loss/reduction in connectivity, reductions in prey item species, or through disturbance or mortality effects to Special Conservation Interest bird species outside their respective SPA).</p>	<p>The location of the UWF Grid Connection overlaps the boundary of the Slievefelim to Silvermines Mountain SPA, therefore there is potential for direct effects to the Special Conservation Interest species.</p> <p>The location of the UWF Grid Connection overlaps and occurs in close proximity to the boundary of the Slievefelim to Silvermines Mountain SPA, therefore there is potential for indirect effects to the Special Conservation Interest species.</p>	<p>Screened In for further evaluation at Stage 2 for SPA Pathway 1</p> <p>Screened In for further evaluation at Stage 2 for SPA Pathways 2 and 3</p>

2.10 Stage One Screening Conclusion

The Screening Evaluation provided herein has examined the potential for UWF Grid Connection to cause any effects via source pathway linkages on the designated SACs and SPAs within the extended study area.

2.10.1 Results of the Screening Exercise of all 23 European Sites (17 SACs, 4 SPAs)

The results are that **there is no potential or no likelihood for UWF Grid Connection to cause any effects to the following 19 no. European Sites (16 SACs, 3 SPAs):**

- Anglesey Road SAC (002125),
- Bolingbrook Hill SAC (002124),
- Keeper Hill SAC (001197),
- Silvermine Mountain SAC (000939),
- Silvermine Mountain West SAC (002258),
- Philipston Marsh SAC (001847),
- Kilduff, Devilsbit Mountain SAC (000934),
- Glenstal Wood SAC (001432),
- Slieve Bernagh Bog SAC (002312),
- Lough Derg, North-East Shore SAC (002241),
- Glenomra Wood SAC (001013),
- Tory Hill SAC (000439),
- Ratty River Cave SAC (002316),
- Askeaton Fen Complex SAC (002279),
- Barrigone SAC (000432),
- Curraghchase Woods SAC (000174),
- Lough Derg (Shannon) SPA (004058),
- River Shannon and River Fergus Estuaries SPA (004077), and
- Stack's to Mullaghareirk Mountains, West Limerick Hills & Mount Eagle SPA (004161).

Therefore, these EU sites have been 'Screened Out' at Stage One of the Appropriate Assessment process. In accordance of the recommendations of the Guidance Document '*Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*', (European Commission 2001), a Finding of No Significant Effects (FONSE) Report has been completed in respect of these European Sites and is included as **Appendix A1: Finding of No Significant Effects (FONSE) Report**.

The results of the screening are also that UWF Grid Connection has potential, via impact pathways, to cause effects to the following 4 European Sites (3 SACs, 1 SPA);

- Lower River Shannon SAC
- Lower River Suir SAC,
- Clare Glen SAC,
- Slievefelim to Silvermines Mountain SPA

As a result, there is an obligation on the Competent Authority to carry out an Appropriate Assessment (i.e. Stage Two of the AA process) under Article 6 (3) of the Habitats Directive for this project, and in this context a Stage 2 Appropriate Assessment Report has been completed.

2.10.2 Summary Results of Screening Exercise

2.10.2.1 European Sites and their respective Qualifying Interests or Special Conservation Interests Screened out from further consideration at Stage 2

The results of this screening is that the following European Sites/Qualifying Interests can be excluded from further consideration as there is no potential or likelihood for UWF Grid Connection to cause effects to these Qualifying Interests, see Table 10.

Table 10: Qualifying Interest Screened Out due to no potential or likelihood of UWF Grid Connection causing any effects

European Site	Qualifying Interest Screened Out due to no potential or likelihood of UWF Grid Connection causing adverse impacts
Lower River Shannon SAC	Freshwater Pearl Mussel [1029] Bottlenose Dolphin [1349] Molinia Meadows [6410] Sandbanks which are slightly covered by sea water all the time [1110] Estuaries (1130) Mudflats and Sandflats not covered by seawater all the time (1140) Coastal Lagoons (1150) (*priority habitat) Large shallow inlets and bays (1160) Reefs (1170) Salicornia and other annuals colonizing mud and sand [1310] Atlantic Salt Meadows (1330) Mediterranean Salt Meadows (1410) Perennial Vegetation of Stony Banks (1220) Vegetated Sea Cliffs (1230)
Lower River Suir SAC	Atlantic salt meadows [1330] Mediterranean salt meadows [1410] Twaite Shad [1103]
Clare Glen SAC	<i>No Qualifying Interests have been screened out</i>
Slievefelim to Silvermines Mountain SPA	<i>No Special Conservation Interest has been screened out</i>

2.10.2.2 European Sites and their respective Qualifying Interests / Special Conservation Interests Screened In for further consideration at Stage 2

The result of this screening is also that the following Qualifying Interests and Special Conservation Interest has been screened in for further detailed evaluation at Stage Two of the Appropriate Assessment process. These Qualifying Interests and Special Conservation Interests are identified on Table 11.

Table 11: Qualifying Interest Screened In due to potential for UWF Grid Connection to cause effects

European Site	Qualifying Interest Screened In due to potential or likelihood of UWF Grid Connection causing effects	Impact Screened in for further consideration at Stage 2
Lower River Shannon SAC	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Alluvial Forests (91E0)* (priority habitat)	SAC Pathway 1, 2, 3
	Atlantic Salmon [1106] Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099] Otter [1355]	SAC Pathway 4, 5, 6, 7, 8
Lower River Suir SAC	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Alluvial Forests (91E0)* (priority habitat) Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Yew Woodlands* Taxus baccata woods of the British Isles [91J0] (priority habitat) Old sessile oak woods with Ilex and Blechnum in the British Isles	SAC Pathway 2, 3
	Freshwater Pearl Mussel [1029] White-clawed Crayfish [1092] Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099] Atlantic Salmon [1106] Otter [1355]	SAC Pathway 5, 6, 7, 8
Clare Glen SAC	Old Oak Woodlands [91A0] Killarney Fern (Trichomanes speciosum) [1421]	SAC Pathway 2, 3
Slievefelim to Silvermines Mountain SPA	Hen Harrier [A082]	SPA Pathway 1, 2, 3

2.10.3 Screening Conclusion

Following screening to inform the requirement for Appropriate Assessment, the potential for significant effects to the Lower River Shannon SAC, Lower River Suir SAC, Clare Glen SAC and Slievefelim to Silvermines Mountain SPA cannot be excluded, as a result of the development of the UWF Grid Connection project.

Therefore, the **Lower River Shannon SAC, Lower River Suir SAC, Clare Glen SAC and Slievefelim to Silvermines Mountain SPA** have been ‘Screened In’ for further evaluation at **Stage Two of the Appropriate Assessment process**.

VOLUME E: APPROPRIATE ASSESSMENT REPORT

STAGE 2: NATURA IMPACT STATEMENT

OCTOBER 2019



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Volume E
APPROPRIATE ASSESSMENT REPORT

Appropriate Assessment Report
for
Upperchurch Windfarm Grid Connection

Stage 2
Natura Impact Statement

October 2019

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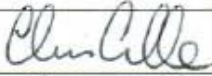


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Quality Assurance

The findings outlined within this report and the data we have provided are to our knowledge true and express our bona fide professional opinions. This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct. Where pertinent, CIEEM Guidelines used in the preparation of this report include the *Guidelines for Ecological Report Writing* (CIEEM, 2017), *Guidelines for Preliminary Ecological Appraisals* (CIEEM, 2015) and *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine*, (CIEEM, 2018). CIEEM Guidelines include model formats for Preliminary Ecological Appraisal and Ecological Impact Assessment. Also, where pertinent, evaluations presented herein take cognisance of recommended Guidance from the EPA such as *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017), and in respect of European Sites, *Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (European Commission, 2018).

Due cognisance has been given at all times to the provisions of the *Wildlife Act (1976)*, the *Wildlife (Amendment) Act (2000)*, the *European Union (Natural Habitats) Regulations (SI 378/2005)*, the *European Communities (Birds and Natural Habitats) Regulations (2011)*, EU Regulation on Invasive Alien Species under *EU Regulation 1143/2014*, the *EU Birds Directive 2009/147/EC* and the *EU Habitats Directive 92/43/EEC*.

No method of assessment can completely remove the possibility of obtaining partially imprecise or incomplete information. In line with Best Practice, any limitation to the methods applied or constraints however are clearly identified within the main body of this document.

Version	Date		Name	Signature
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1	06/12/2019	Report checked by:	Donncha Ó Catháin MSc GradCIEEM	
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Title		Appropriate Assessment Report for Upperchurch Windfarm Grid Connection PART 2 - Stage 2 Natura Impact Statement		

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3 STAGE 2: APPROPRIATE ASSESSMENT

3.1 Introduction to Stage 2

Following screening to inform the requirement for Appropriate Assessment, the potential for significant effects, could not be excluded, with regard to the following four European Sites:

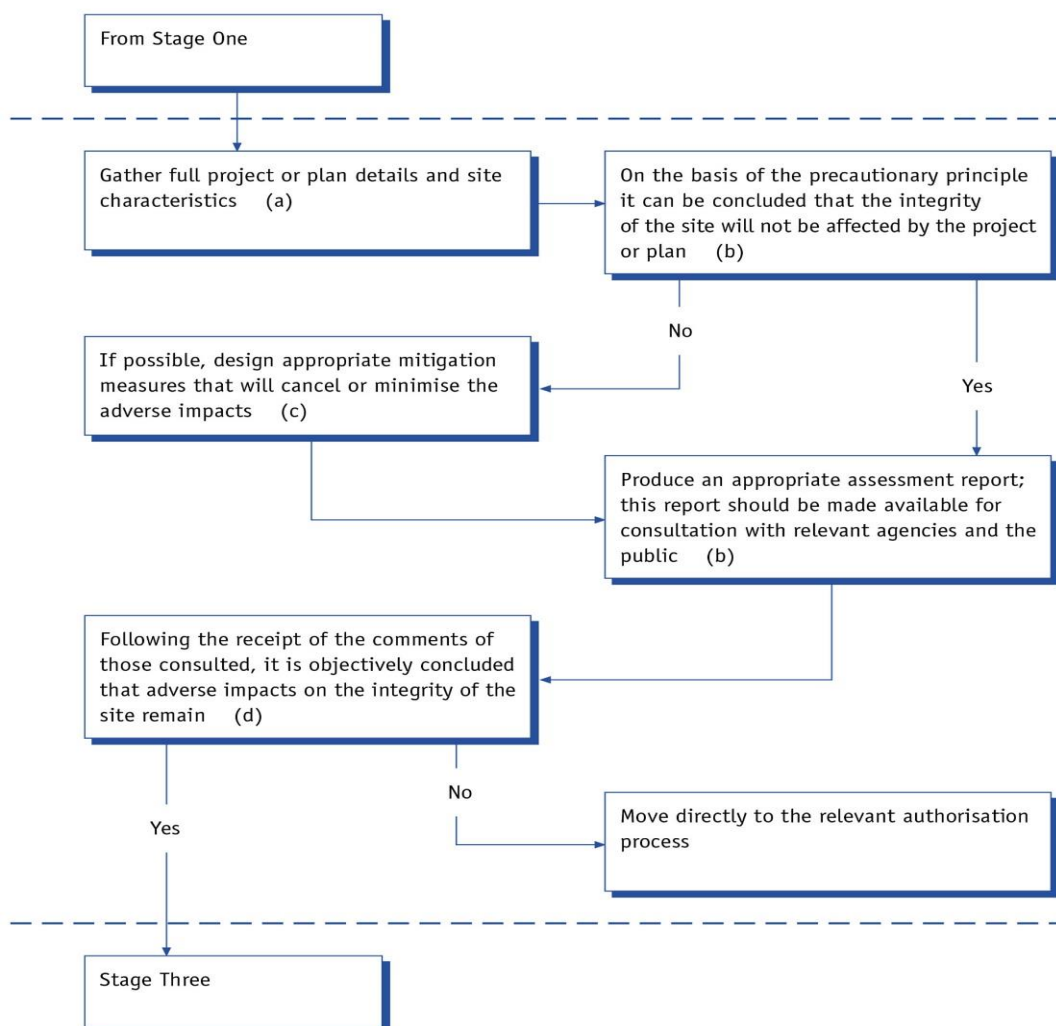
1. Lower River Shannon SAC (002165)
2. Lower River Suir SAC (002137)
3. Clare Glen SAC (000930)
4. Slievefelim to Silvermines SPA (004165).

This section comprises a detailed appraisal of the impacts of the UWF Grid Connection project alone (either directly or indirectly) or in-combination with other projects or plans, on the integrity of the four European Sites, and is considered with respect to their conservation objectives and to their structure and function.

3.1.1 Appropriate Assessment Evaluation Process

The Appropriate Assessment process considers of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the Site’s structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts. The process is illustrated below.

Stage Two: Appropriate assessment



3.1.2 Report Authors and Sources of Information

This Appropriate Assessment Report has been prepared by Chris Cullen of Inis Environmental Consultants with contributions from Howard Williams, Dr. Alex Copland, Mr. Daireann McDonnell, Ms. Jennifer Pearson and Mr. Donncha O Cathain, and contains information which will facilitate the Competent Authority to carry out an Appropriate Assessment for the Upperchurch Windfarm (UWF) Grid Connection project.

The preparation of this Appropriate Assessment Report has had regard to;

- EU Habitats Directive (92/43/EEC),
- EU Birds Directive (Council Directive (2009/147/EC)
- the Part XAB of the Planning and Development Act 2000,
- European Communities (Birds and Natural Habitats) Regulations 2011,
- Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission 2001,
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government (2010).
- Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC, European Commission, 2018.

3.1.2.1 Sources of Information

In addition to consultation with NPWS and IFI, outlined in Section 2.6.1 of the Screening Report, other sources of Information included both desktop studies and fieldwork:

- Conservations Objectives and Site boundary information for the European Sites within with study area;
- Location and layout mapping for the UWF Grid Connection project;
- Detailed description of the UWF Grid Connection project, and a review of the descriptions of the Other Elements of the Whole UWF Project, including construction methodologies, as per **Volume C: EIA Report**;
- EPA online mapping for watercourse features (<https://gis.epa.ie/EPAMaps/>);
- Supporting ecological receptor information described in full in **Volume C2 Chapter 8: Biodiversity** of the UWF Grid Connection EIA Report October 2019, including the Mitigation Measures for UWF Grid Connection (including the Project Design Measures, Surface Water Management Plan, Invasive Species Management Plan, Environmental Emergency Response Procedures, Best Practice Measures, along with a review of the Best Practice Survey Methods used to inform the Biodiversity evaluation;
- **Appendix A10: Environmental Management Plan** (appended to this document), along with
- Site visits and field surveys for the UWF Grid Connection project, and
- Review of the descriptions of the Other Elements of the Whole UWF Project, including the review of planning documentation and environmental reports (including Appropriate Assessment reporting; construction methodologies; supporting survey information from the Upperchurch Windfarm (2013), and from the previous (since refused) UWF Grid Connection (2018), and from the UWF Related Works appeal to An Bord Pleanála documentation (February 2019)) for the Other Elements of the UWF Grid Connection (**Volume F: Reference Documents**)
- Review of planning documentation and environmental reports for other unrelated projects i.e. Milestone Windfarm, Newport Town Park, Rearcross Quarry, Curraghduff Quarry, Castlewaller Windfarm, and

Bunkimalta Windfarm, available on Tipperary County Council website, planning reference numbers for unrelated projects are listed in [Appendix A2 Scoping of Other Unrelated Projects](#).

3.2 Detailed Description of the UWF Grid Connection, including a description of other projects

3.2.1 Overview of the UWF Grid Connection project

Upperchurch Windfarm (UWF) has already received planning permission but is not yet constructed. This application is for grid connection works (UWF Grid Connection) to connect the windfarm to the national electricity system.

UWF Grid Connection comprises two main parts; the first part is the proposed ‘**110kV UGC**’ which is a 30.5km long underground electrical cabling network at high voltage (110 kilovolts (kV)), to connect the already consented Upperchurch Windfarm substation at Knockcurraghbola Commons townland to a new proposed substation at Mountphilips townland; the second part is a proposed 110kV electrical substation ‘**Mountphilips Substation**’, which will manage and control the power coming (via the 110kV UGC) from the consented Upperchurch Windfarm, and from Mountphilips Substation the power will be transported to national electricity system, at an adjacent point on the existing Killonan to Nenagh 110kV overhead line.

3.2.2 Location of UWF Grid Connection

Mountphilips Substation: The new substation is proposed for a location adjacent to the existing Killonan - Nenagh 110kV overhead line in agricultural grassland in Mountphilips townland, 2km north of Newport, 4km south of Birdhill, 17km north east of Limerick City and 23km west of the Upperchurch Windfarm. The new electrical substation will be 160m east of the existing Killonan – Nenagh 110kV overhead line.

Mountphilips - Upperchurch 110kV UGC: The 110kV UGC will connect the new substation at Mountphilips to the already consented substation at Upperchurch Windfarm (Consented UWF Substation) by underground cabling (30.5km), mainly in the public road.

Starting at Mountphilips Substation, the route of the 110kV UGC follows the local road network through Rockvale and Ahane Cross, around Newport town, joining the Limerick to Thurles road (R503) on the east side of Newport town, at the GAA club. From that point, the 110kV UGC will be installed in R503 as far as the turnoff for Borrisoleigh at Knockmaroe. From there, the 110kV UGC uses the local road network and a private paved road to the Consented UWF Substation.

The route bypasses Newport; passes through the village of Rear Cross; passes through the Slieve Felim to Silvermines Mountain SPA for 8km (entirely on the R503); crosses the boundary of the Lower River Shannon SAC at 6 points (entirely on the public road and over existing bridges); and will be installed under or over 65 existing watercourse crossing structures.

The 110kV UGC will start at Mountphilips Substation; will be installed under the new access road for 0.5km as far as the Mountphilips Substation site entrance off the L2166-10 local road; then the 110kV UGC will be installed in Local Road L2166-10 for 0.7km as far as Coole Crossroads, in Local Road L6013-0 for 1.2km; over Rockvale Bridge in the L2156-0 for 0.4km; in the L2157-0 for 0.8km as far as Ahane Crossroads and in the L6009-0 for 1.8km, joining the R503 at Newport GAA Club. The 110kV UGC is then routed under the R503 for 22.1km eastwards until the turn off at Knockmaroe townland, onto the L2264-50. The route to the consented UWF Substation is along the local road network from the Knockmaroe junction - in the L2264-50 for 1.9km; then in the L6188-0 for 0.3km as far as the junction with a private paved road at Knockcurraghbola Commons. The final section of 110kV UGC will be installed in the private paved road for 0.7km and then in the Consented UWF Substation compound for the last 20m.

The 110kV UGC route is through the townlands of Mountphilips, Coole, Freagh, Foildarrig, Oakhampton, Rockvale, Mackney (O'Brien), Mackney (Bourke), Ahane, Newross, Castlewaller, Carrowkeale, Tullow, Cooldrisla, Derryleigh, Kilnacappagh, Scraggeen, Derrygareen, Inchadrinagh, Knockancullenagh, Fanit, Lackamore, Tooreenbrien Upper, Tooreenbrien Lower, Reardnogy Beg, Reardnogy More, Shanballyedmond, Baurnadomeeny, Coonmore, Foildarragh, Kilcommon, Loughbrack, Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons.

3.2.3 Size and Design of UWF Grid Connection

The size and design of the Mountphilips Substation site and ancillary works at the Mountphilips substation site, and the size and design of the Mountphilips – Upperchurch 110kV Underground Cabling (110kV UGC) is described hereunder. The location and layout of the project is illustrated on the following mapping, which are contained in [Appendix A9: Accompanying Figures](#) of this Appropriate Assessment Report:

AA Figure 1: Location of the UWF Grid Connection on OSI Discovery Mapping

AA Figure 2: Layout of the 110kV UGC outside of the Mountphilips Substation Site (Overview & Maps 1 to 4)

3.2.3.1 Size and Design of Mountphilips Substation

The **Mountphilips Substation** will be constructed close to the existing Killonan - Nenagh 110kV overhead line. The design is based on similar high voltage looped-in 110kV substations, and will comprise:

- **Substation Compound** measuring c.10290m² in area, and will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightning protection monopoles (c.18m in height) and other electrical apparatus, underground cabling and access roads. Secure perimeter fencing comprising 2.7m high palisade security fencing, which will surround the Substation Compound and will include 4.8m wide entrance gates. A permanent surface water drainage network will be installed around the compound. The Mountphilips to Upperchurch 110kV UGC will connect to the electrical equipment in the compound from the east side of the compound.
- **Control Building**, measuring c.375m² in area, located inside the Substation Compound, and will contain circuit breakers, electrical metering equipment and other electrical equipment, communications and control equipment, and welfare facilities comprising a self-contained toilet and an integrated rainwater harvesting system.
- **2 No. End Masts** and associated underground 110kV cables will be used to connect the Mountphilips Substation onto the existing Killonan – Nenagh 110kV overhead line (OHL). These End Masts will be constructed beneath the existing Killonan – Nenagh 110kV OHL and are identified as End Mast No.1 and End Mast No.2. The End Masts will be lattice towers and will each be c.16m in height. 110kV cables will connect to the Killonan side of the overhead line at End Mast No.1, be affixed to the mast and then through underground ducting to the Mountphilips compound, through the electrical equipment and control building in the substation compound, and then back onto the overhead through End Mast No.2 and onto the Nenagh side of the overhead line. The cables from End Mast No. 1 and End Mast No.2 will connect to the electrical equipment in the compound from the west side of the compound.

3.2.3.2 Size and Design of Ancillary Works at Mountphilips Substation Site

Ancillary Works for the Mountphilips Substation will support the construction of the Mountphilips Substation for the UWF Grid Connection and includes the construction and use of a Temporary Construction Compound at the Mountphilips Substation site; the construction of a new permanent Entrance at Coole townland (including the provision of sightlines) at an existing farm entrance; the construction of a permanent Access Road from the new entrance to the proposed substation at Mountphilips townland; the installation of drainage systems at Mountphilips Substation, around the Temporary Construction Compound and along the new Access Road; construction of temporary and permanent watercourse crossing structures at Mountphilips; hedgerow/tree removal and hedgerow and tree replanting at the site Entrance and along the new Access Road; fencing at the Entrance, along the new Access Road and around the Substation Compound; provision of electricity supply to Mountphilips; excavation and storage of soils; reinstatement works.

The ‘**Mountphilips Substation site**’ referred to in this NIS consists of the area from the End Masts to the Entrance from the public road in the townlands of Mountphilips and Coole, and includes the proposed Mountphilips Substation Compound, End Masts, new Access Road, permanent Entrance, and the ancillary works and also includes the western extent of the 110kV UGC between the Substation Compound and the site Entrance.

3.2.3.2.1 New Permanent Entrance at Coole townland

A new permanent site entrance will be provided through an existing farm entrance off the L2166-10, for the Mountphilips Substation and Temporary Construction Compound. The existing farm entrance will be widened to 10m, with a visibility splay of 160m provided. The sightlines are based on the 85th percentile ambient traffic speed on the Local Road serving the access, as recorded during traffic count surveys. These sightlines will be provided through the partial removal of the roadside boundary and the pruning of any hedgerow or trees within the visibility splay. The hedges or trees that are removed will be replaced with an equivalent length of hedge and/or number of trees which will be replanted behind the sight lines. Each entrance will be fenced with post and rail and an entrance gate will be installed set back 4.8m from the road edge.

3.2.3.2.2 New Permanent Access Road at Mountphilips Substation site

A new access road, 4.5m in width, will be constructed using ‘excavate and fill’ technique, from the new permanent Entrance, across four grassland fields to provide access to the Mountphilips Substation. The new access road will also provide access to the Temporary Construction Compound. The road will be constructed of crushed stone over a layer of geotextile material and will incorporate permanent roadside drains including check dams and settlement ponds, to slow down flow and settle suspended solids in water runoff. The new road will be bounded with new earthen berms which will be planted with new hedgerows comprising locally sourced native fruiting hedgerow species, the sides of the berms will be sown with a seed mix of grasses and wildflower species common to the surrounding vegetation.

Temporary Access Road: A temporary stone access road will be constructed between the Mountphilips Substation and the End Mast locations. This road will be removed and reinstated following the commissioning of Mountphilips Substation.

3.2.3.2.3 Temporary Works to facilitate the construction of the End Masts

Temporary Access Road: A temporary stone access road will be constructed by overlaying aggregate on a geotextile material. No excavations will be required. The Temporary access road will be located between the Mountphilips Substation and the End Mast locations. This road will be removed and reinstated following the commissioning of Mountphilips Substation. The stone from this temporary access road will be reused on the permanent access road at the Mountphilips Substation site.

Temporary Crane Hardstand: A temporary hardstanding area will be provided adjacent to the End Mast locations to facilitate the lifting of the End Masts into place using a crane. The footprint of this hardstand will be excavated and filled with aggregate. The excavated soils will be temporarily stored in a berm, and used to reinstate the crane hardstand area following the erection of the End Masts. The stone will be reused along the new permanent access road.

3.2.3.2.4 Drainage Systems at the Mountphilips Substation site

An **integrated drainage system** will be installed around the Substation Compound, the temporary hardstanding area at the End Mast locations, the Temporary Compound and along the new permanent Access Road to the Substation Compound. This integrated drainage system will keep ‘clean’ water upslope of the works separate from ‘dirty’ water runoff from construction works areas, while maintaining the existing drainage regime through the regular piping and release of clean water from the upslope side the works area to the downslope side. The integrated drainage system will include the installation of check dams, settlement ponds, clean water cross drains and outfall weirs. These parts of the drainage system will effectively avoid any contribution to flooding risk, minimise erosion, maintain drainage regimes, and minimise the amount of sediment entering downslope watercourses, through the attenuation (slow-down) of water flow rates and the settlement of suspended solids (sediment). Settlement ponds will be removed following construction. The rest of the drainage system will be left in place for the operations phase. The drainage system at temporary works locations will be removed. The drainage system is intended for the management of surface waters within the substation site, in line with effective surface water control and for the protection of local water features only. There are no requirements for such measures arising as a requirement to avoid/reduce the likelihood of significant effects on European Sites, due to separation distance via hydrological pathways.

A permanent concealed drain will be installed at the substation entrance on the Local Road to prevent water runoff from construction areas, flowing onto the road. This drain will be directed into an infiltration trench. Existing roadside drainage which occurs close to road works associated with the substation entrance will be piped to maintain flow.

3.2.3.2.5 Temporary Compound

A temporary construction compound will be set up during the construction stage at Mountphilips Substation location, to support the construction of Mountphilips Substation and ancillary works, and the construction of the Mountphilips to Upperchurch 110kV UGC.

The temporary construction compound will be approximately 1090m² in area, excavated as part of the substation compound excavations, and finished in stone. The compound will accommodate parking, site offices, and canteen and welfare facilities along with designated storage areas for materials, wastes, oils and fuels.

3.2.3.2.6 Watercourse Crossings at the Mountphilips Substation site

There are 3 watercourse crossings required at the Mountphilips Substation site, none of which have existing crossing structures in place:

- **W1:** Watercourse crossing W1 is a stream crossing. In order to install the underground cabling and gain construction access from the substation to the End Masts watercourse crossing works will be required at Watercourse Crossing point W1. The ducts for the underground cables will be installed under W1 in a trench. During the trenching works, the watercourse will be dammed, and the water will be pumped through a flume pipe from the upstream side of the works to the downstream side. When the trenching works are completed, the flume and dam will be removed and the banks and bed of the watercourse will be reinstated. Access from the substation to the End Masts will be provided by installing a temporary Bailey bridge at W1, which will not require any instream works.
- **W2:** Watercourse crossing W2 relates to drains located in the corner of a field which will be crossed by the 110kV UGC and the new access road. These drains flow into the stream associated with W1. New culvert crossing structures will be constructed at the crossing point of these field drains. It should be noted that the drainage system in the adjacent forestry lands are not connected to the field drains, and instead drain towards W3. These works will require that the watercourse is dammed, and the water pumped from the upstream side of the works to the downstream side, while the 110kV UGC and a new permanent bottomless concrete structure is being installed. The new access road will then be built over the concrete structure. When the trenching, crossing structure and access road are completed, the banks and bed of the watercourse will be reinstated and the dam removed.
- **W3:** Watercourse crossing W3 is a crossing of a small watercourse by the 110kV UGC and the new access road. These works will require that the watercourse is dammed, and the water pumped from the upstream side of the works to the downstream side, while the 110kV UGC and a new permanent bottomless concrete structure is being installed. The new access road will then be built over the concrete structure. When the trenching, crossing structure and access road are completed, the banks and bed of the watercourse will be reinstated and the dam removed.

Relevant Appendix

[Appendix A3: Inventory & Classification of Watercourses at Crossing Locations](#)

3.2.3.2.7 Hedgerow and tree removal and replanting at the Mountphilips Substation site

160m of hedgerow and 18 trees (17 immature and 1 mature) will be removed at the substation site entrance to widen the entrance and provide sightlines. These will be reinstated by planting the equivalent amount of hedgerow and semi-mature trees behind the new sightlines.

40m of hedgerow and 3 immature trees will be removed to build the new access road. A new hedgerow, c.700m in length, will be planted on the berms on either side of the new Access Road between the Site Entrance and Mountphilips Substation for the benefit of biodiversity in the area.

All new hedging will comprise locally sourced native fruiting hedgerow species and the replacement trees will be semi-mature native hedgerow tree species.

3.2.3.2.8 Fencing at the Mountphilips Substation site

Fencing will be erected at the Mountphilips Substation site per;

- Permanent timber post and rail fencing with gates will be erected at the substation Entrance in Coole.
- Permanent timber post and rail fencing will be erected along the new Access Road to the Mountphilips Substation. Gates will be erected along the boundary of the new access road, which will allow livestock and farm machinery to cross over the new access road, thereby restoring access to the adjacent agricultural lands.

3.2.3.2.9 Provision of electricity supply to Mountphilips Substation

Mountphilips Substation will require a low voltage electricity supply, in order to energise and run electrical plant and general services at the compound. This supply will be taken from an overhead electrical line which passes through the 1st field, 105m from the substation entrance off the public road. The line is a 10kV overhead line carried on a standard wooden pole. The pole will be fitted with a transformer in order to transform the electricity to low voltage (230V), which is suitable for use in the substation. The electricity thus transformed will be cabled underground to the Control Building in the Substation Compound, in a duct which will be laid alongside the 110kV UGC ducting, under the new Access Road.

3.2.3.2.10 Storage of Excavated Materials at the Mountphilips Substation site

The storage of excavated materials is limited to the excavations associated with groundworks at the Mountphilips Substation site - for the construction of Mountphilips Substation, site entrance, permanent access road, drainage and underground cabling at the Mountphilips Substation site.

In total, approximately 5,300m³ of soils will need to be excavated, comprising 4,060m³ of **topsoil**, 1,200m³ of **subsoil** and 30m³ of **rock**.

5,000m³ of the excavated material will be permanently stored in linear berms along the new access road and around the substation compound and 300m³ of the excavated topsoil will be used to reinstate within the works area at Coole/Mountphilips.

3.2.3.2.11 Reinstatement of Lands at the Mountphilips Substation site

Following the completion of construction works at the Mountphilips Substation site, any lands outside of new permanent infrastructure but within the boundary of the Mountphilips Substation site (which includes the site entrance from the public road, new access road to the substation compound, compound area and the End Mast locations) will be reinstated, as per:

- Native hedging plants will be planted on the berms on either side of the new access road. A mix of local provenance native fruiting hedge species such as hawthorn, blackthorn, holly, hazel, guelder rose, spindle, crab apple, bird cherry, elder and buckthorn, will be used.
- The remaining areas, including the berms around the substation compound, and the side of the berms along the new permanent Access Road will be reseeded with grasses and flower species common to the surrounding vegetation. Local provenance native wildflower seed of flowering plants like clovers, vetches and knapweed will be sown.
- Immature trees removed at the entrance, will be replaced with semi-mature trees (i.e. at least ten years growth), behind the new sightlines, on a like-for-like basis.

The agricultural lands outside the permanent fence which will be erected for the Mountphilips Substation site, will be reseeded with grass and returned to agricultural grassland use.

Landholding access to lands on either side of the new access road will be maintained by the erection of gates along the boundary of the new access road, which will allow livestock and farm machinery to cross over the new access road.

Description of Other Projects

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3.2.3.3 Size and Design of Mountphilips – Upperchurch 110kV UGC

3.2.3.3.1 Location of the 110kV UGC

Within the Mountphilips Substation site, the 110kV UGC is located under the new permanent access road between the substation compound and the site entrance.

Outside of the Mountphilips Substation site, all works will be carried out within the road pavement/built surfaces. Outside the Mountphilips Substation site, the route of the 110kV UGC is entirely on roads, mostly on the Limerick to Thurles Regional Road (R503). There is a short section of the 110kV UGC planned for under the network of Local Roads around Newport Town – between the Mountphilips Substation site Entrance to the north-west and the junction of the Newport GAA Club to the east of the town - and also at the eastern extent of the 110kV UGC between the junction of the local road L2264-50 with the R503 in Knockmaroe and the private road to the Consented UWF Substation in Knockcurraghbola Commons.

Outside of the Mountphilips Substation site, all 110kV UGC works will be carried out entirely in (or from) the road pavement/built environment, and with the exception of culvert replacement works, the construction works area boundary will not extend into the verges/natural environment. At culvert replacement works location; a minimal area of roadside vegetation may be required to be cleared, and then reinstated, to facilitate the replacement of the culvert. However, all works will take place from the road pavement.

3.2.3.3.2 The 110kV UGC Trench, Cables and Joint Bays

The 110kV UGC will be installed in trenches (c.1.25m deep and 0.6m wide), which will be laid with 5 cable ducts through which the 3 electrical cables, communications cables, and copper cables (if required), will be pulled. The ducts will be laid on bedding sand, and then surrounded by concrete, and red cable protection strip and yellow warning tape, and steel protective plates if required at the location, will be placed in the trench before the top of the trench is backfilled and reinstated. The cables will be pulled through the ducts and joined together in 42 No. Joint Bays, communication and link box chambers which will be constructed at regular Joint Bay points along the route. Each Joint Bay will comprise 3 underground pre-cast concrete chambers – a joint bay chamber, communication chamber and a link box chamber. Once the cables have been jointed and commissioned, the chambers will be filled with sand and a concrete cover fitted on top of the chamber. The road surface will be reinstated over the chambers with man-hole type covers over the Joint Bays fitted at road surface level. Over-ground identification marker posts and marker plates will be installed along the route. These manhole covers and marker plates/posts will be the only surface expression of the 110kV UGC.



Plate 1: Typical Trenching Works set-up on the Public Road

3.2.3.3.3 Watercourse Crossing Works for the 110kV UGC

In total, there will be 68 No. watercourse crossings required for the 110kV UGC. 3 watercourse crossings (W1, W2 and W3) are at the Mountphilips Substation site, described above at Section 3.2.3.2.6 above. The remaining 65 No. are located along the route of the 110kV UGC outside of the Mountphilips Substation site - there will be 63 No. crossings (W4 to W66) along the public road between the Mountphilips Substation site and the junction onto the private paved road to the Consented UWF Substation site, the remaining 2 No. crossings (W67 and W68) are on the private paved road.

The 65 No. watercourses along the 110kV UGC outside the Mountphilips Substation site, range in size from rivers and streams to drains. The 110kV UGC will cross all of these watercourses at existing crossing locations. The existing crossing structures comprise 15 No. bridges and 50 No. culverts (both box culverts and pipe culverts).

Trenching over existing bridges: During the trenching works over the bridges, edge protection such as sandbags, will be set up to prevent debris falling into the watercourse below. All of the works will be carried out from the bridge structure rather than from the lands below. There is sufficient cover (depth of road) at the 12 No. of the 15 No. bridges to install the 110kV UGC within the existing road surface and therefore no works to the bridges, such as changes to the height of the road or to the height of the parapet walls will be required. All trenching works over bridges will be carried out under a Road Opening Licence and in accordance with the Department of Transport, Tourism & Sport *Guidelines for Managing Openings in Public Roads (April 2017)*.

Raising Road level 3 No. bridges (W7, W36, W53): At the 3 No. remaining bridges (W7, W36, W53), the construction and installation of the 110kV UGC will require that the road level is raised slightly to accommodate the cable trench so that there is enough clearance between the road surface and the 110kV UGC to satisfy ESB specifications. The road level at W7 will be raised by 23cm; the road level at W36 will be raised by 14cm; and road level at W53 will be raised by 35cm.

Works to Parapet Walls at 3 No. bridges (W7, W36, and W53): At these bridges, the height of the parapet¹ walls will need to be raised to the required safe height. A parapet wall at W7 will be raised by c.0.15; the parapet walls at W36 will be raised by c.70cm; and parapet walls at W53 will be raised by c.75cm. During remedial works to parapets, netting or other barriers will be set up below the works. All of the works will be carried out from the bridge structure rather than from the lands below.

One of these bridges (Anglesey Bridge at W53) is a National Inventory of Architectural Heritage (NIAH) site, and therefore remedial works to the parapet walls will be carried by a specialist architectural restoration stonemason under the supervision of a suitably qualified conservation engineer, with completed works certified by a suitably qualified conservation engineer. The remedial works at Anglesey Bridge will use traditional materials taking due regard of the status of the bridge, and will be carried out in accordance with good building conservation principles as stated in the International Charter for the Conservation and Restoration of Monuments and Sites Charters (1979-88).

All works to bridges, including any works to the parapets will be carried out under a Road Opening Licence and in accordance with the Office of Public Works (OPW) *Guidelines Construction, Replacement or Alteration of Bridges and Culverts (2013)*, and also with the Department of Transport, Tourism & Sport *Guidelines for Managing Openings in Public Roads (April 2017)*.

Crossing by Horizontal Directional Drilling (HDD): 2 of the 15 bridges (W8, W9) do not have sufficient cover to accommodate the installation of the 110kV UGC over the bridge in the road, and substantial changes to the existing structure would be required to accommodate the 110kV UGC. Instead, at these two locations the 110kV UGC will cross underneath the water using directional drilling techniques, whereby a hole is bored

¹ Parapet walls are the safety barriers, generally low walls, at the edge of the bridge to provide protection from falls to people and vehicles

by a drilling rig under the water channel, and the ducting is pulled through. Using this technique means that there is no interference with the water channel or instream works.

Crossing existing culverts: The 110kV UGC will be laid either under or over the 50 No. culverts, there will be no works on 37 No. of these culverts as these culverts are made from plastic or concrete. Of these 37 No. culverts, at 22 No. locations there is sufficient cover between the culvert structure and road surface and the 110kV UGC will be installed over the culvert, at 15 No. locations there is not sufficient cover between the culvert and the road and the 110kV UGC will be installed under the structure.

Replacing Existing Culverts: At the remaining 13 No. locations, at W13, W14, W15, W17, W19, W20, W32, W34, W55, W57, W60, W61 and W64, there is not sufficient cover over the culvert, and the cabling will have to be installed under the structure. All of these culverts are old masonry culverts, and may need to be replaced during the works. For the purposes of this EIA Report, it is evaluated as a worst case scenario that all 13 No. culverts will be replaced. While these works will include instream works to some degree, they are called ‘Culvert Replacement Works’ throughout this this Appropriate Assessment Report to distinguish them from the works at W1, W2 and W3 at Mountphilips Substation site. The works at W1, W2 and W3 are referred to as ‘instream works’ herein. Any culvert replacement works will be in accordance with the Office of Public Works (OPW) Guidelines *Construction, Replacement or Alteration of Bridges and Culverts (2013)*, and also with the Department of Transport, Tourism & Sport *Guidelines for Managing Openings in Public Roads (April 2017)*.

3.2.3.3.4 Road / Lane Closures along the Public Road Network

Traffic management around the construction works along the public road network will be managed along most of the route of the 110kV UGC with one-lane closures. However, due to the narrow nature of some of the roads along the route, a number of roads will need to be closed for between c.1 week and 1 month.

Road Closures: The following roads will be closed to facilitate the works:

- L6013-0 at Foildarrig / Oakhampton (c.3 weeks)
- L6009-0 at Castlewaller / Carrowkeale / Derryleigh (c.1 month)
- L6188-0 at Knockmaroe (c.1 week)

The closure will not be continuous throughout a given day, but will occur during daylight hours but outside of local peak or important traffic periods. There are alternative traffic routes to avoid the works available on all of these roads. All road closures will be subject to Road Closure Licence application to Tipperary County Council; will be carried out in accordance with the Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017); and will be subject to the Traffic Management Plan, as set out in [Appendix A10: UWF Grid Connection Environmental Management Plan](#) (appended to this document).

One lane closures: The works on the R503 between the Newport GAA Club and the turnoff for the windfarm substation at Knockmaroe, and the other local roads (L2166-10 at Coole, L2156-0 at Rockvale, L2157-0 at Rockvale, and L2264-50 at Knockmaroe), will be facilitated with one-lane closures. Traffic flow will be maintained using a stop/go system with flagmen. It is planned to operate up to 3 construction work crews at different locations simultaneously on the R503, the road work locations will be typically 2km to 3km apart. Only one work crew will be deployed on individual local roads, at any one time.

Maintaining Access to Properties: Where works take place in the vicinity of a property entrance (house/farms/businesses/sports facilities), traffic flow will be maintained by placing a steel plate over the 110kV UGC trench to allow traffic to pass over.

3.2.3.3.5 Disposal of Spoil from Public Road Excavations Trenches

The excavated material from the 110kV UGC trenches in the public road will be all be removed to licensed waste facilities as follows:

- Of the c.2,740 m³ of bitumen bound surface dressing, c.2650m³ will be removed to a licensed waste facility such as Kellys of Fantan or Kieran Kelly Haulage. The remaining c.90m³ will be treated as contaminated material within 15m of invasive species infestations.

- Of the c.1,830 m³ of base layer aggregate, c.16,450m³ of subsoil, and c.2360m³ of rock, of these totals c.1770m³, c.15900m³ and c.2300m³ respectively will be disposed of as spoil and will be removed to a licensed waste facility such as Kellys of Fantan, Kieran Kelly Haulage or Fogarty Concrete. The remaining c.60m³, c.550m³ and c.60m³ respectively will be treated as contaminated material within 15m of the confirmed invasive species infestations.
- 760m³ of excavated material, being the material excavated within 15m of the confirmed invasive species infestations along the route of the 110kV UGC. This material will be classified as potentially contaminated and will be removed to a suitably licensed facility, such as Enva. The locations of these infestations were found during surveys and are identified on mapping within the Invasive Species Management Plan, part of the UWF Grid Connection Environmental Management Plan (Appendix A10). To ensure that all infestations are managed under the Invasive Species Management Plan, the occurrence and extent of infestations will be confirmed by an invasive species specialist prior to the commencement of construction works.

3.2.3.3.6 Reinstatement of Public Roads

Along the 110kV UGC route on the public road, confirmatory condition surveys involving pre-construction and post-construction inspections, high definition video surveys and FWD surveys will be undertaken. The road pavements/built surfaces will be reinstated according to the conditions of the Road Opening Licence, and will involve a combination of carriage lane reinstatement and full road reinstatement, per:

Reinstatement of Trenches: The construction works will proceed in a linear manner with on average 80m to 100m completed at each location, each day. At the end of each day, the completed sections will be reinstated with a temporary surface for road safety and trench integrity purposes. Full permanent reinstatement of the road surface/built surface will take place at the end of construction works.

Reinstatement of Joint Bays: Joint Bays are temporarily reinstated more than once; after the joint bay is constructed; after cable pulling; and after cable jointing. Following the electrical commissioning, the road surface/built surface over the Joint Bays will be permanently reinstated.

Trenches within road pavements will be reinstated in accordance with the Department of Transport, Tourism & Sport *Guidelines for Managing Openings in Public Roads* (April 2017).

3.2.3.3.7 Phasing of the Works

As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the works along the public road network will be scheduled to minimise impacts on schools and local businesses. The works will be scheduled so that they do not disrupt or interfere with Tipperary County Council’s road works programme on the R503 through Newport town.

3.2.3.3.8 Supervision of Road Works

As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the Promoter will fund the costs of Tipperary County Council engaging a chartered Civil Engineer to oversee quality control and compliance with drawings, specifications and road opening conditions for the duration of the works.

3.2.3.3.9 Existing Underground Services along the 110kV UGC

Underground services, including water pipes, communication cables and electricity cables along the 110kV UGC route, have been identified and mapped (See Figures for Chapter 14: Material Assets (Built Services) in **Volume C3 EIAR Figures**). There are public water pipes under most of the roads to be used for the 110kV UGC. No waste water pipes were identified in the vicinity of the works during surveys. Before construction, the services owners will be consulted and confirmatory surveys would be carried out ahead of works. This will be done in full consultation with the service owners, including the Newport Regional Water Supply office in Newross. In addition, the services will be protected by the supervision by a banksman during excavation works. All works will be carried out within the road pavement/built surface.

Description of Other Projects

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3.2.3.3.10 Transition from public road to private paved road at Knockcurraghbola Commons

At the eastern end of the 110kV UGC, the route is along the public road L6188-0 and then along a private paved road to the Consented UWF Substation location. This private road is paved, similar to the public road, including at its junction with the public road. There is no requirement to widen this junction to install the 110kV UGC. The junction of the private paved road with the public road does not required any widening or sightline works. It already has the required sightlines of 70m, which satisfies the sightline requirements as set out in Table 10.1 of the North Tipperary County Development Plan 2010 (as amended).

3.2.4 UWF Grid Connection: Construction Stage

The construction process for the UWF Grid Connection is a relatively straightforward civil build. Construction personnel will work on a number of crews or teams, with one crew working at the Mountphilips Substation compound and a number of crews at different locations along the route of the 110kV UGC. The workers will arrive and depart daily to and from the temporary compound at Mountphilips Substation site, parking spaces will be provided at the temporary compound. The various crews will then be transported to the specific works location by means of 'crew-cab' 4x4 vehicles or similar. Bulk deliveries of materials will be delivered to the temporary compound and stored there until needed. Materials needed at works locations will be transported from the Temporary Compound by way rigid body vehicle or tractor and trailer. Aggregate and concrete will be delivered directly to works locations.

3.2.4.1 Construction Works Area Boundary

All construction works will take place within the construction works area boundary. The 'Mountphilips Substation site' located in the townlands of Mountphilips and Coole, consists of the area between the End Masts and the widened site entrance off the public road, and includes the proposed Mountphilips Substation Compound, End Masts, new access road, permanent entrance, the ancillary works and the western extent of the 110kV UGC within this area. The construction works area boundary at the Mountphilips Substation site will be an area larger than the permanent footprint.

Outside of the Mountphilips Substation site, all 110kV UGC works will be carried out entirely in (or from) the road pavement/built environment, and with the exception of culvert replacement works, the construction works area boundary will not extend into the verges/natural environment. At culvert replacement works location; a minimal area of roadside vegetation may be required to be cleared, and then reinstated, to facilitate the replacement of the culvert. However, all works will take place from the road pavement.

3.2.4.2 Construction Timescale and Resource Requirements

Duration & Timing of Construction: The main construction period will take 12 to 18 months to complete. The projected start date is 2020/2021. Pre-construction activities will be carried out immediately prior to the commencement of the main construction period; these activities will include detailed design, confirmatory surveys, and vegetation clearance (during the appropriate period). Normal construction hours of work will be daylight hours between 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays. For the avoidance of doubt the construction of the UWF Grid Connection, including any pre-construction activities, is assumed to overlap with works for Upperchurch Windfarm and UWF Related Works, for the purpose of the appraisal presented in this report, in line with the precautionary principle.

Construction Personnel: It is expected that upto 100 No. persons will be involved in the pre-construction, main construction, cable jointing and commissioning works.

Machinery at the Mountphilips Substation site will include a crane, excavators, dump trucks, rollers, and pumpers and generators, cement mixers, containers, fencing equipment, sandbags, silt bags/traps/fences and hand tools. Machinery to be used for the 110kV UGC includes an excavator, dumper, and 4X4 crew vehicle at each works location along the 110kV UGC, with cable pulling machines, vibrating rollers, tarring vehicle, sediment treatment tanks, and jointing containers used at works located as required. Equipment and tools used along the 110kV UGC will include compaction plates, generators, pumps, mobile sediment treatment tanks, cutting tools, hand tools, and sediment control equipment such as sand bags, silt bags, oil absorbent booms.

Construction Materials include 1360 loads of concrete, 1350 loads of crushed stone, 210 loads of surface dressing for public road surfaces, 26 loads of electrical equipment, apparatus and building materials for

Description of Other Projects

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Mountphilips Substation, 1 load of fencing materials, 1 load of hedging materials, and 302 loads of ducting, cables, warning strips and tapes, culverts, geotextile material and other materials for the 110kV UGC.

3.2.4.3 Construction Access

HGV loads of aggregate, concrete and public road dressing will be delivered directly to construction works areas. These HGVs will travel to the works areas using both the regional and local road networks.

Other materials, such as electrical equipment and apparatus, building materials, cables, ducting, geotextile and other construction materials, will be sourced from various suppliers and will be transported to the Temporary Compound at the Mountphilips Substation site via the national and regional road network. This material will be stored at the Temporary Compound until required at works areas. Each day a smaller truck will be used to deliver the daily volume of ducting, cable protection strip, warning tape, duct jointing collars, joint bay chambers etc. for the 110kV UGC to each active works area along the 110kV UGC route.

3.2.4.4 Construction Methodology for UWF Grid Connection

Outline construction methodologies (OCMs) based on standard construction methods, have been prepared for all of the main construction stage activities. These OCMs, which are listed below, can be found in the Environmental Management Plan for UWF Grid Connection ([Appendix A10](#)).

In the OCMs, a brief description of the work involved; the duration of this work; personnel, machinery, equipment and tools requirements; construction materials; details of the standard methodology for the construction activities are set out. The final Method Statements for the construction works will be developed by the appointed Construction Contractors and will be based on these OCMs.

Table 1: Outline Construction Methodologies for UWF Grid Connection

OCM Ref:	OCM Title
GC_OCM_01	Pre-Construction Activities
GC_OCM_02	Mountphilips Substation Compound
GC_OCM_03	New End Masts west of Mountphilips Substation
GC_OCM_04	Temporary Access Road to End Masts
GC_OCM_05	Instream Works and Temporary Bailey Bridge Crossing At W1
GC_OCM_06	New Permanent Access Road at Mountphilips Substation Site
GC_OCM_07	Installation of 110kV UGC and new crossing structures at W2 and W3
GC_OCM_08	Permanent Site Entrance at Mountphilips Substation Site
GC_OCM_09	Temporary Compound at Mountphilips Substation Site
GC_OCM_10	Formation of Overburden Storage Berms at Mountphilips Substation Site
GC_OCM_11	Reinstatement of Lands at Mountphilips Substation Site
GC_OCM_12	110kV Trenching & Ducting
GC_OCM_13	110kV Joint Bays and Associated Chambers
GC_OCM_14	110kV Cable Pulling
GC_OCM_15	110kV Cable Jointing
GC_OCM_16	Replacing existing culverts along the 110kV UGC
GC_OCM_17	Raising road level and parapet walls at Rockvale Bridge (W6), Tooreenbrien Bridge (W36) and Anglesey Bridge (W53)
GC_OCM_18	Horizontal Directional Drilling at W8 and W9

3.2.5 UWF Grid Connection: Operational Stage

Following commissioning, the UWF Grid Connection will be taken in charge by ESB Networks and both the Mountphilips Substation and the Mountphilips – Upperchurch 110kV UGC will become part of the national electricity network. The new asset will be managed and operated by ESB Networks.

Operational Personnel & Activities: It is expected that scheduled inspection and maintenance activities will be carried out by ESB Networks personnel (2 men crews) over a total of 13 days per year.

Very infrequent planned maintenance or unplanned repairs may be required, if at all, during the lifetime of the UWF Grid Connection, it is expected that one crew with c.6 ESB Networks personnel would be required for 1 week – 2 weeks duration, depending on the nature of the repairs work.

Duration of the Operational stage: The UWF Grid Connection will be operated on a **permanent** basis by ESB Networks.

3.2.6 UWF Grid Connection: Use of Natural Resources, Emissions & Waste

Use of Natural Resources: 4.8 hectares of agricultural land at the Mountphilips Substation site will be required during construction, this will reduce to 1.75 hectares during the operational phase; 5300m³ of soil will arise from excavation works at the Mountphilips Substation site; small amounts of potable and non-potable water will be imported onto the site as required; a total of 200m of hedgerow and 29 No. trees (1 mature and 28 immature) will be removed and a total of 860m of mixed native hedgerow and 18 No. semi-mature native tree species will be planted behind the new sightlines, and on the berms alongside the new access road and around the substation compound; in addition the sides of the berms alongside the new access road and around the substation compound will be seeded with grasses and wildflower species common to the surrounding vegetation, and local provenance native wildflower seed of flowering plants like clovers, vetches and knapweed will be included.

Emissions: Dust, construction machinery exhaust, noise, and vibration will be emitted temporarily during the Construction Stage but the magnitude of these emissions will not be significant. Lights will be used at the Mountphilips Substation site during construction but will not be left turned on overnight. During the Operational Stage there will be negligible dust, vehicle exhaust, noise, and vibration emitted. LED Lighting will be used at the Mountphilips Substation, but will be motion sensitive and will not remain turned on overnight. The operational electrical plant will be a source of electromagnetic fields but these emissions will be negligible and substantially less than the International Commission on Non-Ionising Radiation Protection exposure limit, at a point directly above the operating 110kV UGC cable or beside the substation fence.

Waste: UWF Grid Connection construction personnel will use the welfare facilities and waste facilities provided at the Temporary Compound at Mountphilips Substation. 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 within the Temporary Compound and collected by an appropriately licensed waste contractor. Any wastes which result from the construction of UWF Grid Connection will be managed under the Waste Management Plan for the project, the Waste Management Plan is appended to this Appropriate Assessment Report as **Appendix A10: UWF Grid Connection Environmental Management Plan**.

3.2.7 Other Projects included in the evaluations for in-combination impacts

The following Other Projects are included in the evaluation (Sections 3.6 to 3.9) in relation to in-combination impacts with UWF Grid Connection:

All of the Other Element projects of the Whole UWF Project are included in the cumulative evaluations – i.e.

- Upperchurch Windfarm (consented),
- UWF Replacement Forestry (consented),
- UWF Related Works (currently under appeal to An Bord Pleanála), and
- UWF Other Activities (do not require planning).

and,

Other unrelated projects which are located within the water sub-catchments of the UWF Grid Connection or within 2km of the Slievefelim to Silvermines SPA boundary and which were scoped in for cumulative evaluation (see [Appendix A2 Scoping of Other Unrelated Projects](#)), these projects are:

- existing Rear Cross Quarry,
- existing Milestone Windfarm,
- consented Newport Town Park,
- consented Castlewaller Windfarm (and potential grid connection),
- *potential* Bunkimalta Windfarm (and consented grid connection),
- proposed Quarry at Curraghduff,

and

the following **land-use activities** which occur in the surrounding area are also relevant to the cumulative evaluations:

- Agriculture
- Forestry
- Turf-Cutting.

A summary description of each of the above listed projects is provided in the subsections below.

The Environmental Reports, for the Other Elements of the Whole UWF Project are contained in [Volume F: Reference Documents](#), which accompanies the planning application with this Appropriate Assessment Report.

Planning documentation and environmental reports for other unrelated projects available on Tipperary County Council website. Planning reference numbers for unrelated projects are listed in [Appendix A2 Scoping of Other Unrelated Projects](#).

3.2.7.1 Cumulative Locational Context of UWF Grid Connection in relation to the Other Elements of the Whole UWF Project

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

The UWF Grid Connection is adjacent to and overlaps with Other Elements of the Whole UWF Project and in particular;

- It overlaps with Upperchurch Windfarm at the Consented UWF Substation.
- It is adjacent to the UWF Related Works and the Upperchurch Windfarm in Knocknabansha, Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands
- At Mountphilips Substation, some fiber-wrapping and re-sagging activities (UWF Other Activities) will be carried out from the new End Mast

3.2.7.2 Upperchurch Windfarm

3.2.7.2.1 Planning Consent Overview

An application for planning permission for Upperchurch Windfarm (Consented UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by a Natura Impact Statement. Upperchurch Windfarm will comprise 22 wind turbines with an overall height up to 126.6 metres, 2 meteorological masts with an overall height of up to 80 metres, turbine foundation and crane hardstanding areas, access roads and an electrical substation.

3.2.7.2.2 Location, Size and Design of Upperchurch Windfarm

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

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

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

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

Consented UWF Turbines - 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour and an overall height to blade tip up to 126.6m. The turbines will be constructed on concrete bases with an adjacent hard-core hardstand area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation. The underground cabling forms part of the UWF Related Works application (Internal Windfarm Cabling).

Consented UWF Substation - 110kV substation compound which includes a control building, main transformer and other electrical equipment enclosed in a compound by a palisade fence. The substation will measure 64m x 41m.

Consented UWF Roads - 11.6km of windfarm access roads will comprise 8km of newly built 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (by average of 2m).

Consented Upperchurch Windfarm Ancillary Works – The main items of ancillary works will include, 2 No. meteorological masts up to 80m in height; 11 No. site entrances; 1 No. stream crossing; site drainage system; 2 No. construction site compounds (Site Compound No.1 at Graniera, and Site Compound No.2 at existing building in Knockcurraghbola Commons); 6 No. borrow pits from which most of the aggregate required will be won; forestry felling, hedgerow removal and reinstatement; excavation, storage and reinstatement of soils.

A document, with a detailed description of the Upperchurch Windfarm, has been compiled from the original 2013 Upperchurch Windfarm EIS, from the Reply to Further Information, the additional information submitted during the planning process and mitigation measures and planning conditions attaching to the Grant of Permission, to reflect a description of the development as it is now permitted. This compilation document has been prepared in the same format as the current application Chapter 5, for ease of cross referencing. The compilation document can be found in the **UWF Grid Connection EIA Report, Volume C4 EIAR Appendices - Appendix 5.5: Compiled Description of Upperchurch Windfarm**. The full planning documents, including the Inspectors Report, EIS, RFI and Environmental Management Plans, for the consented Upperchurch Windfarm can be found in **Volume F8 & F9: Reference Documents for Other Elements of the Whole UWF Project**.

3.2.7.2.3 Upperchurch Windfarm: Construction, Operation & Decommissioning

Upperchurch Windfarm Construction Phase: Construction of Upperchurch Windfarm is expected to commence in 2020/2021 and will take approx. 12 months. Approximately 277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for the windfarm. Approximately 950 No. loads of concrete; 15 No. loads of reinforcing steel and 5 No. loads of general building materials and 212 No. loads of electrical plant and equipment (abnormal size loads) will be imported to the site by HGV. The abnormal turbine loads will be transported from Foynes Port.

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

Upperchurch Windfarm Decommissioning: this will involve the removal of all the turbines, removal of the above ground turbine foundation elements and covering the hardstanding areas with topsoil and reseeding. Any roads or hardstands that are not required by the landowner for farm use, can be covered with topsoil and reseeded also. Cabling will be isolated and left in-situ underground. The substation compound will include an ESB Networks owned control room and a windfarm owned control room. The windfarm owned electrical equipment would be decommissioned and sold as second hand equipment. The ESB substation could remain as part of the national electricity network, after the wind farm site is decommissioned.

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

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

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

3.2.7.3 UWF Replacement Forestry

3.2.7.3.1 Consent Overview

An afforestation license for UWF Replacement Forestry was granted by the Minister for Agriculture, Food and the Marine on 07/11/2018. Forest Owner Number FO138819C. Contract Number CN81893. The application for the licence was accompanied by a Natura Impact Statement.

3.2.7.3.2 Location, Size and Design of UWF Replacement Forestry

UWF Replacement Forestry relates to the planting with forestry, of 6ha of agricultural lands the purpose of which is to fulfil the replanting obligation which will arise from the felling of forestry for Other Elements of the Whole UWF Project, namely Upperchurch Windfarm and UWF Related Works. No forestry felling is required for UWF Grid Connection.

Located at Foilnaman townland, near Upperchurch, County Tipperary, 6 hectares (6ha) of agricultural grassland at will be planted with native woodland species, set in clusters of well-matched native species. There will be varied spacing created between the clusters according to Forest Service recommendations. A mixture of tall trees and understory shrubs will be planted, and the design includes wide ride-lines between deeper areas of core woodland. The ride-lines will create open spaces with tree-lined boundaries, which is much favoured by birds of prey during the day (e.g. hen harrier) and bats at night as hunting ground. A mixture of land cover – tall grasses, short grasses and scrub will be maintained under the planting and in the ride lines. Tree guards will be used to protect the saplings and young trees from rabbit damage. A livestock-proof fence will be erected around the perimeter of the planting.

The lands to be afforested are currently in two agricultural landholdings. A small watercourse, with existing culvert crossing, runs through the centre. The existing riparian habitat along this watercourse will be enhanced through planting with hazel, alder and willow species and the entire afforestation land will be protected from livestock by the perimeter fencing. There is a change of use required for an existing agricultural entrance to agricultural and forestry entrance which will remain in permanent use. This change of use is part of UWF Related Works – RW Ancillary Works.

The UWF Replacement Forestry will be designed and planted in accordance with the Forest Service (2006) Information Note No. 5: Establishment, Design and Stocking Densities of New Native Woodland and Felling and Reforestation Policy published by the Forest Service (May 2017).

3.2.7.3.3 UWF Replacement Forestry: Planting & Growth Stages

Planting Stage: Tree planting will be carried out by 4 No. forestry professionals. Tree saplings, wooden fence posts and fencing wire and gates will be imported to the site by 4WD vehicle.

Growth Stage: Once planted, the trees will go through numerous stages of growth from sapling, through to maturity, old age and eventual decay with natural regeneration occurring through the lifecycle of the native wood. Other than thinning activities and grass/scrub management, natural maturation, old age and regeneration, no other changes to the native woodland are expected. Felling is not planned.

Harvesting: The woodland will be permanent woodland and unlike commercial forestry plantations, the new native woodland will not be harvested or felled.

Use of Natural Resources: 6ha of agricultural land will be planted with mixed species to create a native woodland, comprising tall trees and understory shrubs, along with wide ride-lines, and a mix of tall grasses, short grasses and scrub land cover maintained during the growth stage. This will enhance biodiversity in the area. New trees and shrubs will be set back at least 10m from the watercourse which runs through the UWF Replacement Forestry site. The existing riparian habitat will be enhanced through the planting with hazel, alder and willow species and the lands will be protected from livestock by the perimeter fence. Planting will be carried out by hand using spades. Small localised patches of disturbed soil will occur at the tree sapling locations.

Emissions – emission levels associated with either Planting or Growth Stage activities will be Negligible, mainly due to the very short duration of work, the planting by hand.

Waste - Planting and Growth Stage – during the planting stage waste such as packaging will be generated in very small quantities and this waste will be removed at source and disposed of in an appropriate licensed facility. No waste is expected to occur during the Growth stage.

3.2.7.4 UWF Related Works

3.2.7.4.1 Planning Consent Status

A planning application was made by Ecopower Developments Limited to Tipperary County Council for works relating to the construction and operation of the already consented Upperchurch Windfarm – to be called UWF Related Works (Planning Ref. 18/600913). The planning application was accompanied by Appropriate Assessment Reporting. The planning application was submitted on 17/07/2018, Further Information was requested on 10/09/2018. Tipperary County Council Refused Permission on 10th January, 2019. On 6th February, 2019, Ecopower Developments lodged a 1st Party Appeal with An Bord Pleanála on the UWF Related Works Refusal by Tipperary County Council. ABP Ref. 303634-19.

The UWF Related Works project was not changed in terms of location and characteristics for the Appeal to An Bord Pleanála. However the original May 2018 Appropriate Assessment Reporting was revised for the subject appeal to An Bord Pleanála – and called Revised Appropriate Assessment Reporting (January 2019). The revisions to the May 2018 Appropriate Assessment Reporting were necessary in order to take account of the Reason for Refusal by Tipperary County Council of UWF Related Works; the 2 No. 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. The Revised Appropriate Assessment Reporting (February 2019) also takes account of the Refusal by An Bord Pleanála to Grant planning for UWF Grid Connection (ABP-301959-18: Board Order dated 17/12/2018); and the ABP Inspector’s Report on UWF Grid Connection (dated 27th November 2018) and evaluated the in-combination effects of a preliminary route for the UWF Grid Connection 110kV UGC along the R503 Regional Road, through Newport town and on the local road network to the Mountphilips Substation site. For the avoidance of doubt a Stage 2 Appropriate Assessment Report or NIS accompanied the appeal, however we note for completeness that the UWF Grid Connection layout presented therein and evaluated in respect of in combination effects with UWF Related Works differed slightly from the current 2019 application for UWF Grid Connection (the 110kV UGC route now by-passes Newport town).

3.2.7.4.2 Location, Size and Design of UWF Related Works

The UWF Related works comprises of the following:

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

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

Realigned Windfarm Roads to realign the Consented UWF Roads at three locations; (1) The consented windfarm road to Turbine No.5 in Shevry is 560m in length, and will replace this road in its entirety with a new road 230m in length through forestry. This will require forestry felling of 0.2ha; (2) The consented windfarm road between Turbine No.19, Turbine No. 20 and Turbine No. 21, is 840m in length. It will replace 370m of this road with a new road also 370m in length. 220m of this road will be located on grassland field, with the remaining 150m in length located on existing farm road. The existing farm road section will be

upgraded during construction works; (3) A short length (30m) of new access road is between the consented windfarm roads in Knockmaroe to the new Telecom Relay Pole.

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

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

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

3.2.7.4.3 UWF Related Works: Construction, Operation & Decommissioning

Description of Other Projects

UWF Related Works Construction Phase: All elements of the Whole UWF Project will be constructed at the same time and is expected to commence in 2020/2021 and will take approx. 12 months. 5 of the c.100 persons working directly on the Upperchurch Windfarm site will work on UWF Related Works. A specialist communication engineering crew, made up of c. 2 personnel, will be involved in the erection and set up of the Telecom Relay Pole. The UWF Related Works, 23 No. loads of concrete and 292 No. loads of aggregate will be transported to the site by HGV, from local suppliers. A further 2 No. loads of road surfacing material and 43 No. loads of specific building materials will also be imported to the site, from various suppliers in the Region.

UWF Related Works Operational Phase: 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 operation and maintenance of Upperchurch Windfarm will also maintain the UWF Related Works.

UWF Related Works Decommissioning: The UWF Related Works will cease to function following the decommissioning of the Upperchurch Windfarm. The Internal Windfarm Cables will be pulled from the ducts and will be re-used off-site or recycled in a licensed recycling facility. Realigned Windfarm Roads will be left in situ, for use by the landowner. Haul Route Works will be left in situ. The Telecom Relay Pole and compound will be removed and the footprint of the compound will be reinstated with the soils from the surrounding berms.

UWF Related Works use of Natural Resources: 20.9 hectares of land within the full UWF Related Works construction site which is reduced to just 25m² around the Telecom Relay Pole compound, during the operational phase; 4750m³ of topsoil, 6670m³ of subsoil and 360m³ of rock will arise from excavation works;

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small amounts of potable and non-potable water will be imported onto the site as required; 170m of hedgerow and 4 No. trees will be removed and the equivalent amount replanted following construction.

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

UWF Related Works Waste: UWF Related Works personnel will use the welfare facilities and waste facilities provided at the 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 Upperchurch Windfarm operation and maintenance personnel 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.

3.2.7.5 UWF Other Activities

3.2.7.5.1 Planning Consent Status

Although UWF Other Activities do not require planning permission, they do form part of the Whole UWF Project and therefore are included in the evaluations. A summary description of the UWF Other Activities is provided below. A more detailed description of these activities, along with mapping and figures is included in the [UWF Grid Connection EIA Report, Volume C4 EIAR Appendices -Appendix 5.6: Description of the UWF Other Activities](#).

3.2.7.5.2 Location and Overview of UWF Other Activities

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

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

Monitoring Activities will monitor the Whole UWF Project for compliance with the environmental protection measures and mitigation measures detailed in the Upperchurch Windfarm 2013 EIS and 2013 RFI (including the Construction Environmental Management Plan for Upperchurch Windfarm and the Ecological Management Plan for Upperchurch Windfarm); Planning Conditions attaching to the already consented Upperchurch Windfarm; and measures in the UWF Grid Connection EIA Report (2019), the UWF Related Works Revised EIA Report (2019) and the UWF Replacement Forestry EIA Report (2018), environmental protection measures set out in the Description of UWF Other Activities ([see Volume C4 - Appendix 5.6 of the EIAR](#)), and the Environmental Management Plans for UWF Grid Connection, UWF Related Works and Upperchurch Windfarm. Monitoring will also involve the supervision and recording of key construction activities, and monitoring of progress of land reinstatement. Operational stage monitoring will include monitoring of the success of Upperchurch Hen Harrier Scheme throughout the operational lifetime of Upperchurch Windfarm. Monitoring will also include operational planning conditions and Ecological Management Plan compliance.

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

out according to industry standard method statements, including standard health & safety and environmental management systems

3.2.7.5.3 UWF Other Activities: Construction, Operation & Decommissioning

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

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

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

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

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

3.2.7.6 Rearcross Quarry (existing)

Existing quarry using blasting and hydraulic excavators on a total site area of 8.5ha. Activities involve extraction of aggregate, processing of the extracted material using mobile plant and screening and crushing prior to stockpiling for sale off site. Restoration/rehabilitation of the entire quarry site will take place following the completion of extraction, as per planning conditions. This quarry is just south of Rear Cross village at Shanballyedmond townland. The quarry is located ca.1km to the south of the route of the 110kV UGC along the Regional Road R503. This project was accompanied by Environmental Reports and Appropriate Assessment Screening (Stage 1) Report. Planning Ref: 11510323. *Note: the supply of aggregate to the UWF Grid Connection and Other Elements of the Whole UWF Project will be supplied as part of the consented capacity of the Rearcross Quarry, and no expansion of the quarry is required in relation to this supply.*

In relation to downstream SAC sites: The operational Rearcross Quarry is located in the regional River Shannon (Mulkear) catchment and physically straddles both the Killeengarriff_SC_010 and Bilboa_SC_010 sub-catchments. There is no spatial overlap between the Rearcross Quarry and the 110kV UGC works. Quarry operations only interface with the 110kV UGC works at the point of egress from the quarry access road onto the R503, the quarry operations themselves are ca.2km from the R503. One watercourse crossing (W39) occurs within 50m of the quarry entrance, however no new instream works or culvert replacement works are proposed for 110kV UGC at this location.

In relation to the SPA: the Rearcross Quarry is located within the SPA, 10ha of lands are management for the benefit of Hen Harrier.

3.2.7.7 Curraghduff Quarry (proposed)

This quarry is currently in the planning permission process at Further Information Stage. (Tipperary County Council Ref. 19600317). The extraction of sandstone from a 3.585ha disused quarry site, which includes site entrance and access laneway. It is intended to extract between 590,000 - 690,000m³ of sandstone and to install temporary settlement ponds. Quarry works to entail removal of sandstone by blasting and mechanical digger, dry screening and crushing and restoration of the area on completion of works. It is assumed that the mitigation measures to protect European Sites, will be implemented during the development of the quarry. This application was accompanied by an NIS.

In relation to downstream SAC sites: The quarry is located within the River Suir regional catchment, and is c.600m upstream of the Lower River Suir SAC.

In relation to the SPA: The proposed Quarry works are 5.6km from the SPA, to the east and south east, at its closest. The screening process included as part of this NIS determined that the Slievefelim to Silvermines Mountains SPA will ‘not be impacted’ by the proposed works. The NIS also determined the SPA to be ‘outside the area of impact’ in respect of disturbance to Hen Harrier.

3.2.7.8 Milestone Windfarm (existing)

Milestone Windfarm is an existing 4-turbine windfarm located adjacent to the southwest of the consented Upperchurch Windfarm, with 3 No. turbines consented under planning ref: 12510385 at Knockcurraghbola Commons, Knockcurraghbola Crownlands, Graniera and Shevry and 1 No. turbine consented under planning ref: 1410 at Inchivara and Knockduff. Milestone Windfarm comprises 4 No. wind turbines (each with a maximum tip height of 126m) along with new access tracks, and electrical substation, and associated works. The grid connection associated with Milestone Windfarm is towards the south at ESNB Cauteen Station, cabled along the public road network. A Natura Impact Statement accompanied the planning applications for Milestone Windfarm – Ref: 12510385 & 1410.

Milestone Windfarm is constructed and therefore there will be no construction works during the construction of the subject development or any of the other elements of the Whole UWF Project. Therefore there will be no overlap of construction periods.

In relation to the SPA: Milestone WF is located outside the SPA. Effective Habitat Loss of Hen Harrier habitat occurs where suitable habitat is present within 250m of each existing turbine (n=4) location. However, an

area of lands at Knockcurraghbola Commons is managed as part of a Hen Harrier Management Area for the lifetime of the windfarm for the benefit of Hen Harrier- comprising 10.8ha. This includes rush management, nutrient management, weed control, and the maintenance of edge habitat- all of which should benefit prey items such as small mammals and ground nesting passerine species of birds for Hen Harrier.

3.2.7.9 Castlewaller Windfarm (consented windfarm and *potential* grid connection)

Consented Windfarm: 16 turbines and associated hardstands, electrical substation, internal underground cables, internal access roads, upgrading of existing internal access roads, borrow pits, expansion of drainage system and ancillary works. A Natura Impact Statement accompanied the planning application 11/51/0251 for Castlewaller Windfarm.

Potential Grid Connection: The grid connection for Castlewaller Windfarm is neither currently consented nor proposed. In SID pre-application consultation, commenced in December 2018 with An Bord Pleanála for the grid connection element of Castlewaller Windfarm, the applicant (ABO Wind Ireland) indicated underground cabling to connect the windfarm to Killonan Station, near Limerick City. The *potential* route of this grid connection is predominantly on public roads. Part of the grid route is along the L6009-0, just east of Newport Town which will also be used for the UWF Grid Connection 110kV UGC. A *potential* site entrance off the R503 via an existing forestry entrance (along the UWF Grid Connection route) was also included in the SID Pre-Application consultations for the grid connection. It is assumed that any future application for the grid connection would be accompanied by Appropriate Assessment Reporting. ABP Ref. 303293-19.

Overlap of Construction Periods: Although Castlewaller Windfarm is not likely to be constructed during the same period as UWF Grid Connection (because the Castlewaller Windfarm has not yet been offered a grid connection from EirGrid, and has to obtain planning consent for its grid connection), there is some possibility that this windfarm could be built during the same period as UWF Grid Connection, and therefore the Castlewaller Windfarm project is included in the cumulative evaluation on a precautionary basis.

In relation to downstream SAC sites: the consented windfarm is entirely located in the Newport (Tipperary)_SC_010 sub-catchment upstream of the Lower River Shannon SAC. The route of the *potential* grid connection is assumed, for the purposes of this EIA Report, to be routed along the public road, as indicated during the aforementioned SID Pre-Application consultations. And therefore it is assumed that the potential grid connection will be located in two of the same sub-catchments as UWF Grid Connection - Kileengarrif_SC_010 and Newport (Tipperary)_SC_010. The construction of the Castlewaller Windfarm and potential grid connection will involve both instream works and works in close proximity to watercourses. It is assumed that any future proposal for the grid connection will include Best Practice environmental protection measures, including surface water runoff and invasive species management, which will ensure adverse effects to the integrity of downstream SACs are avoided. No Otter was recorded in baseline studies to inform the Castlewaller Windfarm EIS.

In relation to the SPA: Castlewaller Windfarm is also located within the Slievefelim to Silvermines SPA, with turbines located c.1.2km to the north of the UWF Grid Connection where the 110kV UGC is routed along the R503. This windfarm is located within areas containing suitable foraging and nesting Hen Harrier habitat and in close proximity to known historical and more recent nesting attempts. As per planning conditions, Castlewaller Windfarm will be subject to significant management plans in respect of Hen Harrier. The potential grid connection is routed along forestry/windfarm roads and public roads where it occurs within the SPA. It is assumed that any future proposal for the grid connection will include protection measures for Hen Harrier which will ensure adverse effects to the integrity of the SPA are avoided.

3.2.7.10 Bunkimalta Windfarm (potential) windfarm and associated consented grid connection

Potential Bunkimalta Windfarm & Consented Grid Connection:

Potential Windfarm: c.34MW wind farm in potentially the same general location as the previously consented (and now annulled) windfarm comprising wind turbines, substation compound, access tracks, anemometer masts, potentially borrow pits and soils storage areas and associated site works. The potential windfarm is assumed, for the purposes of this EIA Report, to be located in the same townlands as the previous application – i.e. Bunkimalta, Bauraglanna, Lackabrack, Knockfune and Foilduff at Keeper Hill.

Consented Grid Connection: The Bunkimalta Windfarm (should it be permitted in the future) is expected to connect to the National Grid via the already consented underground grid connection to the existing Nenagh Substation, on the outskirts of Nenagh town. The consented grid connection comprises the Installation of approximately 22.25km of 38kV underground cable (UGC) between Bunkimalta Wind Farm and Nenagh 110kV substation, to be installed primarily in public roads. Bunkimalta Windfarm is located c.3.5km to the north of the UWF Grid Connection. Modifications to the existing entrance from the L-2163 to the Keeper Hill Coillte Forest. The consented Grid Connection was accompanied by a Natura Impact Statement. Planning Ref: 16600433 and 16600432.

Overlap of Construction Periods: Although it is not expected that the Bunkimalta Windfarm will be constructed at the same time as Upperchurch Windfarm or UWF Grid Connection (due to the recent annulment of the Bunkimalta Windfarm planning permission following the European Court of Justice ruling C-164/17), this project and its associated grid connection are nonetheless included in the cumulative evaluation on a precautionary basis. For the purposes of this EIA Report, the Bunkimalta Windfarm is assumed to be located in the same general area (as previously proposed), in the northern part of the upland area. The Bunkimalta Windfarm is assumed in this EIA Report to be similar to the previous application for 16 no. turbines and a substation compound.

In relation to downstream SAC sites: The potential (future) Bunkimalta Windfarm is assumed to be located within both the Kileengarrif_SC_010 sub-catchment and the Newport (Tipperary)_SC_010 sub-catchment, within the catchment area of the Lower River Shannon SAC. The grid connection (consented) is predominately within the public road corridor to Nenagh town and also is partially located within the Kileengarrif_SC_010 and Newport (Tipperary)_SC_010 sub-catchments, though it is not located close to the UWF Grid Connection. The *potential* Bunkimalta Windfarm is located upstream of the UWF Grid Connection only. The construction of the *potential* Bunkimalta Windfarm and associated grid connection will involve both instream works and works in close proximity to watercourses. It is assumed that any future proposal will involve surface water and invasive species controls in line with Best Practice. It is assumed that any future proposal for a windfarm will include Best Practice environmental protection measures, including surface water runoff and invasive species management, which will ensure adverse effects to the integrity of downstream SACs are avoided. No Otter was recorded in baseline studies to inform the original Bunkimalta Windfarm planning application.

In relation to the SPA: It is assumed, for the purposes of this EIA Report, that the *potential* Bunkimalta Windfarm will be located within the Slievefelim to Silvermines SPA, with turbines potentially located c.5km to the north of the UWF Grid Connection 110kV UGC route. Due to its location within an SPA, it is assumed that any future proposal for a windfarm will include protection measures for Hen Harrier which will ensure adverse effects to the integrity of the SPA are avoided, and that any future proposed Bunkimalta Windfarm will have to prove that effects to Hen Harrier will not be significant (in the context of its location within a Hen Harrier SPA).

It is assumed that any future application for the windfarm would be accompanied by a Natura Impact Statement.

3.2.7.11 Newport Town Park

A recently consented public park in Newport town, Co. Tipperary. The Newport Town Park will incorporate children's play area, play equipment, zip wire, outdoor gym equipment, pump track, multi-use games area, recreational walkways, seating, signage, interpretive panels, landscaping and car parking. Work to commence in 2019/2020. Planning Ref: PL92.302960

In relation to SAC sites: The park includes excavations, groundworks, landscaping and car-parking facilities on lands immediately adjacent to the Newport River and overlaps the boundary of the Lower River Shannon SAC. No instream works are associated with the Newport Town Park project. Sediment control, water quality protection, measures for the protection of Otter, and invasive species control measures will be implemented, as conditioned by planning consent.

3.2.7.12 Agriculture

Agriculture in the Surrounding Area: Agriculture is widespread throughout the study area and predominately comprises hill farming with more intensive grassland farming occurring at lower altitudes. General agricultural activities on agricultural lands in the surrounding area, includes dry stock farming, mainly cattle, along with some dairy farming, and some sheep farming. Roughly half of the surrounding landuse in the upland area relates to agriculture.

Hill farming constitutes roughly one half of the land use within the Slievefelim to Silvermines Mountain SPA and is mainly based on the usage of rough grassland. Grazing is a medium ranked activity both in terms of negative and positive impacts on the SPA.

Agricultural activities occur within the catchments of the Lower River Shannon SAC, Lower River Suir SAC and Clare Glen SAC.

3.2.7.13 Forestry

Forestry in the Surrounding Area: General forestry activities in commercial conifer plantations in the surrounding area, includes management of growing forests, along with planting, thinning and harvesting activities. Roughly half of the surrounding landuse in the upland area relates to forestry.

In relation to downstream SAC sites and the SPA: Forestry activities occur within the catchments of the Lower River Shannon SAC, Lower River Suir SAC and Clare Glen SAC. Forestry Services protocols (including water quality protection) define all forestry felling activities and are a condition of each felling license.

In relation to the SPA: Forestry occurs outside and inside the boundary of the Slievefelim to Silvermines Mountain SPA. Approximately half of the SPA is afforested, including both first and second rotation plantations and clear fell areas and forestry is consequently listed as one of the most important activities with high effect on the SPA (High negative rank). Disturbance from forestry operations is part of background trends, limited information is available on magnitude of this however forestry extraction is subject to Forest Service procedure for felling within the Hen Harrier breeding season, this includes full Appropriate Assessment to protect Hen Harriers within SPA's and a requirement to consider an EIA on lands outside of Natura 2000 sites (depending upon the nature of the forestry operations). It is assumed this process will be undertaken for all commercial forestry resulting in no likelihood of significant effects or adverse effects on site integrity.

3.2.7.14 Turf-Cutting

Turf-Cutting: General turf cutting activities which occur in pockets of peatlands in the surrounding upland area. Turf cutting carried out both mechanically and by hand, with cut-over bog evident at a number of locations including at Bleanbeg Bog, Cummermore, Gortmahonoge and at Cummer (Mulloghney).

Turf-Cutting is also a medium ranked negative pressure on the Slievefelim to Silvermines Mountain SPA.

3.2.7.15 Summary Results of Scoping

Each of the Other Unrelated Projects and Activities described at 3.2.7.6 to 3.2.7.14 above were scoped to determine whether these projects had potential to cause in-combination effects to each of the 3 SAC and 1 SPA sites. The results are outlined in Table 2. See Appendix A2 for further details on the scoping of the projects.

Table 2: Scoping of Other Projects in Relation to the European Sites

European Site	Unrelated Project or Activity scoped in for evaluation of in-combination effects
Lower River Shannon SAC	<ul style="list-style-type: none"> ● Rearcross Quarry ● Newport Town Park ● Castlewaller Windfarm ● Bunkimalta Windfarm ● Agriculture, Forestry and Turf-cutting in the surrounding area
Lower River Suir SAC	<ul style="list-style-type: none"> ● Curraghduff Quarry ● Agriculture, Forestry and Turf-cutting in the surrounding area
Clare Glen SAC	<ul style="list-style-type: none"> ● Rearcross Quarry ● Castlewaller Windfarm ● Bunkimalta Windfarm ● Agriculture, Forestry and Turf-cutting in the surrounding area
Slievefelim to Silvermines Mountain SPA	<ul style="list-style-type: none"> ● Rearcross Quarry ● Castlewaller Windfarm ● Bunkimalta Windfarm ● Milestone Windfarm ● Curraghduff Quarry ● Agriculture, Forestry and Turf-cutting in the surrounding area

3.3 Receiving Environment

The context and characteristics of the receiving environment in respect of Aquatic Habitats & Species and Otter (in respect of SAC sites) and Hen Harrier (in respect of the SPA) were described in the EIA Report as part of the Biodiversity evaluation (Chapter 8 of the accompanying EIAR, **Volume C2**). These descriptions have been reproduced hereunder. Descriptions in respect of Habitats (pertinent for consideration of invasive species locations and the SAC Sites under consideration) and General Birds (prey items for Hen Harrier under consideration in respect of the SPA) are also included.

3.3.1 Aquatic Habitats & Species

3.3.1.1 Baseline Context and Character of Aquatic Habitats & Species

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

68 no. watercourse crossings occur within the construction works area boundary associated with the UWF Grid Connection. The majority (63 no.) of which are located in the Lower Shannon & Mulkear River hydrometric area of the River Shannon catchment (crossings W1 to W63), with just 5 No. watercourses located in the River Suir catchment (crossings W64 to W68). The UWF Grid Connection is also located upstream of the Clare Glen SAC.

See [AA Figure 4: Location of UWF Grid Connection in relation to Lower River Shannon SAC](#)
[AA Figure 5: Location of UWF Grid Connection in relation to Lower River Suir SAC](#)
[AA Figure 6: Location of UWF Grid Connection in relation to Clare Glen SAC](#)

Where the 110kV UGC leaves the Mountphilips Substation site, it is entirely located on public roads (W4 to W66) and private paved road (W67 to W68) along its route to the Consented UWF Substation. The watercourse crossings are located in the following EPA sub-catchments: Killeengarriff_SC_010, Newport [Tipperary]_SC_010, Bilboa_SC_010 and the Suir_SC_030.

There are three main watercourses along the route of the 110kV UGC, all of which are within the River Shannon catchment; the Newport River (W7 at the Rockvale Bridge), the Clare (Annagh) River (W36 at the Toorenbrien Bridge) and the Bilboa River (W53 at the Anglesey Bridge). At these crossing locations all three watercourses are evaluated as containing good salmonid habitat, with good/high biological water quality and good ecological status. Crossing works required for the UWF Grid Connection at these three locations will be in the road pavement within the bridge structures, road level raising works and works to increase the height of parapet walls will all be undertaken from the road surface of the bridge.

The Newport River (W7), Clare River (W36) and Bilboa River (W53), which flow through the study area, were generally 4 to 6 metres wide. The smaller Toorenbrien Lower which occurs at W33 and Foildarragh which occurs at W49 are c.1-2m wide, and the remaining Class 1 or Class 2 watercourses were generally shallow fast flowing streams which ranged between 0.5m and 1m wide.

All 68 no. watercourse crossing locations were subject to a site visit by an aquatic ecologist and surveyed to evaluate fisheries habitat suitability, riparian and instream habitat and potential for protected aquatic species. In summary the majority of watercourse crossings for UWF Grid Connection are characterised as minor streams and land drains, which have been subject to previous anthropogenic modification (arterial drainage, drainage maintenance, channel modification, abstractions, diversions, etc.). This has resulted in the reduction of ecological status and fisheries potential in the majority of cases throughout the catchments. A number of watercourse crossing points are heavily poached by cattle and in poor condition due to effluent run-off. A summary of the results of the field surveys for the UWF Grid Connection is included in Table 3.

As per table below, instream works are required at 2 no. watercourses with Fisheries value (at Mountphilips Substation site), with culvert replacement works likely to be required at 1 no. watercourse with Fisheries value.

Table 3: Summary of Watercourses within the UWF Grid Connection Study Area

Class	Watercourse Description	Watercourse Crossing ID	Location	Total No. of Watercourses	Confirmed In-Stream Works	Potentially requiring culvert replacement works
Class 1	Fisheries Value: EPA mapped blue line, major river or stream	W5, W7, W8, W9, W14, W18, W33, W36, W38, W39, W45, W49, W53	Public Roads along 110kV UGC	13	0	1 (W14)
Class 2	Fisheries Value: Headwater Stream Equivalent to EPA blue line but not mapped	W1, W3, W65	Agricultural lands at Mountphilips Substation site Public Roads along 110kV UGC	3	2 (W1, W3)	0
Class 3	Low Fisheries Value: Sub-optimal, heavily vegetated, low or no flow during dry periods	W2, W4, W6, W10, W11, W15, W17, W21, W22, W23, W24, W25, W26, W27, W28, W29, W31, W32, W37, W41, W42, W43, W44, W50, W51, W52, W56	Agricultural lands at Mountphilips Substation site (W2), Public Roads along 110kV UGC	27	1	3
Class 4	No Fisheries Value: Drain, no flow	W12, W13, W16, W19, W20, W30, W34, W35, W40, W46, W47, W8, W54, W55, W57, W58, W59, W60, W61, W62, W63, W64, W66, W67, W68	Public Roads and Private paved road along 110kV UGC	25	0	9
Total				68	3	13

Receiving Environment

Stage 2: Natura Impact Statement

Watercourse crossing locations, watercourse classifications and the boundary of various sub-catchments are identified on [AA Figure 7: Location of Aquatic Habitats, Species and Otter in relation to UWF Grid Connection](#).

Further details on each watercourse are included in [Appendix A3: Inventory & Classification of Watercourses at Crossing Locations](#), and [Appendix A4: Aquatic Habitats & Species Fieldwork & Survey Results](#).

A summary of watercourse crossings on a per catchment basis is presented in Table 4.

Table 4: Summary of Watercourse Crossings for UWF Grid Connection (110kV UGC)

Regional Catchment	EPA sub-catchments ¹	EPA - Local Surface Water Bodies ²	Length of 110kV UGC (km)	No. Water-course crossings	No. Watercourses with Fisheries Value – i.e. Class 1 or Class 2	Watercourses with Fisheries Value which will be subject to new Instream Works	Watercourses with Fisheries Value which will be subject to <i>potential</i> Culvert Replacement Works
Shannon	Killeengarrif_SC_010	Ballyard_010	1.3	4	2	2 (W1, W3)	0
	Newport[Tipperary]_SC_010	Newport_040	3.5	5	5	0	0
	Killeengarrif_SC_010	Annagh (Tipperary)_030	4	7	1	0	0
		Annagh (Tipperary)_020	8.4	23	5	0	1 (W14)
	Bilboa_SC_010	Bilboa_010	6.4	18	3	0	0
		Inch (Bilboa)_010	5.4	6	0	0	0
Suir	Suir_SC_030	Clodiagh (Tipperary)_010	1.5	5	1	0	0

¹ Catchments are listed from west to east along the UWF Grid Connection route from the Mountphilips Substation to the Consented UWF Substation

² Catchment areas as defined in <https://gis.epa.ie/EPAMaps/>

3.3.1.2 Importance of Aquatic Habitats & Species

As above, there are three principal rivers which will be crossed by the UWF Grid Connection located in the Lower Shannon & Mulkear hydrometric area of the River Shannon catchment. At the crossing locations, the Newport River (W7) and the Bilboa River (W53) are designated within the Lower River Shannon SAC. The Clare (Annagh) River crossing (W36) is located approximately 9.5 km upstream of the Lower River Shannon SAC designation on this watercourse. This European Site designation terminates at the downstream point of impassable falls, which creates a migratory barrier for Atlantic Salmon and Sea lamprey. Although these three rivers are not listed as Salmonid Waters under Schedule 1 of the S.I. No. 293/1988, all are designated within the Lower River Shannon SAC within the wider study area and support nationally important Atlantic salmon (within the passable reaches) and resident Brown trout populations. Furthermore, all three watercourse crossings on the Newport, Bilboa and Clare (Annagh) Rivers comprise internationally important aquatic instream habitat for additional water-dependant Annex II species, including Brook lamprey and Otter. The Bilboa River and the Newport River are part of the Lower River Shannon SAC and are therefore of International Importance. The Clare (Annagh) River at the crossing point is evaluated as being of National Importance, taking account of the salmonid fisheries value (resident Brown trout); in addition to its connectivity to the Lower River Shannon downstream; and with cognisance of the water-dependant habitats and species it supports.

In the Suir catchment, the Clodiagh (Tipperary) sub-catchment is identified as a Freshwater Pearl Mussel (FPM) sensitive catchment², containing other **extant** populations of this Annex II listed species. The Clodiagh River population in north Tipperary is not designated as a qualifying interest within the Lower River Suir SAC; where the conservation objectives for the Lower River Suir SAC relate specifically to the Clodiagh (Portlaw) FPM population³, which is connected to the River Suir main channel in Co. Waterford. In the Clodiagh River (County Tipperary), extant Freshwater pearl mussel populations are located downstream of the watercourse crossings, within the SAC boundary and at a distance of approximately 17km from the subject development.

The upper reaches of the Suir catchment within the study area are characterised as land drains (W64, W66, W67 and W68) with one watercourse crossing (W65) identified as providing important juvenile habitat for Atlantic salmon, contiguous with the populations within the Lower River Suir SAC downstream; resident Brown trout populations are also supported within this watercourse. Therefore, the unnamed headwater stream of the Clodiagh River at W65 is evaluated as of ‘Good’ status with ‘Good’ biological water quality and as being of National Importance.

Minor watercourses within the UWF Grid Connection study area which were identified as having fisheries potential (Class 1 or Class 2) are evaluated as being of local importance (higher value). Those watercourses and drains with sub-optimal or no fisheries value (Class 3 or Class 4) are evaluated as being of local importance (lower value), and subsequently scoped out from further evaluation in the impact assessment, in line with guidance (EPA, 2017). Furthermore, a suite of water quality protection measures will be implemented during the construction of UWF Grid Connection and these measures will include all watercourses, regardless of their fisheries value. As evaluated in the EIA Report **Volume C2** (Chapter 11 Water), no effects of greater significance than ‘Imperceptible’ are likely to any of the watercourses in proximity to the development.

3.3.1.3 Sensitivity of Aquatic Habitats & Species

Aquatic ecological receptors, including fisheries, are dependent on prevailing good to high water quality conditions; this includes the chemical water quality character, as well as sediment and nutrient loadings within the affected streams. Both aquatic macroinvertebrates (Freshwater pearl mussel, White-clawed crayfish and pollution sensitive lotic communities generally) and fish communities are sensitive to suspended solids loading (turbidity), as well as the associated effects of siltation within the river channel. Siltation and turbidity have negative implications for fish and invertebrates due to physical damage and reduced feeding/foraging, as well as negative impacts due to compaction of spawning gravels and mortality impacts for salmonid eggs (affecting recruitment) and invertebrate life stages within gravel substrates (interstitial spaces). Suspended solids may be mobilised downstream and affect reaches remote from the source of the suspended solids. Furthermore, fish populations and macroinvertebrate communities may be sensitive to vibration affecting the aquatic environment, arising during construction activities such as directional drilling works.

3.3.1.4 Trends in the Baseline Environment

The UWF Grid Connection is located in the Killeengarrif_SC_010, Newport[Tipperary]_SC_010, and Bilboa_SC_010 sub-catchments which are part of the Lower Shannon & Mulkear hydrometric area of the River Shannon catchment, and the Clodiagh (Tipperary)_010 local waterbody catchment of the Suir_SC_010 sub-catchment of the River Suir catchment. Both the Newport River and Clodiagh River catchments were classified as ‘catch and release’ by IFI in 2019 (Salmon Angling Regulations: Management of the Wild Salmon Fishery 2019) for the conservation of Atlantic Salmon stocks, indicating the ongoing pressures on the salmon populations in these catchments. There is an ongoing and persistent decline in Atlantic Salmon stocks in Irish

² Sourced from online NPWS dataset, available at: <https://www.npws.ie/research-projects/animal-species/invertebrates/freshwater-pearl-mussel/freshwater-pearl-mussel-data>

³ NPWS (2017) Conservation Objectives: Lower River Suir SAC 002137. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

freshwaters overall, pertaining specifically to the European Sites which list this species as a qualifying interest (NPWS, 2013). Pressures and threats affecting the freshwater habitat of salmon correlate directly to those pressures affecting other aquatic ecological interests including lamprey species, aquatic invertebrates and other salmonids (siltation; channelization; drainage maintenance; invasive species and disease vectors; and direct/diffuse pollution from agriculture, forestry and direct discharges). It is noted that morphological pressures such as barriers to movement or channelisation may have varying adverse significance on different species; for example, affecting salmon differently to lamprey species. As per Chapter 11 – Water of the accompanying EIAR (Volume C2), the Water Framework Directive status of the surface water bodies at the study area is typically Good. The majority of the waterbodies are *Not at Risk* with the exception of the Inch (Bilboa)_010 and Clodiagh (Tipperary)_010 which are reported to be At Risk of not meeting the Water Framework Directive objectives, due to morphological and forestry related effects such as suspended sediment and eutrophication. It is noted that the status and risk characterisations have not been updated in the current RBMP (2018-2021), thus characterisation and water quality status are cited as indicative.

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

3.3.2 Otter

3.3.2.1 Baseline Context and Character

Baseline surveys of the UWF Grid Connection recorded evidence of Otter (*Lutra lutra*) within the study area, however limited evidence of breeding or resting sites is present, primarily due to the placement of the majority of work locations within the public road. No active breeding or resting sites for Otter (Couches and/or holts) are present within 300m of UWF Grid Connection.

The Lower River Shannon SAC (site code 002165), which intersects the development at certain watercourse crossing locations, is designated for Otter.

The territories of otters can stretch for several kilometres; the total length of the home range depends on the availability of food. The smallest territories are thought to occur at coastal sites, where territories may be as small as 2km. The longest territories occur in upland streams where an individual may have to range more than 20km to find sufficient food. Territorial marking typically occurs by means of sprainting or anal secretions. These marks are left mostly at features such as bridge footings, boulders, grass tussocks and stream confluences. Within their territories an individual otter may utilise a number of resting sites; these can be hidden refuges above ground (couches), or under-ground chambers (holts). Holts tend to be natural crevices, associated with the roots of trees growing along river and lake banks. These natural recesses provide the otter with a holt that has multiple entrances from which the otter can escape if disturbed. Couches occur frequently in dense vegetation and may be associated with frequently used runs and slides into the water. The rearing of cubs occurs within ‘natal holts’, which are not marked by spraint. Although capable of breeding at any time of the year, a peak in breeding occurs during the summer and early autumn.

Otters that live in rivers and lakes tend to be completely nocturnal, described as being crepuscular – activity peaks at dusk and dawn. Otters are principally piscivorous (fish eating), relying predominantly on salmonids (salmon and trout), but also eel and small fish species such as stickleback. However, otters are not limited to fish and feed opportunistically on a range of prey when available: frogs are frequently eaten by otters, and the remains of invertebrates (crayfish), birds and small mammals have also been found in spraints.

A survey of suitable watercourses was carried out in January and May 2019. A total of 26 watercourses were surveyed for Otter, 300m upstream and downstream, which include the Newport River (W7), Clare River (W36) and Bilboa River (W53) and 23 other watercourses (W5, W8, W9, W18, W21, W22, W23, W26, W28, W29, W30, W33, W35, W39, W41, W42, W46, W47, W48, W49, W50, W51 and W52). There were four records of Otter at 3 locations within the UWF Grid Connection study area, consisting of slides (locations where Otters tend to slide down steep banks), and spraints (droppings). One of the four records was recorded along the River Bilboa within the Lower River Shannon SAC, and consisted of an Otter slide, recorded approximately 60 metres downstream of watercourse crossing W53. An Otter spraint was recorded along the Tooreenbrien Lower River, approximately 45 metres downstream of watercourse crossing W33, with an Otter print recorded underneath the bridge structure. The fourth record relates to an Otter slide which was recorded along the Annagh (Clare) River, approximately 135 metres upstream of watercourse Crossing W36.

No active breeding or resting sites (Holts or Couches) were identified within 300m of any watercourse crossing.

Previous studies undertaken in January 2017 have recorded Otter evidence within the hinterland of the study area. Otter evidence (Otter path) has previously been recorded on the Munnia stream, east of the Mountphilips Substation compound, this location is >300m from the proposed Mountphilips Substation. An Otter slide was also recorded on the Newport River, approximately 980 metres upstream of the UWF Grid Connection 110kV UGC route. Although occupied territories were not recorded at the downstream locations of these records during the 2019 surveys, considering the territories of Otter can be several kilometres long these records are included (VWT, 2019).

No Otters were observed during current surveys, although this is typical in respect of a species where most activity takes place at night. Survey results detailed in [Appendix A5: Otter Fieldwork & Survey Results](#). The location of Otter records within the study area are presented on: [AA Figure 7: Location of Aquatic Habitats, Species and Otter in relation to UWF Grid Connection](#).

3.3.2.2 Importance of Otter

Otter are afforded protection under a number of pieces of legislation/regulation: the Wildlife Act (as amended); EU Habitats Directive 92/43/EEC; Convention on Trading in Endangered Species; and Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats).

Otter is listed as a qualifying interest of the Lower River Shannon SAC and, hence, is evaluated as of International Importance, which is equivalent to a Very High sensitivity rating.

3.3.2.3 Sensitivity of Otter

The conservation status of Otter was obtained from the International Union for Conservation of Nature (IUCN) red list, the Habitat Directive Article 17 Reporting, and the NPWS 2009 Red List for Mammals. According to the IUCN Red List, Otter is listed as ‘Near Threatened’. According to Habitats Directive Article 17 Reporting: Otter is listed as having ‘Favourable’ conservation status. According to the Irish (NPWS 2009) Red List: Otter is classified as ‘Near Threatened’.

Otters can be sensitive to the direct effects from disturbance/displacement from breeding and foraging ranges as a result of noise and visual intrusion. Although this species shows variable or flexible responses to disturbance - where research from English Nature (Chanin, 2013) suggests indicate that Otters will rest under roads, in industrial buildings, close to quarries, and at other sites close to high levels of human activity. Otters are also sensitive to habitat loss and additive mortality from inadvertent contact with operating machinery or vehicles.

The National Parks & Wildlife Service’s Threat Response Plan for the Otter (NPWS, 2009), a review of and response to the pressures and threats to Otters in Ireland, categorized three principal risks implicated in Otter declines across Europe: i) habitat destruction and degradation; ii) water pollution; and, iii) accidental death and/or persecution. Biodiversity Ireland identifies roads, motorways, professional passive fishing, pollution to surface waters, along with the removal of riparian habitats and a decline in eel numbers as the main threats to Otter.

3.3.2.4 Trends in the Baseline Environment

Article 17 reporting suggests there appears to have been a genuine improvement in the status of Otter in Ireland with future prospects evaluated as ‘favourable’ (NPWS, 2019).

A scenario in which this proposed project does not take place would result in a continuation of current trends and populations of otter would be expected to remain as described above, i.e. favourable in the case of Otter, in line with prospects nationally. It is assumed in this report that the baseline environment in relation to Otter, as described herein, will be the receiving environment at the time of construction with ongoing trends as identified expected to be reflected during the operational phase.

3.3.3 Terrestrial Habitats

3.3.3.1 Baseline Context and Character of Terrestrial Habitats in the Study Area

Terrestrial Habitats within the UWF Grid Connection Study Area comprise a mosaic of agricultural grassland, commercial forestry plantations, broadleaved woodland, peatlands, hedgerows, wet grassland, private roads and public roads. Due to the location of UWF Grid Connection mainly along existing public roads within an agricultural setting, for the most part the landscape is dominated by agricultural grassland and other habitats reflective of this e.g. roadside hedgerows, treelines and earth banks, with numerous dwellings, farm buildings and associated gardens, amenity grassland, hedges and lawns.

Within the construction works footprint itself, the Public Road and other built surfaces (BL3) accounts for 24.8ha or 83% of the habitat.

Thirty-seven habitat types (including fifteen types of habitat mosaic) comprising 306.9Ha were recorded along the survey corridor (i.e. within 50m of the construction works areas). The dominant habitats present are buildings and artificial surfaces (BL3) (15%), agricultural grassland (GA1) (36%), wet grassland (GS4) (13%), and a mosaic of built land and amenity grassland (BL3/GA2) (10.5%) which together make up 75% of all habitats present. Conifer plantation (WD4) and Scrub (WS1) have the highest cover of the remaining habitats by area at 8.8%, and 3.5% of the total area respectively. The remaining 13.1% of habitats include mixed/broadleaf/conifer woodland (WD2) (1.9%), riparian woodland (WS5) (1.6%), amenity grassland (GA2) (1.5%) and WS1/GS4 (1%) and a mixture of 27 habitats or habitats mosaics each less than 1% of the overall total within the study area. No Flora Protection Order (FPO) species are present within the construction area boundary.

Habitats of Local Importance (Higher Value) include buildings and artificial surfaces (BL3) (based on possible importance of certain roadside buildings to bats/Barn Owl), scrub (WS1) (importance to local diversity), mixed broadleaf woodland (WD1) (based on importance to birds/mammals), mixed broadleaf/conifer woodland (WD2) (based on importance to birds and mammals), hedgerows (WL1) (level of maturity and value to birds and mammals), tree lines (WL2) (local importance to birds and mammals), and riparian woodland (WN5) (Importance to local diversity and hydrological function). Six linear habitat types comprising Tree lines (WL2), Hedgerows (WL1), Earthen banks (BL2), Drainage ditches (FW4), Depositing/lowland rivers (FW2), and Stone walls (BL1) were also recorded. The total length of linear hedgerow and treelines (or mosaics of both) present within the study area along the survey corridor comprises 39.2km.

Non-native invasive plant species listed on the Third Schedule subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) are herein described. Rhododendron (*Rhododendron ponticum*) is present at 28 locations. Japanese knotweed or Himalayan knotweed infestations were recorded at 17 locations during habitat assessments on the UWF Grid Connection. Giant hogweed (*Heracleum mantegazzianum*) was recorded at one location. Locations of non-native invasive plant species are illustrated in **AA Figure 8: Location of Invasive Species in relation to UWF Grid Connection (extract from ISMP)**.

Cherry laurel (*Prunus laurocerasus*) was recorded at 12 locations, this species, while not listed on the Third Schedule subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) is listed as a ‘High impact’ invasive species by O’ Flynn et al. (2014). ‘Medium impact’ non-native invasive plant species (Kelly et al., 2013, O’ Flynn et al., 2014) recorded included Sycamore (*Acer pseudoplanatus*), Pheasant berry (*Leycesteria formosa*), and Cotoneaster (*Cotoneaster* spp.). Other non-native plant species of lesser significance were also recorded, these included Box honeysuckle (*Lonicera nitida*), Snowberry (*Symphoricarpus albus*), Montbretia (*Crocsmia x crocosmiflora*) and Bamboo (Subfamily Bambusoideae).

3.3.3.2 Importance of Terrestrial Habitats

International importance: Habitats of international conservation importance occur at four locations where the UWF Grid Connection passes though the boundary of the Lower River Shannon SAC. These rivers and

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riparian habitats support habitats and species listed on Annex I and II, respectively, of the EU Habitats Directive 92/43/EEC which are listed as qualifying interests for the Lower River Shannon SAC.

Habitats of National Importance include: Newport River, Clare River, Bilboa River, and Upland/Eroding Streams habitats which are hydrologically connected to the Lower River Shannon SAC, comprising high and good ecological status surface water habitats, and supporting nationally important fisheries and protected fauna.

Habitats of Local Importance (Higher Value) occurring within the survey corridor for the proposed development include wet grassland (GS4), scrub (WS1), mixed broadleaf woodland (WD1), mixed broadleaf/conifer wood-land (WD2), hedgerows (WL1), and tree lines (WL2). A small area of Oak-birch-holly wood-land (WN1) at Scraggeen was found to correspond to the EU Habitats Directive 92/43/EEC habitat, ‘Old sessile oak woods with Ilex and Blechnum, in the British Isles (91A0)’, and is therefore evaluated as being of County Importance. A small area of Wet heath/Wet grassland (HH3/GS4) habitat mosaic was found at Loughbrack Townland; wet heath corresponds to EU Habitats Directive 92/43/EEC Annex I habitat ‘North-ern Atlantic wet heaths with Erica tetralix (4010)’, however as the area of habitat in question was very limited in extent and degraded through grazing and drainage it is considered to be of Local Importance (Higher Value). An area of Lowland blanket bog (PB3) was found at Reardnogy Beg, this habitat corresponds to EU Habitats Directive 92/43/EEC Annex I habitat to ‘Blanket bogs (7150)’; however, this area of bog was found to be in poor condition due to evidence of peat harvesting and substantial colonization by invasive Rhododendron. With the exception of 0.05ha of Wet Grassland (GS4) at Mountphilips Substation site, none of the above described habitats are located within the works area and hence will not be directly impacted by the UWF Grid Connection. It is noted that the Mountphilips Substation site is predominantly (1.7ha) Improved Agricultural Grassland (GS1), which is of Local Importance (Lower Value).

Due to the location of sections of the UWF Grid Connection 110kV UGC within an SPA designated for Hen Harrier, a number of habitats along the route of the 110kV UGC support the structure and function of the SPA. This primarily includes foraging habitats in the open landscape (grassland, heath and bog) habitats.

3.3.3.3 Sensitivity of Terrestrial Habitats

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

3.3.3.4 Trends in the Baseline Environment

The present survey forms a baseline classification of habitats on or near the subject development. No previous habitat information at a suitable scale is available from which trends can be identified or changes evaluated. Reporting on trends with regard to protected habitats and species under the EU Habitats Directive is provided to the EU under Article 17 of said directive. Overall trends for some Annex quality habitats present within the receiving environment such as Wet Heath are included therein and evaluated nationally (stable in the case of Wet Heath for example). Availability of trends in respect of locally important habitats is limited (Browne, 2007). We would note that the onsite Wet Heath was subject to cattle grazing at the time of the windfarm EIS (2013), and this is still the case. Likewise, in respect of Upland Blanket Bog, the windfarm EIS has previously identified degradation from peat extraction, land reclamation, conifer planting, grazing and drainage. The latter two pressures are still present and therefore represent an ongoing trend. This trend is expected to continue the degradation of these particular habitat types regardless of the proposed development. As such, a scenario in which the Subject Development does not take place would result in a continuation of current trends relating to habitats within the study area.

3.3.4 Hen Harrier

3.3.4.1 Baseline Context and Character

3.3.4.1.1 Character

The harriers (genus *Circus*) are all fairly large hawks with long, broad wings, long tails and legs and slim bodies (Watson 1977). The Hen Harrier *Circus cyaneus* is a medium sized, ground nesting bird which is specifically suited to foraging (hunting) at low height over open ground containing preferred prey species. Their long wings and hunting technique does not equip them for hunting in closed woodland. They were once widespread throughout Ireland but by the early 20th century their numbers had been substantially reduced (O’Flynn, 1983).

In Ireland the Hen Harrier is confined largely to heather moorland and young forestry plantations, where they nest on the ground. They are found mainly in Counties Laois, Tipperary, Cork, Clare, Limerick, Galway, Monaghan, Cavan, Leitrim, Donegal and Kerry. The current national breeding population is estimated at 108 - 157 breeding pairs (Ruddock *et al.*, 2016). The most recent estimate of the national wintering population, from Irelands Article 12 submission to the EU, is 269-349 individuals. Wintering birds may comprise native breeding birds but also birds from overseas which visit Ireland during the winter months (Wernham *et al.*, 2002; Etheridge & Summers, 2006).

Ireland holds the most westerly breeding population of Hen Harrier in Europe.

It has been shown in Ireland (Wilson *et al.*, 2006) that breeding Hen Harriers avoid areas where less than 30% of the landscape comprises suitable habitats such as bog (used for foraging and nesting), rough pasture (used for foraging) or young forest (used for foraging and nesting).

Studies have also shown that Hen Harrier demonstrate high nest fidelity (faithfulness) and use nest sites on a traditional basis (which may include different birds using sites on an annual or irregular basis over many years (e.g. Amar & Redpath, 2002, Hardey *et al.*, 2014).

The mechanism for the selection of nesting sites by Hen Harrier is not perfectly understood and is thought to relate to micro-climatic and habitat variables (e.g. shelter, aspect, vegetation present at the actual nest location) as well as macro-habitat determinants (larger scale landscape related influences such as showing a preference for open moorland, heath, young conifer etc.) (Redpath *et al.*, 1998; Wilson *et al.*, 2009).

Hen Harrier foraging habitat preferences during the breeding season are generally biased towards moorland, grassland mosaics and pre-thicket forest habitats which support larger numbers of prey species. Ruddock *et al.*, 2016, reported that Hen Harrier were more frequently recorded foraging over heather moorland (30%), second rotation forest (18.7%), rough grassland (12.4%) and thicket stage forest (12.4%). In a published study of 900 Hen Harrier pellets in Ireland covering winter and breeding seasons, Hen Harriers were found to have a diverse diet, which varies between areas and seasons and includes small mammals, birds, amphibians and reptiles - up to 78% of the diet of Hen Harriers in Ireland was shown to comprise passerine species of birds (Irwin *et al.*, 2012).

Hen Harrier are considered as ‘central-place’ foragers with most foraging taking place during the breeding season within a ‘core range’ of 2km from nests (SNH, 2018, Irwin *et al.*, 2012). During the breeding season females hunt closer to nest locations (typically <1km) whereas males hunt further away (Arroyo *et al.*, 2006). In a remote tracking study in the Irish context, the concentration of Hen Harrier hunting behaviour was more than 10 times higher within 1 km of the nest than it was between 2 and 5 km from the nest (Irwin *et al.* 2012).

Hen Harrier wintering grounds are typically lowland sites below 100m. During winter, Hen Harriers gather at communal or solitary roost sites. In Ireland the majority of these roost sites are located in reed beds, heather/bog and rank/rough grassland but also fen, bracken, gorse or saltmarsh. Approximately 20% of known roosting sites in Ireland occur within close proximity to core nesting areas. In 2014, approximately 96 confirmed solitary and communal roosts were known in Ireland, and were estimated to support between 219 – 313 individuals (B. O’Donoghue, pers comm cited in NPWS, 2015). Within continental Europe maximum numbers of up to 50 birds have been recorded at winter roosts, and in the Irish context, up to 10 birds has

been documented (Watson, 1977). Winter hunting grounds cover a much wider range and greater variety of habitats than Summer (Watson, 1977).

3.3.4.1.2 Context

The UWF Grid Connection comprises the Mountphilips Substation site, which is located to the west of the Slieve Felim & Silvermine Mountains upland area, and the 110kV UGC which is routed from the Mountphilips Substation to the already consented Upperchurch Windfarm (UWF) Substation to the east of the upland area. The Mountphilips Substation is not located within the SPA; however, the 110kV UGC, which is 30.5km in length, passes through the boundary of the SPA for 8km in total. Where the 110kV UGC is routed outside of the Mountphilips Substation site (including through the SPA area), the 110kV UGC is entirely located within paved roads. The public road in question, through the boundary of the SPA, is the aforementioned Regional Road R503 which links Thurles to Limerick city.

See **AA Figure 9: Location of UWF Grid Connection in relation to Slievefelim to Silvermines Mountain SPA.**

The landcover of the surrounding upland area is predominately agricultural grassland and commercial forestry, with regional and local roads occurring throughout connecting the towns of Thurles, Nenagh, Cappawhite, Cappamore, Tipperary Town, Newport and Limerick city, in addition to several smaller villages such as Hollyford, Upperchurch, Kilcommon, Rearcross, Murroe, Doon and Silvermines.

This upland area also includes the Slievefelim to Silvermines Mountain Special Protection Area (SPA), which is a European Site designated under the EU Birds Directive (2009/147/EC) of special conservation interest for Hen Harrier.

The Slievefelim to Silvermines Mountain SPA as a whole covers 20,917ha⁴, has held between seven (2010) and ten (2015) pairs of nesting Hen Harrier (Ruddock *et al.*, 2016), and is considered one of the strongholds for Hen Harrier in the country. The SPA has a high proportion (70%) of suitable habitat, totalling 14,552ha (extrapolated from data in Moran & Wilson-Parr, 2015). Within the SPA, nesting Hen Harriers have shown a preference to nest in the early stages of new and second-rotation conifer plantations, though some pairs may still nest in tall heather of unplanted bogs and heath⁵. Hen Harrier surveys, carried out between 2016 and 2019 for the UWF Grid Connection, found that Hen Harriers within the UWF Grid Connection Study Area all nested within this SPA – no nests were recorded outside of the SPA boundary.

In terms of the proposed development, the Mountphilips Substation is not located within the SPA; however, the 110kV UGC, which is 30.5km in length, passes through the boundary of the SPA for 8km in total. Where the 110kV UGC is routed outside of the Mountphilips Substation site (including through the SPA area), the 110kV UGC is entirely located within paved roads. The public road in question, through the boundary of the SPA, is the aforementioned Regional Road R503 which links Thurles to Limerick city. In relation to traffic volumes, while the R503 is not a congested road, there is some variation in traffic usage along the route dependant on proximity to local facilities such as schools, with traffic levels higher nearer to Newport. There are 317 houses and 17 community facilities within 100m of the route of the 110kV UGC.

3.3.4.1.3 SPA Connectivity

Guidance is available from Scottish Natural Heritage (SNH) to assist in establishing levels of connectivity to designated SPA's. Connectivity distances per species included are set out from a literature review that examined ranging behaviour. SNH specifically recommends that *"in most cases the core range should be used when determining whether there is connectivity between the proposal and the qualifying interests"*. A core foraging range of 2km from nests sites during breeding is presented for Hen Harrier in this Best Practice Guidance (SNH 2018).

As the proposed development passes through the boundary of the SPA for over 8km, connectivity is assumed.

⁴ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004165.pdf>

⁵ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004165.pdf>

3.3.4.1.4 Nearest Nesting Sites to UWF Grid Connection

In line with the justification as set out in Best Practice⁶, nests within 2km of the proposed development have been identified for the current appraisal over a study period spanning 2017-2019 inclusive. However, a precautionary approach has been taken to include the presentation of nest data out to 3km from the proposed development – this reflects that in certain instances the central point of observed breeding activity is often variable within a breeding season or inter-annually, and due to this potential for variation, it is considered that this more comprehensive, precautionary approach is required for completeness.

Methods for the current study included a systematic review of desktop information, consultation with local experts and NPWS and fieldwork in line with Best Practice methods. The results of previous Hen Harrier surveys (2016, 2017 to inform the previous 2018 UWF Grid Connection (PL92.301959), and 2019 fieldwork to identify breeding behaviour (in April 2019) and active nests (in June and July 2019) within the study area are presented. For the purpose of this appraisal, all confirmed nests and /or centre points of observed breeding behaviour are considered as nesting attempts, in line with a precautionary approach⁷ and established Best Practice in the evaluation of nesting attempts⁸. For the avoidance of doubt, although studies conducted in 2016 and 2017 were in relation to a different 110kV UGC route for the previous 2018 UWF Grid Connection application (PL92.301959) and therefore different study extent, consultation with local experts and NPWS was undertaken in 2019 for the current appraisal to determine whether or not additional nests were known from any areas outside the prior study extent. Results of this consultation was used to scope possible territories requiring survey in 2019 (within 2km of the now proposed route of the 110kV UGC) in line with Best Practice (Hardey *et al.*, 2014) and for which the results are herein presented. Based on information on nest territories in 2016-2018 obtained through consultation, the 2019 study results which confirm the location of these previously identified territories, and the cautionary approach in assigning nest status to any observed breeding activity, data presented herein is considered complete and sufficient to inform the evaluation of likely significant effects.

Hen Harrier nests and/or nesting attempts for the period 2016-2019 and within 3km of the proposed development are shown in Table 5. In general terms there are 7 traditional nesting territories within and up to 2km from the proposed development (A-G) - with a further 3 traditional territories within 3km (H-J); i.e. 10 traditional territories in total within 3km. Not all of these are occupied in any given year, however, with, for example, only 7 of the 10 territories confirmed as active during the 2019 breeding season.

For the period 2016-2019, 9 nests were recorded within 2km, with a further 3 nests within 3km, and 1 nest at 3.2km from the development (13 nests in total), all of which were located on lands within the SPA boundary, (note that nest locations G1, G2 and G3 are considered to be the same occupied territory, as are locations H1 and H2, with slight inter-annual variation in the exact nest location within that territory). Four of the seven active territories identified in 2019 had successful nests (i.e. these were still active in July 2019 having either recently fledged young or with large chick(s) still in the nest at that time).

⁶ Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind Farms. Version 2. SNH, Battleby.

⁷ Not all breeding activity observed potentially becomes a breeding attempt- however a precautionary principle is applied.

⁸ Hen Harrier Project, (2019). HARRIER HEN PROGRAMME Terms and Conditions 2nd Edition April 2019. Hen Harrier Project, Oranmore, Co. Galway. Note 6, Pg. 22

Table 5: Identified Hen Harrier Nests within 3km of the proposed UWF Grid Connection, 2016-2019

Nest	Distance to UWF Grid Connection (km)	Most recent year when active
A	0.6	2016
B	1.0	2019
C	0.9	2019
D	1.5	2019
E	1.8	2019
F	2.0	2019
G1	1.8	2019
G2	2.0	
G3	1.9	
H1	2.6	2019
H2	3.2	
I	2.4	2016
J	2.6	2017

With regard to proximity to works and therefore exposure to source impact pathways for possibly significant effects, the closest identified nest in any year to the proposed UWF Grid Connection development was 0.6km away (breeding territory A in 2016), with the closest active nest (or centre-point of a territory) in 2019 0.9km from the nest (breeding territory C).

No nest occurs closer than 600m to the proposed development. No nests were recorded within 2km of the Mountphilips Substation site, with the nearest nest being 4.6km from Mountphilips (Nest A in 2016).

3.3.4.1.5 Nesting Habitat in the UWF Grid Connection Study Area

As noted earlier, Hen Harrier are essentially central place foragers, with most foraging taking place during the breeding season within 2km of nests. They are also faithful to traditional nesting sites or territories and regularly nest year after year in the same general location (Hardey *et al.*, 2014). The heretofore identified nests (A-J) are therefore reasonably considered to accurately reflect any short-term nesting or likely nesting territories which may overlap the proposed time period for construction.

Nevertheless, cognisance is being given in the current evaluation to the general availability of nesting habitat, within 2km of the proposed development, notwithstanding whether Hen Harrier territories have been recorded within this area. This is to provide contextual information on the general availability of nesting habitats and to allow for evaluation if required of the degree of displacement habitat available for nesting harrier within the study zone stipulated in Guidance.

All habitats within 2km of the proposed UWF Grid Connection development (whether within the SPA or outside the SPA) were evaluated for their suitability as nesting habitat for Hen Harrier. Habitats identified as suitable for nesting by Hen Harriers within 2km of the proposed UWF Grid Connection were wet grassland, peatland habitats (including heath), scrub, dense bracken and both pre- and post-thicket forestry (as per Ruddock *et al.*, 2016). Habitats considered unsuitable for nesting included agricultural grasslands (including improved grasslands and rough grazing), clearfell, hedgerows and treelines (Ruddock *et al.*, 2016).

Of the 8,343ha of lands present within 2km of the proposed UWF Grid Connection development, 3,580ha (43%) was considered to provide suitable nesting habitat for Hen Harrier, with 4,763ha (57%) classed as unsuitable. The latter percentage includes all the lands at Mountphilips – there is no suitable nesting habitat at this location.

The availability of suitable habitats within 2km of the proposed UWF Grid Connection therefore exceeds the 30% threshold indicated by Wilson *et al.* (2006) for Hen Harriers to use the landscape.

However, while there is sufficient nesting habitat (43%) to support Hen Harrier within 2km of the UWF Grid Connection, at closer distances to the proposed UWF Grid Connection the habitats are considered to be less attractive at least to nesting Hen Harriers - within 50m of the proposed UWF Grid Connection works for example, all habitats (a total of 340ha), only comprised 38ha (11%) as suitable nesting habitat for Hen Harrier. This undoubtedly reflects the location of the route of the 110kV UGC on primarily public road.

The appropriate core foraging range is illustrated on **AA Figure 10: Habitat Suitability within the Core Foraging Range of Hen Harrier Nests** and **AA Figure 11: Habitat Suitability within 2km of UWF Grid Connection**. In line with Best Practice, the background mapping, townlands, geographical context, precise locations of nests are not provided, to protect Hen Harrier.

3.3.4.1.6 Foraging habitat within the 2km core range of identified nests

The consideration of the availability of suitable *foraging* habitat is required to determine the likelihood of source impact pathways related to disturbance impacting on foraging Hen Harrier, during the breeding season and potentially resulting in reduced breeding success.

Hen Harriers primarily forage within 2km of the nest, and therefore this core range of 2km around identified nests has been selected for further consideration.

Within this radius of nests *breeding* Hen Harrier will be more susceptible to displacement related effects where sources of disturbance occur within 150m of suitable foraging habitat (based on the Minimum Approach Distance or MAD⁹) A subset therefore of all suitable habitats within 2km of an identified nest location, and which also occur within 150m of proposed works is examined further within the relevant evaluation tables for disturbance in Section 3.9.

Collectively, the total area of lands suitable for foraging Hen Harrier within 2km of all nests combined comprise 5,413ha or 43% of the total lands within 2km of all identified Hen Harrier nests (12,560ha). Linear features comprising 332km are also present which may offer foraging opportunities.

On an ‘individual territory’ basis, none of the 10 regularly occupied territories currently (2019) have less than 33% foraging habitat available (range 33%-54%) within 2km of their individual nest locations (or identified central point of territory).

As noted, at least 30% suitable habitat is required for an area to be attractive to Hen Harrier. Foraging habitat analysis demonstrate that there is foraging habitat greater than this threshold available within the core foraging range comprising a 2km radius of the nests identified, individually (33% - 54%), collectively (43%) and also on a per territory basis.

The appropriate core foraging range is illustrated on **AA Figure 10** and **AA Figure 11**.

3.3.4.1.7 Winter Roosting Habitat in the UWF Grid Connection Study area

In the winter months harriers often roost communally, typically in habitats such as reedbeds and heather less than 100m above sea level (ASL). However, small numbers of communal roosts exist at higher altitudes. Roosts are often traditionally used sites (Clarke & Watson, 1990), and selection of same may not be based on habitat suitability alone, with other factors such as land use change, levels of disturbance, etc. being critical determinants (Clarke & Watson, 1990).

In relation to roost sites, suitable roosting habitats (reed beds, heather/bog and rank/rough grassland but also fen, bracken, gorse) are not widely available, with very small fragmented patches of habitat are located within 2km of UWF Grid Connection. Specific roosts are described in Section 3.3.4.1.8 below - it is considered

⁹ 150m is the Minimum Approach Distance (MAD) (Livesey et al., 2016) indicated for likely disturbance in respect of Falconiformes (the family of birds with characteristics most similar to Hen Harrier).

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that these comprise the only roost locations likely to be used with sufficient frequency to be considered in terms of possible source impact pathways.

3.3.4.1.8 Winter Roosts in the UWF Grid Connection Study Area

No communal roost was identified within 2km of UWF Grid Connection during 2016-2018 surveys. 1 no. roosts exist at 2.1km from the UWF Grid Connection in Goulmore townland, with 2 further roosts between 3.3km and 3.6km from the UWF Grid Connection (110kV UGC). Based on desktop review, and the results of scoping and consultation with local NPWS/Hen Harrier surveyors no other roosts have been identified. There are therefore no known roosts within the likely zone of effect of the proposed development.

Based on studies conducted for the previous planning application (PL92 .301959) the roost population of the UWF Grid Connection study area was previously estimated as 0-5 birds (based on a maximum of 5 birds recorded concurrently across all roosts on any given day, from 2 winter seasons of effort). This has the potential to increase or decrease dependant on inter-annual variation, weather or other factors. The maximum count of 5 birds at any individual roost (comprising 4 adult males and one female) was only recorded on a single occasion, in January 2018.

Further details on fieldwork and survey results for Hen Harrier is contained in [Appendix A6: Hen Harrier Fieldwork & Survey Results](#) and [Appendix A7: Hen Harrier Surveys at Upperchurch Windfarm 2015 – 2017](#)

3.3.4.2 Importance of Hen Harrier

Hen Harrier is listed on Annex I of the EU Birds Directive 2009/147/EC. In 2007, six Special Protection Areas (including the Slieve Felim to Silvermines Mountains SPA) were designated across the country with breeding populations of Hen Harrier as the sole Special Conservation Interest to ensure the conservation of the species. The breeding population of Hen Harrier is Amber listed on the most recent Birds of Conservation Concern in Ireland 2014 – 2019 (Colhoun and Cummins, 2013). The Slievefelim to Silvermines Mountain SPA is only designated for breeding hen harrier. Both breeding and wintering Hen Harrier present are evaluated as Internationally Important and assigned a sensitivity rating of **Very High** (equivalent to NRA International Importance) for the purpose of evaluation.

3.3.4.3 Sensitivity of Hen Harrier

3.3.4.3.1 Sensitivity to Habitat Loss

Studies have shown that most foraging takes place within 2km of the nest site, and as per SNH Guidance this is considered the core foraging range for Hen Harrier during the breeding season. The magnitude of effects is distance (to nearest nest) dependant, as both frequency of occurrence and foraging intensity decreases with distance from the nest. Of particular importance and where pathways for likely significant effects are more likely are lands which provide high quality foraging habitat within 2km of nests and on which breeding Hen Harrier (male or female birds) may be dependent during key periods of the breeding cycle such as provisioning young. Loss of suitable habitat may affect breeding success/productivity for one whole cycle, or until vegetation is re-instated both when considered alone and in combination with other possible sources of loss.

3.3.4.3.2 Sensitivity to disturbance

At the nest

Hen Harriers are known to be sensitive to disturbance at the nest (Masden, 2010, Pearce-Higgins *et al.*, 2012). The effects of significant disturbance to Hen Harrier may be nest desertion, reduced incubation periods (resulting in embryo mortality), or additional stress on adult birds due to their propensity to alarm at intruders. Some or all of these effects may result in longer term abandonment of (traditionally held) nesting areas, with resultant local and/or population level effects.

Whilst raptors in general may accept short infrequent disturbance events proximal to nests, and may even be highly tolerant of certain sources of disturbance, sudden changes during critical periods such as the start of the breeding season may provoke a higher level of response (Petty, 1998) with consequent effects on breeding success and local reproductive rates.

Ruddock and Whitfield, 2007, provides background citations from the grey literature on disturbance to Hen Harriers from construction and human activities (e.g. Brown and Amadon 1968, Newton 1979). In addition, the paper cites further references to buffer zone recommendations within the literature, such as Romin and Muck (1999), who recommended a 500m buffer for Northern Harrier, a species very similar to Hen Harrier, and formerly considered conspecific (i.e. the same species). The expert review of disturbance presented by Ruddock and Whitfield (2007) suggests active disturbance events during the incubation (part of breeding) period for Hen Harrier are, in the view of the majority of experts, likely to occur at <10-500m from a nest.

Hen Harrier, whilst at the nest, are evaluated as potentially sensitive to disturbance from construction related activities (during the breeding season) at distances of 500m or less.

Whilst foraging

There have been no specific studies examining the flight initiation distance (FID) of Hen Harriers to human disturbance. However, 150m is the Minimum Approach Distance (MAD) (Livesey *et al.*, 2016) indicated for likely disturbance in respect of Falconiformes (the family of birds with characteristics most similar to Hen Harrier).

A study on FIDs on Northern Harrier *Circus cyaneus hudsonius* from aircraft suggested a mean FID of 70m (Booms *et al.*, 2010) implying that birds may react to disturbance of similar magnitude (90db) at a distance of 105m. In a wider review of FIDs, Livesey *et al.* (2016) indicated a mean FIDs for Falconiformes of 89.7m (with a Minimum Approach Distance (MAD) 134.5m) (for pedestrian-based disturbance) and 79.7m (MAD 119.5m) (for motorized vehicles). However, birds will be habituated to certain background activities and react less to artificial noise versus the presence of humans.

Collectively, these data would conservatively suggest that the MAD indicated in Livesey *et al.*, 2016 is acceptable to assume for the current appraisal, and therefore it is concluded that foraging Hen Harrier are unlikely to be impacted by disturbance events over 150m away and within this distance only events of similar magnitude to the sources described (e.g. at 90dB) may have any effect. A 150m buffer of the proposed development is taken as the zone wherein effective habitat loss may take place following disturbance through noise or visual intrusion, should suitable foraging habitat be present within this radius of works which also overlaps the 2km core foraging range of any given nest location. Breeding Hen Harrier are evaluated as sensitive to disturbance within this distance (150m) from works – given the potential for secondary effects on breeding success.

3.3.4.3.3 Sensitivity of Roosting Hen Harrier

As a species that disperses widely during the winter from breeding sites (Watson, 1977), Hen Harrier are less restricted to specific foraging areas (i.e. non-breeding birds are not territorial) during the non-breeding season. As a consequence, foraging Hen Harrier are evaluated as less sensitive to disturbance at this time, as any individual encountering sources of disturbance will not be tied to a defined territory, and would have ample displacement habitat available within which to forage in the event of a brief disturbance event.

In relation to disturbance in proximity to winter roosting sites; birds are known to forage extensively from regularly used roosting sites (at least up to 24km see Watson, 1977) (compared to a 2km core range for nesting sites) and, in comparison to during the breeding season show little fidelity¹⁰ both of which reduce sensitivity to disturbance related effects.

Windfarms and associated infrastructure have not been explicitly defined as a threat or pressure on roosts within the Irish context.

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

3.3.4.3.4 Positive Sensitivity towards habitat creation or sympathetic management

Hen Harriers are positively sensitive to the creation of or sympathetic management of foraging and nesting habitat within their traditional range (Forrest *et al.*, 2011). Multiple studies exist where Hen Harriers have continued to nest and forage in close proximity to operational wind energy developments where inclusive habitat ‘enhancement’ was provided (Forrest *et al.*, 2011; Robson, 2011 as cited in NPWS, (draft) 2017¹¹).

3.3.4.4 Trends in the Baseline Environment

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

The Slievefelim to Silvermines Mountains SPA was one of only two SPAs to record an increase in breeding territories between 2005 and 2015 (Ruddock *et al.*, 2016). It also had the greatest proportional increase in population, with an estimated population of five pairs in the SPA in 2005 rising to a total of ten pairs being estimated in the SPA in 2015. Apart from the Slieve Bloom Mountains SPA, where the Hen Harrier population rose from five pairs in 2005 to 13 pairs in 2015, the remaining four SPAs designated for the conservation of Hen Harrier all showed reductions in the number of breeding territories recorded from 2005 to 2015 (Ruddock *et al.*, 2016).

Habitat use in the 2015 National Survey of Hen Harrier indicated that second rotation forestry was the most common nesting habitat selected followed by heather. Out of 108 confirmed nesting territories, 64 (59%) were in second rotation forestry with 28 nests (26%) of nests in heather. More scarcely used habitats included scrub (nine nests), first rotation forestry (six nests) and failed forest (one nest).

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

“Forests less than 15 years old constitute to varying degrees a potential foraging resource for Hen Harriers. In line with the forecasted reduction in the extent of the forest nesting resource, indicative future estimates of the extent of the potential forest foraging resource within the SPA network shows an acute declining trend over the next 10 years¹²”. This negative trend is also applicable to the Slieve Felim to Silvermines Mountains SPA.

¹¹ NPWS. 2017. *Hen Harrier Conservation and the Renewable Energy Sector in Ireland (Draft)*.

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

3.3.5 General Birds

3.3.5.1 Baseline Context and Character of General Bird Species in the UWF Grid Connection Study Area

The receiving environment in the UWF Grid Connection Study Area supports a wide variety of general bird species of open countryside and farmland, in addition to more specialist upland species. Some migratory species are only present during the summer or winter months within which they disperse widely over suitable habitat, whilst other sedentary species are present throughout the year.

General Breeding Birds

A standardised bird transect survey was undertaken at the Mountphilips Substation site in the breeding season of 2016 and 2017 and a similar transect methodology was also used to survey whole length of the proposed 110kV UGC route in April 2019 (including again the lands at Mountphilips – covered under Transect T40).

The three breeding season surveys at the Mountphilips substation site recorded a total of 36 species, including one species, Meadow pipit that is Red-listed as a Bird of Conservation Concern in Ireland (BoCCI; Colhoun & Cummins, 2013). A further eleven Amber-listed BoCCI species were recorded (Barn Swallow, Goldcrest, Greenfinch, House Sparrow, Linnet, Mistle Thrush, Robin, Starling and Stonechat). Although breeding status was not confirmed during this survey effort it is likely that all these species could potentially breed within the vicinity of the Mountphilips substation due to the presence of suitable habitats.

In the April 2019 survey along the entire length of the proposed 110kV UGC route, a total of 50 bird species were recorded and although breeding for all species was not confirmed, it is likely that 49 species could possibly be breeding in the vicinity of the route (the exception being a casual record of Lesser Black-backed Gull during surveys – a species which breeds on coasts or large inland waterbodies in Ireland, and were likely to have been recorded on passage through the survey area). During the April 2019 transect survey along the proposed 110kV UGC route, two bird species that are Red-listed as Birds of High Conservation Concern in Ireland (Colhoun & Cummins, 2013) were recorded: Grey Wagtail and Meadow Pipit. In addition, 16 Amber-listed Birds of Conservation Concern in Ireland (Colhoun & Cummins, 2013) were also recorded (Dunnock, Goldcrest, Greenfinch, House Sparrow, Linnet, Mistle Thrush, Robin, Skylark, Stonechat, Barn Swallow, Sparrowhawk, Sand Martin, House Martin, Kestrel, Lesser Black-backed Gull and Starling).

The species recorded during the surveys at Mountphilips Substation site and along the route of the 110kV UGC are all representative of common and widespread terrestrial breeding bird communities in Ireland, being typical of the mosaic of farmland, woodland and rural gardens found in the survey areas. The full list of species is included in [Appendix A8 General Birds Fieldwork & Survey Results](#).

No species on Annex I of the EU Birds Directive were recorded during any of these surveys.

During Hen Harrier vantage point surveys during the non-breeding season 2017/2018 two bird species that are Red-listed as Birds of High Conservation Concern in Ireland (Colhoun & Cummins, 2013) were recorded: Golden Plover and Meadow Pipit. In addition, 3 Amber-listed Birds of Conservation Concern in Ireland (Colhoun & Cummins, 2013) were also recorded (Snipe, Sparrowhawk, and Kestrel).

General Wintering Birds

A repeat of the breeding bird survey at the Mountphilips substation was undertaken in the winters (November-February) of 2016-17 and 2017-18. For these surveys, a total of 25 species were recorded in the vicinity of the Mountphilips substation during transect surveys in the winter of 2016-17 and 2017-18. As with summer, Meadow Pipit was the only BoCCI Red-listed species recorded, along with five BoCCI Amber-listed species (Snipe, Goldcrest, Starling, Robin and House Sparrow).

Based on the range of terrestrial habitats mapped and based on observations made during these surveys of the Mountphilips Substation site and the 110kV UGC route, the general wintering bird community is typical of common and widespread bird communities found in the wider countryside in Ireland.

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Meadow Pipit

Terrestrial habitat surveys indicate that Meadow Pipit habitat is widespread along the 110kV UGC route. A total of 98 Meadow Pipits were recorded along the 110kV UGC route in April 2019 and breeding in the fields adjacent to the survey transect is therefore likely. A maximum of two birds were recorded in the vicinity of the Mountphilips Substation site in the 2017 breeding season. Meadow Pipit have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

This species is generally site-faithful, although there is some post-breeding dispersal in winter months, particularly from upland areas to lowland habitats.

3.3.5.2 Importance of General Bird Species

All wild bird species are protected by legislation under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000. Merlin, Peregrine Falcon, Golden Plover and Kingfisher are listed on Annex I of the EU Birds Directive 2009/147/EC. Eurasian Curlew is now classified on the IUCN Red List as ‘near threatened’.

Notwithstanding the protection afforded to some bird species at EU level, the importance of each species in relation to the UWF Grid Connection area takes account of international classifications and the occurrence of the species at the site within the context of resident or regularly occurring local populations, county populations or those at a national or international level.

Although not listed on either Annex I or II of the EU Birds Directive, due to its importance as a prey item for Hen Harrier in the context of the nearby Slievefelim to Silvermines Mountain SPA, Meadow Pipit have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

3.3.5.3 Sensitivity of General Bird Species

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

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

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

3.3.5.4 Trends in the Baseline Environment

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

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

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

3.4 Summary of Impact Pathways screened in for examination at Stage 2

The following impact pathways to Qualifying Interests/Special Conservation Interests are examined in relation to each of the four European Sites under consideration, in order to evaluate the effect of UWF Grid Connection, if any, on the integrity of each of the four European Sites.

Table 6: Qualifying Interests/Special Conservation Interests and Impact Pathways examined at Stage 2

European Site	Qualifying Interest/Special Conservation Interest screened in for evaluation at Stage 2	Impact examined at Stage 2
Lower River Shannon SAC	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260] Alluvial Forests (91E0)* (priority habitat)	SAC Pathway 1, 2, 3
	Atlantic Salmon [1106] Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099] Otter [1355]	SAC Pathway 4, 5, 6, 7, 8
Lower River Suir SAC	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260] Alluvial Forests (91E0)* (priority habitat) Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Yew Woodlands* Taxus baccata woods of the British Isles [91J0] (priority habitat) Old sessile oak woods with Ilex and Blechnum in the British Isles	SAC Pathway 2, 3
	Freshwater Pearl Mussel [1029] White-clawed Crayfish [1092] Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099] Atlantic Salmon [1106] Otter [1355]	SAC Pathway 4, 5, 6, 7, 8
Clare Glen SAC	Old Oak Woodlands [91A0] Killarney Fern (Trichomanes speciosum) [1421]	SAC Pathway 2, 3
Slievefelim to Silvermines Mountain SPA	Hen Harrier [A082]	SPA Pathway 1, 2, 3

The SAC Pathways and SPA Pathways are described (over).

Summary of Impact Pathways screened in for examination at Stage 2

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As described at Stage 1 Screening (Section 2.7), the SAC Pathways 1 to 8 are:

- SAC Pathway 1: Direct effects to **Qualifying Interest habitats** of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) **within the SAC**
- SAC Pathway 2: Indirect Effects to **Qualifying Interest habitats** of an SAC Site (i.e. via reductions in water quality or spread of invasive species) **within the SAC**
- SAC Pathway 3: Indirect Effects to **Qualifying Interest habitats**, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) **ex-situ** the SAC
- SAC Pathway 4: Direct effects to **Qualifying Interest species** of an SAC Site (i.e. mortality) **within** or **ex-situ** the SAC
- SAC Pathway 5: Indirect effects to **Qualifying Interest species** of an SAC Site (i.e. disturbance /displacement) **within** the SAC
- SAC Pathway 6: Indirect effects to **Qualifying Interest species** of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) **within** the SAC
- SAC Pathway 7: Indirect effects to **Qualifying Interest species** of the SAC Site (i.e. disturbance /displacement) **ex-situ** to the SAC
- SAC Pathway 8: Indirect effects to **Qualifying Interest species** of the SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) **ex-situ** the SAC.

As described at Stage 1 Screening (Section 2.7), the SPA Pathways 1 to 3 are:

- SPA Pathway 1: Direct effects to Special Conservation Interest Species **within an SPA** (i.e. Disturbance, Mortality)
- SPA Pathway 2: Indirect effects to Special Conservation Interest Species **within an SPA** (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or reduction/loss of connectivity, or through a reduction in prey item species)
- SPA Pathway 3: Indirect effects to Special Conservation Interest Species **ex-situ an SPA** (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or loss/reduction in connectivity, reductions in prey item species, or through disturbance or mortality effects to Special Conservation Interest bird species outside their respective SPA).

3.5 Mitigation Measures

As there is potential for significant effects, the mitigation measures which will avoid the impact, or reduce the significance of impact, are described for each of the impact pathways identified hereunder.

3.5.1 Mitigation Measures to avoid or reduce effects via SAC Pathways 1, 2, 3, 6 and 8 (habitats)

SAC Pathways 1, 2, 3, 6 and 8 relate to direct effects to habitats, or indirect effects to species via habitat effects.

- SAC Pathway 1: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC
- SAC Pathway 2: Indirect effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC
- SAC Pathway 3: Indirect effects to Qualifying Interest habitats, of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC
- SAC Pathway 6: Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC
- SAC Pathway 8: Indirect effects to Qualifying Interest species of the SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ the SAC

The mitigation measures detailed in Table 7 (over) will be implemented during the development of UWF Grid Connection:

Table 7: Mitigation Measures for UWF Grid Connection to avoid or reduce effects via SAC Pathways 1, 2, 3, 6, 8

General PD Measure to ensure mitigation implementation	
PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the UWF Grid Connection Environmental Management Plan (see Appendix A10).
General PD Measure for water quality protection – included on a precautionary basis due to the presence of works within the Lower River Shannon SAC greater catchment area.	
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads.
PD17	At Mountphilips Substation, water for operational stage welfare facilities will be obtained from a Rain Water Harvesting system. Waste water will be collected in tanks and removed from site by an appropriately licensed operator, for treatment in a licensed water treatment plant. These two measures will avoid the need for a new well or mains water connection and will avoid the need to treat waste water on-site.
PD18	The new substation compound and the new permanent access road at the Mountphilips Substation site will have a permanent surface water drainage network in place which will include check dams. These check dams will allow the settlement of suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD19	At Mountphilips Substation location, where dewatering of trenches or excavations is required, there will be no direct discharge of untreated 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 to the volume of water requiring treatment (if any) to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD20	At Mountphilips Substation site, all excavated material will be removed for temporary or permanent storage at designated berms, which will be located more than 25m away from the watercourses on Mountphilips Substation site. All storage berms will be graded and sealed following emplacement. The berms will be covered if there is a risk of erosion. Temporary silt control methods such as silt fencing will be placed around all overburden storage areas. The existing vegetative buffer between the berms and the nearest watercourses will be maintained and no works will occur in the buffer zone.
PD21	At Mountphilips Substation site, permanent storage berms around the substation compound will be sown with grasses and flower species common to the surrounding vegetation. The permanent storage berms along the new access road will be planted with local provenance native fruiting hedge species, with grasses and native flower species sown along the sides of the berms. Revegetation works will take place at the soonest practicable opportunity after emplacement.
PD22	Outside of the Mountphilips Substation site, there will be no storage of overburden and all excavations from road trenches will be removed to licensed waste facilities in accordance with the UWF Grid Connection Waste Management Plan. Loads of excavated material will be covered during transportation to prevent spillages of excavated material.

PD23	All Joint Bays for the 110kV UGC will be located at least 50m from a Class 1 or Class 2 watercourse and at least 25m from Class 3 or Class 4 watercourses.
PD24	Outside of the Mountphilips Substation site, where dewatering of trenches or excavations is required for the 110kV UGC, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated using a mobile water treatment train and then discharged via a silt bag to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD27	At Mountphilips Substation site, works within 50m of watercourses, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD28	Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, additional mitigation measures will be implemented which include silt fencing and placement of sandbag arrangements along preferential surface water flowpaths on the road pavement. Following works on any particular section, any works debris will be removed from the road before the sandbags and silt fences are removed.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD30	Lines of silt fencing and sandbags will be erected along the edge of the road so that surface water runoff from adjacent construction works areas is captured and directed to the excavated trench, where it can be pumped and treated before being released, as per PD24.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of

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	<p>CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.</p> <p>Although intended for the purpose of the WFD, this measure will also indirectly contribute to downstream water quality protection in the SAC.</p>
PD33	<p>All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event.</p>
PD34	<p>Only precast concrete culverts or structures will be used at the watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site.</p>
PD35	<p>Concrete pours will be required for the 110kV UGC cables trench. Only chutes will be washed out at the works locations into the cable trench, with the washout of the tank taking place at the concrete supplier depot. Concrete chute washouts within the SAC boundary will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site.</p>
PD42	<p>There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.</p>
PD43	<p>The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.</p>
PD44	<p>Overnight parking of plant and machinery will only be permitted at the temporary compound at the Mountphilips Substation site and at a distance greater than 50m from watercourses.</p>
PD45	<p>The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Appendix A10).</p>
PD47	<p>Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained and that there is</p>

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	no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009. Where non-compliance in water quality is measured or recorded, works will stop until the issue is resolved. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection. The Surface Water Management Plan is part of the UWF Grid Connection Environmental Management Plan (see Appendix A10).
PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD50	Culvert replacement works along the 110kV UGC will not be undertaken without isolation of flow within the watercourse. Isolation of flow will be achieved through the use of sandbags filled with clean, washed sand. Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping using a flume (pipe), with deflector plates used on the downstream side of the flume to reduce the hydraulic power of the water. Construction works at the crossing will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and the use of deflector plates during the restoration of flow. As per PD41, culvert replacement works will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. These measures will ensure that the baseline character is maintained and will ensure that a deterioration in morphology is avoided, as required under the Water Framework Directive. This in turn will protect Aquatic Ecology.
PD69	All covering of vegetative invasive knotweed infestations with high density polyethylene grass carpet terram will take place, at all identified locations prior to any works commencing on UWF Grid Connection or any other element of the Whole UWF Project. The covering of infestations will be completed on sections seven days in advance of works occurring on those sections. The infestations will be covered so that their full extent plus 1 metre is covered entirely and no vegetation is visible. The covering of these infestations will only be carried out under the direct supervision of an ecologist with prior experience of this type of work i.e. this work cannot be carried out by any general construction staff. No posts will be used to secure the coverings i.e. there will be no ground interference during any of these operations.
PD Measures Specific to the Lower River Shannon SAC – included for locations that overlap or are in close proximity to the SAC	
PD36	The sections of 110kV UGC trenches that overlap the Lower River Shannon SAC will be lined with an impermeable geotextile material to prevent potential migration of cement from the trench base or sides into the SAC.
PD37	In addition to PD22, there will be no storage of overburden within the Lower River Shannon SAC.
PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points

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	(including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.
PD39	In addition to PD42, there will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within 100m of the boundary of the Lower River Shannon SAC.
PD40	In addition to PD29, all 110kV UGC works within the boundary of the Lower River Shannon SAC will only be completed during dry weather in the dryer months of the year – i.e. February to September included.
PD41	The instream works at W1, W2 and W3 at Mountphilips Substation site, and the culvert replacement works at the 13 existing culverts on the public road, and all works (including concrete placement) within the boundary of the Lower River Shannon SAC, will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice Measures are followed.
Specific Management Plans which include measures designed to or which will in part avoid/reduce the likelihood of adverse effects on European Sites	
PLAN	Surface Water Management Plan (SWMP)
PLAN	Invasive Species Management Plan (ISMP)
Environmental Emergency Response Procedures included in the UWF Grid Connection Environmental Management Plan	
GC-ERP-01	Oil/Fuel Spillage
GC-ERP-02	Significant Pollution Occurrence in Local Surface Waters
GC-ERP-03	Frac-Out during Drilling Works at W8 or W9
Best Practice Measures which include measures which will in part avoid/reduce the likelihood of adverse effects on European Sites	
GC-BPM-01	Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during instream works at Mountphilips Substation site
GC-BPM-02	Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during replacement of existing culverts along the 110kV UGC outside Mountphilips Substation site
GC-BPM-03	Best Practice Design of New Permanent Watercourse Crossing Structures and Existing Culvert Replacements to Prevent Flood Risk
GC-BPM-04	Best Practice Surface Water Quality Protection Measures for Site Runoff during the Mountphilips Substation Site Construction Works
GC-BPM-05	Best Practice Measures to Protect Surface Water and Groundwater Quality during use of Cement Based Compounds
GC-BPM-06	Best Practice Measures to Protect Surface Water and Groundwater Quality During Storage and Handling of Fuels, Oils and Chemicals
GC-BPM-07	Best Practice Measures to Protect Surface Water Quality During Storage of Overburden at the Mountphilips Substation Site
GC-BPM-08	Best Practice Measures for Minimising Dust Emissions from Site Activities

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Project Design Environmental Protection Measures (PD)	
General PD Measure to ensure mitigation implementation	
PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the UWF Grid Connection Environmental Management Plan (see Appendix A10).
General PD Measure for water quality protection – included on a precautionary basis due to the presence of works within the Lower River Shannon SAC greater catchment area.	
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads ('L' roads).
PD17	At Mountphilips Substation, water for operational stage welfare facilities will be obtained from a Rain Water Harvesting system. Waste water will be collected in tanks and removed from site by an appropriately licensed operator, for treatment in a licensed water treatment plant. These two measures will avoid the need for a new well or mains water connection and will avoid the need to treat waste water on-site.
PD18	The new substation compound and the new permanent access road at the Mountphilips Substation site will have a permanent surface water drainage network in place which will include check dams. These check dams will allow the settlement of suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD19	At Mountphilips Substation location, where dewatering of trenches or excavations is required, there will be no direct discharge of untreated 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 to the volume of water requiring treatment (if any) to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD20	At Mountphilips Substation site, all excavated material will be removed for temporary or permanent storage at designated berms, which will be located more than 25m away from the watercourses on Mountphilips Substation site. All storage berms will be graded and sealed following emplacement. The berms will be covered if there is a risk of erosion. Temporary silt control methods such as silt fencing will be placed around all overburden storage areas. The existing vegetative buffer between the berms and the nearest watercourses will be maintained and no works will occur in the buffer zone.
PD21	At Mountphilips Substation site, permanent storage berms around the substation compound will be sown with grasses and flower species common to the surrounding vegetation. The permanent storage berms along the new access road will be planted with local provenance native fruiting hedge species, with grasses and native flower species sown along the sides of the berms. Revegetation works will take place at the soonest practicable opportunity after emplacement.
PD22	Outside of the Mountphilips Substation site, there will be no storage of overburden and all excavations from road trenches will be removed to licensed waste facilities in accordance with the UWF Grid

	Connection Waste Management Plan. Loads of excavated material will be covered during transportation to prevent spillages of excavated material.
PD23	All Joint Bays for the 110kV UGC will be located at least 50m from a Class 1 or Class 2 watercourse and at least 25m from Class 3 or Class 4 watercourses.
PD24	Outside of the Mountphilips Substation site, where dewatering of trenches or excavations is required for the 110kV UGC, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated using a mobile water treatment train and then discharged via a silt bag to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD27	At Mountphilips Substation site, works within 50m of watercourses, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD28	Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, additional mitigation measures will be implemented which include silt fencing and placement of sandbag arrangements along preferential surface water flowpaths on the road pavement. Following works on any particular section, any works debris will be removed from the road before the sandbags and silt fences are removed.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD30	Lines of silt fencing and sandbags will be erected along the edge of the road so that surface water runoff from adjacent construction works areas is captured and directed to the excavated trench, where it can be pumped and treated before being released, as per PD24.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of

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	<p>deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.</p> <p>Although intended for the purpose of the WFD, this measure will also indirectly contribute to downstream water quality protection in the SAC.</p>
PD33	All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event.
PD34	Only precast concrete culverts or structures will be used at the watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site.
PD35	Concrete pours will be required for the 110kV UGC cables trench. Only chutes will be washed out at the works locations into the cable trench, with the washout of the tank taking place at the concrete supplier depot. Concrete chute washouts within the SAC boundary will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site.
PD42	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD43	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD44	Overnight parking of plant and machinery will only be permitted at the temporary compound at the Mountphilips Substation site and at a distance greater than 50m from watercourses.
PD45	The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency

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	Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Appendix A10).
PD47	Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained and that there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009. Where non-compliance in water quality is measured or recorded, works will stop until the issue is resolved. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection. The Surface Water Management Plan is part of the UWF Grid Connection Environmental Management Plan (see Appendix A10).
PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD50	Culvert replacement works along the 110kV UGC will not be undertaken without isolation of flow within the watercourse. Isolation of flow will be achieved through the use of sandbags filled with clean, washed sand. Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping using a flume (pipe), with deflector plates used on the downstream side of the flume to reduce the hydraulic power of the water. Construction works at the crossing will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and the use of deflector plates during the restoration of flow. As per PD41, culvert replacement works will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. These measures will ensure that the baseline character is maintained and will ensure that a deterioration in morphology is avoided, as required under the Water Framework Directive. This in turn will protect Aquatic Ecology.
PD69	All covering of vegetative invasive knotweed infestations with high density polyethylene grass carpet terram will take place, at all identified locations prior to any works commencing on UWF Grid Connection or any other element of the Whole UWF Project. The covering of infestations will be completed on sections seven days in advance of works occurring on those sections. The infestations will be covered so that their full extent plus 1 metre is covered entirely and no vegetation is visible. The covering of these infestations will only be carried out under the direct supervision of an ecologist with prior experience of this type of work i.e. this work cannot be carried out by any general construction staff. No posts will be used to secure the coverings i.e. there will be no ground interference during any of these operations.
PD Measures Specific to the Lower River Shannon SAC – included for locations that overlap or are in close proximity to the SAC	
PD36	The sections of 110kV UGC trenches that overlap the Lower River Shannon SAC will be lined with an impermeable geotextile material to prevent potential migration of cement from the trench base or sides into the SAC.

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PD37	In addition to PD22, there will be no storage of overburden within the Lower River Shannon SAC.
PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points (including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.
PD39	In addition to PD42, there will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within 100m of the boundary of the Lower River Shannon SAC.
PD40	In addition to PD29, all 110kV UGC works within the boundary of the Lower River Shannon SAC will only be completed during dry weather in the dryer months of the year – i.e. February to September included.
PD41	The instream works at W1, W2 and W3 at Mountphilips Substation site, and the culvert replacement works at the 13 existing culverts on the public road, and all works (including concrete placement) within the boundary of the Lower River Shannon SAC, will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice Measures are followed.
Specific Management Plans which include measures designed to or which will in part avoid/reduce the likelihood of adverse effects on European Sites	
PLAN	Surface Water Management Plan (SWMP)
PLAN	Invasive Species Management Plan (ISMP)
Environmental Emergency Response Procedures included in the UWF Grid Connection Environmental Management Plan	
GC-ERP-01	Oil/Fuel Spillage
GC-ERP-02	Significant Pollution Occurrence in Local Surface Waters
GC-ERP-03	Frac-Out during Drilling Works at W8 or W9
Best Practice Measures which include measures which will in part avoid/reduce the likelihood of adverse effects on European Sites	
GC-BPM-01	Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during instream works at Mountphilips Substation site
GC-BPM-02	Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during replacement of existing culverts along the 110kV UGC outside Mountphilips Substation site
GC-BPM-03	Best Practice Design of New Permanent Watercourse Crossing Structures and Existing Culvert Replacements to Prevent Flood Risk
GC-BPM-04	Best Practice Surface Water Quality Protection Measures for Site Runoff during the Mountphilips Substation Site Construction Works
GC-BPM-05	Best Practice Measures to Protect Surface Water and Groundwater Quality during use of Cement Based Compounds
GC-BPM-06	Best Practice Measures to Protect Surface Water and Groundwater Quality During Storage and Handling of Fuels, Oils and Chemicals
GC-BPM-07	Best Practice Measures to Protect Surface Water Quality During Storage of Overburden at the Mountphilips Substation Site

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GC-BPM-08	Best Practice Measures for Minimising Dust Emissions from Site Activities

3.5.1.1 Effectiveness of these measures

The Mitigation Measures (Project Design Measures, Management Plans, Environmental Emergency Response Measures and Best Practice Measures), listed in Section 3.5.1 above, have been developed by the hydrological/drainage and ecological expert members of the Project Design team in consultation with Inland Fisheries Ireland and use best practice water quality protection techniques which are tried and tested regularly across the country. Furthermore, an Environmental Clerk of Works will be employed during the construction stage to monitor the effectiveness of these measures on a daily basis.

The watercourse crossing, drainage and water quality measures have been developed using relevant legislation, guidance and literature including:

Watercourse crossing works and aquatic habitat protection guidance

- Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters;
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes; and,
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Eastern Regional Fisheries Board.
- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts.
- EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems

Pollution Prevention Guidance Notes (PPGs):

- PPG01 General guide to the prevention of water pollution;
- PPG02 Above ground oil storage tanks;
- PPG05 Works in near or liable to affect watercourses;
- PPG06 Working at construction and demolition sites;
- PPG07 Refuelling Facilities;
- PPG11 Preventing pollution at industrial sites;
- PPG18 Control of spillages and fire fighting run-off;
- PPG20 Dewatering underground ducts and chambers;
- PPG21 Pollution Incident Response Planning;
- PPG23 Maintenance of Structures over Water; and,
- PPG26 Pollution Prevention Storage and Handling of Drums & Intermediate Bulk Containers.

Construction Industry Research and Information Association (CIRIA):

- CIRIA Report C502 Environmental Good Practice on Site;
- CIRIA Report C532 Control of Water Pollution from Construction Sites;
- CIRIA Report C648 Control of Pollution from Linear Construction Project; Technical Guidance;
- CIRIA Handbook C650 Environmental good practice on site;
- CIRIA Handbook C651 Environmental good practice on site checklist;
- CIRIA Report C609 - SuDS – hydraulic, structural & water quality advice; and,
- CIRIA Report C697 – The SuDS Manual.

Invasive Species Guidance

- Managing Japanese knotweed on development sites - The Knotweed Code of Practice produced by the Environmental Agency (2013);
- NRA Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010);
- Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010);
- Best Practice Management Guidelines Japanese knotweed Fallopia japonica, Invasive Species Ireland (2015);
- IFI Biosecurity Protocol for Field Survey Work, Inland Fisheries Ireland (2010).

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3.5.1.2 Implementation of the Mitigation Measures

The Mitigation Measures (Project Design measures, Management Plans, Environmental Emergency Procedures and Best Practice Measures) will be implemented by the Project Manager and the main Contractor during the construction stage. Implementation of the Mitigation Measures, will be implemented under an Environmental Management Plan for the UWF Grid Connection project. The EMP is appended to this Appropriate Assessment Report as Appendix A10.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and an Invasive Species Specialist. The Contractor will be contractually obliged to comply with the requirements of the Environmental Clerk of Works to ensure that the EMP is implemented.

3.5.1.3 Degree of confidence in the likely success of the mitigation measures

All protection measures have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. As such there is a very high degree of confidence in their likely success.

3.5.1.4 Monitoring of the Implementation and Effectiveness of the Mitigation Measures

Monitoring measures are the procedures to keep under systematic review the adverse effects on the environment resulting from the construction and operation of a Project, and to identify unforeseen significant adverse effects, in order to be able to undertake appropriate remedial action.

Monitoring arrangements will involve an Environmental Clerk of Works team, monitoring the implementation of a suite of environmental protection measures, i.e. Mitigation Measures (Project Design Measures, Management Plans and Best Practice Measures) which have been developed to avoid, prevent or reduce adverse effects on the receiving environment and the European Sites located therein. These measures are incorporated into the **UWF Grid Connection Environmental Management Plan** (EMP) for the project. Some monitoring measures come from Project Design Measures (PDs), some come from the Surface Water Management Plan (SWMP) or Invasive Species Management Plan (ISMP), and some come from Best Practice Measures (BPMs).

All watercourse crossings occur within or upstream of salmonid watercourses. In order to demonstrate compliance with and effectiveness of the prescribed mitigation, it is proposed to carry out construction phase monitoring of watercourse crossing works, and of water quality upstream and downstream of the crossing locations. The measures proposed in Table 8 below are based on standard guidance; however, ongoing monitoring during the works will provide proactive adjustments in line with prevailing conditions.

With regard to water quality monitoring, both suspended solids (TSS) and turbidity will be monitored upstream and downstream of at each watercourse crossing during works. Suspended solids analysis will be carried out in an approved laboratory and data cannot be obtained in real-time. Turbidity probes provide real-time data on site and can be used to indicate a comparison of the suspended silt fraction in the water column upstream and downstream. Both TSS and turbidity sampling will be completed in-situ both upstream and downstream of all watercourse crossings (other than drains) immediately before works commence and then during and after to manage compliance with water quality standards. It is recognised that TSS and turbidity fluctuate naturally within the aquatic environment based on seasonal and sporadic flow events.

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Surface water quality standards for TSS are not specified in the Surface Water Regulations (2009); however, limit levels or trigger values will be defined for both TSS and turbidity based on the pre-construction monitoring results. With reference to the minor headwater streams within the Clodiagh Freshwater pearl mussel catchments, strict adherence to water quality protection measures will ensure compliance with water quality standards, in the downstream monitoring locations specified in the SWMP.

Table 8: Monitoring Measures and Procedures for UWF Grid Connection

Project Design (PD) Monitoring Measures (PD32, PD41, PD45, PD46, PD47)
<p>The instream works at W1, W2 and W3 at Mountphilips Substation site, and the culvert replacement works at the 13 existing culverts on the public road, and all works (including concrete placement) within the boundary of the Lower River Shannon SAC, will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice Measures are followed.</p>
<p>The horizontal directional drilling works at W8 and W9 will be supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures.</p>
<p>All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the Environmental Management Plan for UWF Grid Connection (see Appendix A10).</p>
<p>Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection.</p>
Surface Water Management Plan Monitoring Measures (Section 4 of the SWMP)
<p><u>Drainage Inspections at Mountphilips Substation site</u> The following periodic inspection regime at Mountphilips Substation site will be implemented, and inspections recorded:</p> <ul style="list-style-type: none"> • Daily general visual inspections by Environmental Clerk of Works; • Weekly (existing & new drains) inspections by site Construction Manager; • All inspection to include all elements of drainage systems; • Inspections required to ensure that drainage systems are operating correctly and to identify any maintenance that is required; • Any changes, such as discolouration, odour, oily sheen or litter should be noted and corrective action should be implemented immediately. • High risk locations such as settlement ponds will be inspected on a daily basis by the Construction Manager; • Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement; • Event based inspections by the Environmental Clerk of Works as follows: <ul style="list-style-type: none"> ○ >10 mm/hr (<i>i.e.</i> high intensity localised rainfall event); ○ >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, ○ Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). <p>Weekly, Fortnightly and Monthly (depending on weather conditions and the nature of on-going construction works) site inspections by the Project Hydrologist during construction phase</p>
<p>Water Quality Monitoring</p>

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- Daily field monitoring of water quality parameters and collection of samples will be undertaken by the Environmental Clerk of Works. He/she will be appropriately trained on the required monitoring methods and the use, calibration and maintenance of all monitoring equipment used.
- Regular (i.e. weekly or fortnightly depending on weather conditions) field monitoring will be carried out by the Project Hydrologist.
- Surface water quality will be monitored during the construction phase and this monitoring will also extend into the post construction phase. Proposed monitoring locations downstream of the works areas. The locations of the surface water monitoring points will be agreed with Inland Fisheries Ireland and Tipperary County Council in advance of the construction phase.

Laboratory analysis of water samples will also be undertaken as part of the monitoring programme by an independent and appropriately certified laboratory.

Frequency of Water Quality Monitoring

- Daily visual checks at watercourse crossing locations where works are taking place;
- Weekly sampling for suspended solids and turbidity in catchments where earthworks or watercourse crossing work is on-going;
- Fortnightly sampling for the full suite of parameters in catchments where works are on-going;
- Event based sampling, e.g. after heavy rainfall;
- Additional sampling in the event of trigger level exceedance, after heavy rainfall, etc; and,

Post construction sampling programme (monthly sampling) for a period of six months

- Pre-Construction confirmatory surveys will be completed by an invasive species specialist, 3 – 4 weeks before construction begins. Mapping, showing the most up to date distribution and extent of each infestation, will be distributed to the Client, Owners Engineer and the Contractor;
- The covering of vegetative knotweed infestations with high density polyethylene grass carpet terram at all identified locations prior to any works commencing on that section and the monitoring of construction works at that section when it happens;
- To ensure the effective implementation of the biosecurity measures, an invasive species specialist will monitor each infestation location during all critical stages of construction works;

Visual inspections will be carried out on all machinery and equipment (particularly for machinery and equipment exiting the site and which has come into contact with water or soils) for evidence of attached plant or animal material, or adherent mud or debris.

Invasive Species Management Plan Monitoring Measures (Section 4.1 and Section 5.3 of the ISMP)

Pre-Construction confirmatory surveys will be completed by an invasive species specialist, 3 – 4 weeks before construction begins. Mapping, showing the most up to date distribution and extent of each infestation, will be distributed to the Client, Owners Engineer and the Contractor;

During the operational phase: Before planned maintenance or unplanned repair works commence, an ecology or invasive species specialist will survey the works locations for invasive plant species infestations in proximity to the works location(s), ... the ecologist/invasive species specialist will supervise any works in proximity (5m) to infestations to ensure that construction machinery and operatives do not come into contact with these infestations;

Best Practice Monitoring Measures (BPM01 to BPM08, included in the EMP at Tab 9)

The Construction Manager will be responsible for monitoring weather conditions
 All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments
 Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained. The surface water

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monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection
 Daily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase
 All permanent overburden storages areas will be checked / monitored daily until stabilised to ensure no drainage issues of surface water quality impacts are occurring

3.5.1.5 How any mitigation failure will be addressed

The Mitigation measures (Project Design Measures, Best Practice Measures, Surface Water Management Plan and Invasive Species Management Plan) prepared specifically for this project have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. The Mitigation Measures are considered to be robust and proven measures which will avoid significant adverse effects to European Sites.

The Mitigation Measures will be implemented by the Project Manager and the main Contractor during the construction stage. Implementation of the measures, including the Management Plans, will be carried out under an Environmental Management Plan for the UWF Grid Connection project.

The UWF Grid Connection Environmental Management Plan includes a supervisory structure which ensures accountability for all works elements, with requirements for a Project Manager and an independent (of the Contractor) Environmental Clerk of Works along with suitably qualified specialists (including Site Ecologist; Site Hydrologist, mud engineer and invasive species specialist) who will supervise the works and monitor the implementation of Mitigation Measures in order to ensure that sensitive works elements are carried out in a manner which delivers the planned outcomes within the parameters of the impact assessment, as specified.

On this basis, it can be confidently concluded that failures in the mitigation measures and their prescribed outcomes will be avoided.

Nonetheless, the EMP includes contingency measures for unforeseen events, such as oil/fuel spillages, frac-out or water pollution. The Environmental Clerk of Works will have a full-time presence on-site during the construction stage, and environmental experts will supervise works at environmentally sensitive locations. This will ensure that any unforeseen significant adverse effects are identified in a timely manner and appropriate remedial action taken immediately. The Environmental Clerk of Works will have a ‘stop-works’ authority to temporarily stop works over part of the site to avoid either an infringement of the Environmental Commitments or an unforeseen adverse environmental event. Works will not be allowed to re-commence until the issue is resolved.

3.5.2 Mitigation Measures to avoid or reduce effects via SAC Pathways 4, 5 and 7 (species)

SAC Pathways 4, 5, and 7 relate to direct effects to species.

- SAC Pathway 4: Direct effects to **Qualifying Interest species** of an SAC Site (i.e. mortality) within or **ex-situ** the SAC
- SAC Pathway 5: Indirect effects to **Qualifying Interest species** of an SAC Site (i.e. disturbance /displacement) **within** the SAC
- SAC Pathway 7: Indirect effects to **Qualifying Interest species** of the SAC Site (i.e. disturbance /displacement) **ex-situ** to the SAC

The mitigation measures detailed in Table 9 (over) will be implemented during the development of UWF Grid Connection:

Table 9: Mitigation Measures for UWF Grid Connection to avoid or reduce effects via SAC Pathways 4, 5, 7

Project Design Environmental Protection Measures (PD)	
General PD Measure to ensure mitigation implementation	
PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the UWF Grid Connection Environmental Management Plan (see Appendix A10).
Specific PD Measures to avoid or reduce effects on SAC species	
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads ('L' roads).
PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD50	Culvert replacement works along the 110kV UGC will not be undertaken without isolation of flow within the watercourse. Isolation of flow will be achieved through the use of sandbags filled with clean, washed sand. Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping using a flume (pipe), with deflector plates used on the downstream side of the flume to reduce the hydraulic power of the water. Construction works at the crossing will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and the use of deflector plates during the restoration of flow. As per PD41, culvert replacement works will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. These measures will ensure that the baseline character is maintained and will ensure that a deterioration in morphology is avoided, as required under the Water Framework Directive. This in turn will protect Aquatic Ecology.
Specific PD Measures to avoid or reduce effects on Otter	
PD52	Confirmatory surveys for active Otter holts and breeding activity will be carried out 150m upstream and downstream of watercourse crossing locations including those watercourses evaluated as unsuitable for Otter in the current appraisal.

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PD53	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer and outside of 1 hours after sunrise or before sunset during winter.
PD54	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken while breeding females or cubs are present in the holt and NPWS will be notified immediately
PD55	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand will not take place within 15m of such holts, except under license.
PD56	The prohibited area associated with otter holts, should they be located in confirmatory surveys, will, where appropriate, be protected from any inadvertent disturbance from any works or personnel occurring nearby such as at a bridge and declared as 'Ecology Restriction Zone' with no mention of otters to any onsite staff. Appropriate awareness of the purpose of the excluded area will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each possible access point. All contractors or operators on site will be made fully aware of the procedures pertaining to Ecology Restriction Zones and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.
PD63	All construction works will be carried out during daylight hours. Security lighting will be used at the temporary compound at Mountphilips Substation site. All lighting will be cowed in order to prevent light spill and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational.
Specific Management Plans which include measures designed to or which will in part avoid/reduce the likelihood of adverse effects on European Sites	
PLAN	Surface Water Management Plan (SWMP)
PLAN	Invasive Species Management Plan (ISMP)

3.5.2.1 Effectiveness of these measures

The Mitigation Measures (Project Design Measures and Management Plans), listed in Section 3.5.2 above, have been developed by the ecological expert members of the Project Design team in consultation with relevant statutory bodies such as Inland Fisheries Ireland, comprise tried and tested Best Practice, and will adhere to the following Standard Guidelines and Best Practice documentation:

- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts.
- IFI (2016) Guidelines on protection of fisheries during construction works in and adjacent to waters. <https://www.fisheriesireland.ie/extranet/fisheries-management-1/624-guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters/file.html>
- EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems
- National Roads Authority. Guidelines for the treatment of Otters prior to the construction of National Road Schemes. <https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf>
- Environmental Assessment and Construction Guidelines (NRA, 2006).

The effectiveness of the Surface Water Management Plan and Invasive Species Management Plan is described at Section 3.5.1.1 above.

3.5.2.2 Implementation of the Mitigation Measures

The Mitigation Measures (Project Design measures and Management Plans) will be implemented by the Project Manager and the main Contractor during the construction stage. Implementation of the Mitigation Measures, will be implemented under an Environmental Management Plan for the UWF Grid Connection project. The EMP is appended to this Appropriate Assessment Report as Appendix A10.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and an Invasive Species Specialist.

The Contractor will be contractually obliged to comply with the requirements of the Environmental Clerk of Works to ensure that the EMP is implemented.

3.5.2.3 Degree of confidence in the likely success of the mitigation measures

All protection measures have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. As such there is a very high degree of confidence in their likely success.

3.5.2.4 Monitoring of the Implementation and Effectiveness of the Mitigation Measures

The appointed Environmental Clerk of Works and their team of environmental specialists (including Site Ecologists and Site Hydrologist), will monitor the implementation of the Mitigation Measures through the UWF Grid Connection Environmental Management Plan.

In addition, as per Project Design PD32 and PD41, the instream works at W1, W2 and W3 at Mountphilips Substation site, and the culvert replacement works at the 13 existing culverts on the public road, and all works (including concrete placement) within the boundary of the Lower River Shannon SAC, will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice Measures are followed.

To avoid any direct impacts to fish species (e.g. juvenile Atlantic salmon and lamprey species, as well as White-clawed crayfish) which may be presented at watercourse crossings where the watercourse will be dammed, as per Project Design PD50: ‘Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water’. A qualified and experienced aquatic ecologist will be present during the initial dewatering works to manage and confirm the removal of these species, under license, to alternative suitable habitat, well away from the working area. This will avoid indirect effects on contiguous populations of these Annex II species within the Lower River Shannon SAC or Lower River Suir SAC downstream.

3.5.2.5 How any mitigation failure will be addressed

The Mitigation measures (Project Design Measures and Management Plans) prepared specifically for this project have been designed in line with Best Practice and constitute the Best Available techniques following

scientific literature and field baseline verification. The Mitigation Measures are considered to be robust and proven measures for the avoidance of significant adverse effects to European Sites.

The Mitigation Measures will be implemented by the Project Manager and the main Contractor during the construction stage. Implementation of the measures, including the Management Plans, will be carried out under an Environmental Management Plan for the UWF Grid Connection project.

The UWF Grid Connection Environmental Management Plan includes a supervisory structure which ensures accountability for all works elements, with requirements for a Project Manager and an independent (of the Contractor) Environmental Clerk of Works along with suitably qualified specialists (including Site Ecologist; Site Hydrologist, mud engineer and invasive species specialist) who will supervise the works and monitor the implementation of Mitigation Measures in order to ensure that sensitive works elements are carried out in a manner which delivers the planned outcomes within the parameters of the impact assessment, as specified.

On this basis, it can be confidently concluded that failures in the mitigation measures and their prescribed outcomes will be avoided.

Nonetheless, in relation to secondary effects relating to aquatic habitats, the EMP includes contingency measures for unforeseen events, such as oil/fuel spillages, frac-out or water pollution. The Environmental Clerk of Works will have a full-time presence on-site during the construction stage, and environmental experts will supervise works at environmentally sensitive locations. This will ensure that any unforeseen significant adverse effects are identified in a timely manner and appropriate remedial action taken immediately. The Environmental Clerk of Works will be a member of CIEEM and will have a ‘stop-works’ authority to temporarily stop works over part of the site to avoid either an infringement of the Environmental Commitments or an unforeseen adverse environmental event. Works will not be allowed to re-commence until the issue is resolved.

3.5.3 Mitigation Measures to avoid or reduce effects via SPA Pathways 1 to 3 (hen harrier and supporting species)

SPA Impacts relate to hen harrier and supporting species;

SPA Pathway 1: Direct effects to Special Conservation Interest Species **within an SPA** (i.e. Disturbance, Mortality)

SPA Pathway 2: Indirect effects to Special Conservation Interest Species **within an SPA** (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or reduction/loss of connectivity, or through a reduction in prey item species)

SPA Pathway 3: Indirect effects to Special Conservation Interest Species **ex-situ** an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or loss/reduction in connectivity, reductions in prey item species, or through disturbance or mortality effects to Special Conservation Interest bird species outside their respective SPA).

The mitigation measures detailed in Table 10 (over) will be implemented during the development of UWF Grid Connection:

Table 10: Mitigation Measures for UWF Grid Connection to avoid or reduce effects via SPA Pathways 1,2, 3

Project Design Environmental Protection Measures (PD)	
General PD Measure to ensure the efficacy of all avoidance measures	
PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the UWF Grid Connection Environmental Management Plan (see Appendix A10).
PD Measures to avoid/reduce land cover change/potential habitat disturbance or degradation during construction	
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads ('L' roads).
Measures to avoid disturbance to breeding Hen Harrier	
PD01	UWF Grid Connection construction works during the Hen Harrier breeding season (March to August inclusive) will only take place at the Mountphilips Substation Site; construction of the 110kV UGC between the Mountphilips Substation site and the Consented UWF Substation compound will be carried out during the months of September to February inclusive.
PD02	If works at Mountphilips Substation site are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory Hen Harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the entire construction works area boundary. These surveys will be completed prior to the start-up of all construction activities. No works will take place within 2 km of any identified active Hen Harrier nest during the hen harrier breeding season.
Measures to avoid disturbance to Hen Harriers at communal Winter Roosts	
PD03	Although no hen harrier roosts are currently known to occur within 1km of UWF Grid Connection, confirmatory surveys will be completed to record any roosting locations within 1km of UWF Grid Connection. Should a hen harrier roost occur within 1km of UWF Grid Connection works, then construction works within 1km of a roost will be limited to the period between 'one hour after sunrise' to 'one hour before sunset' during the Hen Harrier roosting season (October to February inclusive).
Measures to avoid any reduction in prey item species, collision	
PD58	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season <i>i.e.</i> not during the period of March to August inclusive. This includes hedgerow and scrub removal in addition to hedgerow trimming.
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads ('L' roads).
Measures to avoid/reduce sequential effects	
PD07	110kV UGC construction works along the local roads L2264-50 and L6188-0, will not take place at the same time as the UWF Related Works Haul Route Works on these roads. The 110kV UGC construction works will also be scheduled so that the works do not occur on the same days as concrete deliveries for Consented UWF Turbines along these local roads.

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PD11	Construction works for the 110kV UGC 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 Related Works or Upperchurch Windfarm where those works also occur within 350m.
Specific Management Plans which will avoid secondary deterioration of adjacent SPA habitats, within and ex-situ the European Site	
PLAN	Surface Water Management Plan (SWMP)
PLAN	Invasive Species Management Plan (ISMP)

3.5.3.1 Effectiveness of these measures

The Mitigation Measures (Project Design Measures and Management Plans), listed in Section 3.5.3 above, have been developed by the ecological expert members of the Project Design team, based on best practice, including recommendations within the Irish context, and will adhere to the following Standard Guidelines, peer reviewed publications, studies, and Best Practice documentation:

- Wilson et al., (2015) The interactions between Hen Harriers and wind turbines: Final Project Report. BEES, University College Cork.
- Forest Service, (2012). Appropriate Assessment Procedure. Information Note.
- Currie & Elliott, (1997) Forests and birds: a guide to managing forests for rare birds. Cambridge: Forestry Authority and Royal Society for the Protection of Birds
- Forestry Commission Scotland, (2006) Guidance Note 32: Forest operations and birds in Scottish forests
- Romin & Muck, (2002) Utah field office guidelines for raptor protection from human and land use disturbances. Salt Lake City: USFWS Utah Field Office.
- Whittington & Allen, (2008) Guidelines for raptor conservation in the western United States. Washington DC, USA: U.S. Fish and Wildlife Service, Region 9, Division of Migratory Bird Management.
- Livesey et al., (2016) Database of bird flight initiation distances to assist in estimating effects from human disturbance and delineating buffer areas. Journal of Fish and Wildlife Management 7: 181–191.
- Scottish National Heritage (2009) Monitoring the impact of onshore wind farms on birds - January 2009. Guidance Note.
- Scottish National Heritage (2016) Dealing with Construction and birds. Guidance Version 3.
- Scottish National Heritage (2017) Survey Methods for Use in Assessing the Impacts of Onshore Windfarms on Bird Communities. Version 2. <https://www.nature.scot/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms>
- Scottish National Heritage (2014) Survey Methods for Use in Assessing the Impacts of Onshore Windfarms on Bird Communities. SNH, Battleby.
- Ruddock and Whitfield (2007) A Review of Disturbance Distances in Selected Bird Species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage. SNH, Battleby.
- Hen Harrier Conservation and the Forestry Sector in Ireland. V3.2. NPWS. <https://www.npws.ie/sites/default/files/publications/pdf/HHTRP%20-%20Forestry%20-%20V3.2.pdf>
- Percival, S.M. Predicting the effects of wind farms on birds in the UK: the development of an objective assessment method. [ed.] M., Janss, F.E., Ferrer, M. De Lucas. Madrid: Quercus, 7, pp. 137-152.

The effectiveness of the Surface Water Management Plan and Invasive Species Management Plan is described at Section 3.5.1.1 above.

3.5.3.2 Implementation of the Mitigation Measures

The Mitigation Measures (Project Design measures and Management Plans) will be implemented by the Project Manager and the main Contractor during the construction stage. Implementation of the Mitigation Measures, will be implemented under an Environmental Management Plan for the UWF Grid Connection project. The EMP is appended to this Appropriate Assessment Report as Appendix A10.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and an Invasive Species Specialist.

The Contractor will be contractually obliged to comply with the requirements of the Environmental Clerk of Works to ensure that the EMP is implemented.

All surveys for breeding or roosting Hen Harrier, and monitoring of temporal restrictions of works in relation to nesting or roosting Hen Harrier will be undertaken by a suitably qualified Ornithologist(s) (and member of CIEEM) with experience in the survey and management of Hen Harrier.

3.5.3.3 Degree of confidence in the likely success of the mitigation measures

All protection measures have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. As such there is a very high degree of confidence in their likely success.

3.5.3.4 Monitoring of the Implementation and Effectiveness of the Mitigation Measures

The appointed Environmental Clerk of Works and their team of environmental specialists (including Site Ecologists, Site Hydrologist and specialist Ornithologist(s)), will monitor the implementation of the Mitigation Measures through the UWF Grid Connection Environmental Management Plan.

In addition, as per Project Design PD32, confirmatory Hen Harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the entire construction works area boundary. These surveys will be completed prior to the start-up of all construction activities. The Project Ecologist will keep NPWS informed of the real-time status of nesting Hen Harrier as a result of the monitoring associated with this project.

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3.5.3.5 How any mitigation failure will be addressed

The Mitigation measures (Project Design Measures and Management Plans) prepared specifically for this project have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. The Mitigation Measures are considered to be robust and proven measures for the avoidance of significant adverse effects to European Sites.

The Mitigation Measures will be implemented by the Project Manager and the main Contractor during the construction stage. Implementation of the measures, including the Management Plans, will be carried out under an Environmental Management Plan for the UWF Grid Connection project.

The UWF Grid Connection Environmental Management Plan includes a supervisory structure which ensures accountability for all works elements, with requirements for a Project Manager and an independent (of the Contractor) Environmental Clerk of Works along with suitably qualified specialists (including Site Ecologist; Site Hydrologist, and specialist Ornithologist(s)) who will supervise the works and monitor the implementation of Mitigation Measures in order to ensure that sensitive works elements are carried out in a manner which delivers the planned outcomes within the parameters of the impact assessment, as specified.

On this basis, it can be confidently concluded that failures in the mitigation measures and their prescribed outcomes will be avoided.

Nonetheless, in relation to secondary effects relating to aquatic habitats, the EMP includes contingency measures for unforeseen events, such as oil/fuel spillages, frac-out or water pollution. The Environmental Clerk of Works will have a full-time presence on-site during the construction stage, and environmental experts will supervise works at environmentally sensitive locations. This will ensure that any unforeseen significant adverse effects are identified in a timely manner and appropriate remedial action taken immediately. The Environmental Clerk of Works (and member of CIEEM) will have a 'stop-works' authority to temporarily stop works over part of the site to avoid either an infringement of the Environmental Commitments or an unforeseen adverse environmental event. Works will not be allowed to re-commence until the issue is resolved.

3.6 Evaluation of Adverse Impacts to the Lower River Shannon SAC

The Screening stage evaluated the potential for UWF Grid Connection to impact the Lower River Shannon SAC via identified impact pathways (Sections 2.9). The potential for impacts was identified with regard to individual Qualifying Interests of the SAC. These impacts are evaluated further within this Section 3.6 of the Appropriate Assessment report, to determine whether the UWF Grid Connection project (either alone or in-combination) will affect the conservation status of these conservation interests, and thus the overall integrity of the Lower River Shannon SAC.

The evaluation of the impacts of UWF Grid Connection on the integrity of the Lower River Shannon SAC takes account of the following information:

- conservation objectives, outlined at Section 3.6.1 below, for the Qualifying Interests which were screened in for evaluation at Stage 2;
- the potential impact pathways to Qualifying Interests which were screened in for evaluation, these impact pathways are identified in Section 3.4;
- the description of the UWF Grid Connection project as described in Section 3.2 of this report, and its Mitigation Measures as described in see Section 3.5 of this report;
- the descriptions of the other projects as outlined in Section 3.2.7.

3.6.1 Conservation Objectives of Lower River Shannon SAC (002165)

The site-specific conservation objectives of the Lower River Shannon SAC aim to define favourable conservation condition for the particular habitat or species at that site. These objectives and conditions are summarised in Table 11 below in respect of the Qualifying Interests of the Lower River Shannon SAC which were screened in for further evaluation.

The conservation objectives of the Lower River Shannon SAC are available in full on the National Parks & Wildlife Service website at <https://www.npws.ie/protected-sites>. The conservation objectives reproduced in the table below were sourced from NPWS *Conservation Objectives: Lower River Shannon SAC 002165. Version 1.0*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [Version dated 07/08/2012], and should be read in conjunction with any other supporting documentation on the referenced website as referenced above.

Table 11: Conservation Objectives of the Lower River Shannon SAC (002165)

Lower River Shannon SAC (002165)			
Floating river vegetation (3260)	To maintain the favourable conservation condition of Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	Three sub-types of high conservation value are known to occur in the site. See Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details. Note: rooted macrophytes should be absent or trace (< 5% cover) in freshwater pearl mussel (<i>Margaritifera margaritifera</i>) habitat. The freshwater pearl mussel (1029) conservation objective takes precedence over this objective for habitat 3260 in the Cloon River within this SAC, because the mussel requires environmental conditions closer to natural background levels
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 13	See Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details

Lower River Shannon SAC (002165)			
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	See Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Hydrological regime: tidal influence	Daily water level fluctuations - metres	Maintain natural tidal regime	See Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Hydrological regime: freshwater seepages	Metres per second	Maintain appropriate freshwater seepage regimes	See Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Substratum composition: particle size range	Millimetres	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles)	Although many of the high-conservation-value sub-types are dominated by coarse substrata, for certain sub-types, notably triangular club-rush (<i>Schoenoplectus triquetter</i>) and opposite-leaved pondweed (<i>Groenlandia densa</i>), fine substrata are required. See Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Water quality: nutrients	Milligrams per litre	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	The specific targets may vary among sub-types. See Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	See Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Floodplain connectivity	Area	The area of active floodplain at and upstream of the habitat should be maintained	See Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details
Riparian habitat	Area	The area of riparian woodland at and upstream of the bryophyte-rich sub-type should be maintained	See Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation supporting document for further details. See also the conservation objective for Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) (91E0)
91E0 *Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>)	To restore the favourable conservation condition of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at	Minimum area, based on 5 sites surveyed by Perrin et al. (2008) - site codes 1286, 1577, 1857, 1861, 1995. See woodland habitats supporting document for further details. NB further areas are likely to be present within the SAC

Lower River Shannon SAC (002165)			
		least c.8.5ha for sites surveyed. See map 14	
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 14	Distribution based on Perrin et al. (2008). NB further areas are likely to be present within the SAC.
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). Topographical and land-ownership constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008). See woodland habitats supporting document for further details
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008). See woodland habitats supporting document for further details
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Alder and oak regenerate poorly. Ash often regenerates in large numbers although few seedlings reach pole size
Hydrological regime: flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river floodplains
Woodland structure: dead wood	m ³ per hectare; number per hectare	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure:	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin and Daly (2010)

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indicators of local distinctiveness			list four sites as containing potential ancient/long established woodland. See woodland habitats supporting document for further details
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp) and, locally, oak (<i>Quercus robur</i>) and ash (<i>Fraxinus excelsior</i>)	Species reported in Perrin et al. (2008). See woodland habitats supporting document for further details
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: Himalayan balsam (<i>Impatiens glandulifera</i>), giant hogweed (<i>Heracleum mantegazzianum</i>), sycamore (<i>Acer pseudoplatanus</i>)
Atlantic Salmon (<i>Salmo salar</i>) (only in freshwater)	To restore the favourable conservation condition of Salmon in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmon's upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas. The large hydro-electric station at Ardnacrusha and the Parteen regulating weir present considerable obstructions to upstream passage of salmon on the Shannon main channel. While both have fish passes installed, upstream migration of salmon is still problematical. Further weirs upstream on the Shannon also restrict access to spawning habitat. No such obstacles, causing significant fish passage issues for salmon are present on the Feale and Mulkear rivers
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	A conservation limit is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee of the National Salmon Commission's annual model output of CL attainment levels. See SSC (2010). Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The salmon stocks in the Shannon above the impoundments are significantly below their Conservation Limits. Salmon stocks in the Feale and Mulkear rivers are above CL
Salmon fry abundance	Number of fry/5 minutes electro-fishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17	Target is threshold value for rivers currently exceeding their conservation limit (CL). The abundance of salmon fry at monitored sites on the Shannon main channel, above the hydro-electric station, is significantly below this target

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		salmon fry/5 min sampling	
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (<i>Lepeophtheirus salmonis</i>). On the Shannon main channel, salmon smolt abundance may be significantly affected by mortality passing through hydro- electric turbines
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels. Artificial barriers are currently preventing salmon from accessing suitable spawning habitat on the Shannon main channel
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)
Sea Lamprey (<i>Petromyzon marinus</i>)	To restore the favourable conservation condition of Sea Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas. See Gargan <i>et al.</i> (2011). Specific barriers serve to constrain the up- river migration of sea lamprey. The upper extent of the SAC in the R. Fergus is delineated by a barrier to migration. Barriers are also present in the Mulkear and Feale
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007)
Juvenile density in fine sediment	Juveniles/m ²	Juvenile density at least 1/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003)
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	Lampreys spawn in clean gravels. Surveys by Inland Fisheries Ireland (IFI) commonly indicated accumulations of redds downstream of major weirs. (See also Gargan <i>et al.</i> , 2011)
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Despite observed spawning activity, sampling for ammocoetes consistently fails to find these in many sampling stations and never in any great numbers
Brook Lamprey (<i>Lampetra planeri</i>)	To maintain the favourable conservation condition of Brook Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to brook lampreys' migration, both up- and downstream, thereby possibly limiting the species to specific stretches and creating genetically isolated populations (Espanhol <i>et al.</i> , 2007)

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Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between brook and river lamprey juveniles in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m ² in optimal conditions and more than 2/m ² on a catchment basis
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	Spawning site and redd attributes established by IFI (Rooney <i>et al.</i> , in press)
Availability of juvenile habitat	Number of positive sites in 2 nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Many sites with suitable larval attributes i.e. fine sediment in low velocity habitat, are found not to contain larval lamprey. This may be a function of chance or probability or may be a consequence of insufficient recruitment to fill all spatial niches. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date (King <i>et al.</i> , unpublished data)
River Lamprey (<i>Lampetra fluviatilis</i>)	To maintain the favourable conservation condition of River Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to river lampreys' migration, both up- and downstream, thereby possibly limiting species to specific stretches and creating genetically isolated populations (Espanhol <i>et al.</i> , 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between river and brook lamprey juveniles in the field (Gardiner 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of river/brook lamprey at least 2/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m ² in optimal conditions and more than 2/m ² on a catchment basis
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	
Availability of juvenile habitat	Number of positive sites in 2 nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Many sites with suitable larval attributes i.e. fine sediment in low velocity habitat, are found not to contain larval lamprey. This may be a function of chance or probability or may be a consequence of insufficient recruitment to fill all spatial niches. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date (King <i>et al.</i> , unpublished data)
Otter (<i>Lutra lutra</i>)	To restore the favourable conservation condition of Otter in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes

Lower River Shannon SAC (002165)			
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in Shannon catchment estimated at 70.5% (Bailey and Rochford 2006)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds	No field surveys. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 4,461.6ha	No field surveys. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 500.1km	No field surveys. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 125.6ha	No field surveys. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston <i>et al.</i> , 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 17	Otters will regularly commute across stretches of open water up to 500m. e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

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3.6.2 Qualifying Interests and potential impact pathways which were screened in for evaluation

The Qualifying Interests of the Lower River Shannon SAC and potential impact pathways which were screened in for evaluation are:

Table 12: Qualifying Interest Screened In due to potential for UWF Grid Connection to cause effects

Qualifying Interest of the Lower River Shannon SAC Screened In due to potential or likelihood of UWF Grid Connection causing effects	Pathway(s) Screened in for further consideration at Stage 2
<ul style="list-style-type: none"> Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260] 	SAC Pathway 1, 2, 3
<ul style="list-style-type: none"> Alluvial Forests (91E0) * (priority habitat) 	SAC Pathway 2, 3
<ul style="list-style-type: none"> Atlantic Salmon [1106] Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099] Otter [1355] 	SAC Pathway 4, 5, 6, 7, 8

The SAC Impact Pathways 1 to 8 are described below:

SAC Pathway 1: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC
SAC Pathway 2: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC
SAC Pathway 3: Indirect Effects to Qualifying Interest habitats , of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC
SAC Pathway 4: Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC
SAC Pathway 5: Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within the SAC
SAC Pathway 6: Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC
SAC Pathway 7: Indirect effects to Qualifying Interest species of the SAC Site (i.e. disturbance /displacement) ex-situ to the SAC
SAC Pathway 8: Indirect effects to Qualifying Interest species of the SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ the SAC.

3.6.3 Evaluation of the Impact of UWF Grid Connection on Qualifying Interests of the Lower River Shannon SAC

In order to evaluate the effect of UWF Grid Connection on the integrity of the Lower River Shannon SAC, the impact pathways identified above are examined in detail, through a number of focused impact evaluations, as per:

SAC Pathway 1 SAC Pathway 2 SAC Pathway 3 SAC Pathway 6 SAC Pathway 8	<i>Will be examined through these impact evaluations:</i>	<ul style="list-style-type: none"> • Decrease in instream aquatic habitat quality • Changes to flow regime • Riparian habitat degradation • Spread of invasive aquatic species
SAC Pathway 4 SAC Pathway 5 SAC Pathway 7	<i>Will be examined through these impact evaluations:</i>	<ul style="list-style-type: none"> • Direct Mortality of Fish and Aquatic Species • Disturbance or displacement of fish and aquatic species • Direct Mortality of Otter • Disturbance/Displacement of Otter.

For the purposes of the appraisal herein, effects on aquatic QI Habitats (and their respective conservation objectives) within the Lower River Shannon SAC (direct, secondary, within or Ex-Situ) as defined via possible pathways SAC Pathway 1, 2, 3, 6, and 8 can be characterised under a number of specific impact types. This includes general decreases in instream aquatic habitat quality, changes to flow regime, degradation of riparian habitat and potential cross-factor effects on QI Habitats via the spread of Aquatic invasive species.

Potential effects (direct, indirect within and ex-situ) on those QI species (and their respective conservation objectives) for which the Lower River Shannon is designated, as defined via possible pathways SAC Pathway 4, 5 and 7 also fall under a number of typical impact categories, primarily related to the mortality of, or disturbance or displacement of aquatic species, both mammalian and fisheries. Direct mortality of mammals is considered on a precautionary basis, due to the exclusion of Mitigation Measures (which would prevent inadvertent mortality) from consideration at Stage 1.

Evaluation of In-Combination Effects:

The evaluations of the impact of UWF Grid Connection on the Qualifying Interests of the Lower River Shannon SAC takes into account the in-combination effect with the Other Elements of the Whole UWF Project, and with the following other unrelated projects and activities:

- Rearcross Quarry
- Newport Town Park
- Castlewaller Windfarm
- Bunkimalta Windfarm
- Agriculture, Forestry and Turf-cutting in the surrounding area.

- A description of the other projects is included in Section 3.2.7.
- The location of the UWF Grid Connection, and the other projects, in relation to the Lower River Shannon SAC is illustrated on the following mapping, which are contained in **Appendix A9: Accompanying Figures** of this Appropriate Assessment Report:
 - **AA Figure 4: Location of UWF Grid Connection in relation to Lower River Shannon SAC**
 - **AA Figure 12: Location of UWF Grid Connection and other projects in relation to Lower River Shannon SAC.**

3.6.3.1 Evaluation of SAC Pathways 1, 2, 3, 6 & 8

3.6.3.1.1 Effects on QI habitats and/or species along Pathways 1, 2, 3, 6 & 8 from decreases in instream aquatic habitat quality, within or ex-situ the Lower River Shannon SAC

Impact Description:	
Project Life Cycle Stage:	Construction stage
<u>Impact Source:</u> instream works; culvert replacement works; parapet works; movement of soils and machinery; excavation works; use of hydrocarbons & cement-based compounds; reinstatement works.	
<u>Cumulative Impact Source:</u> Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Hydrocarbons; Reinstatement; Earthworks and Groundwork	
<u>Impact Pathway:</u> Soils; Surface water, water flowpaths	
<p><u>Impact Description:</u> Aquatic habitat relates to the instream features supporting aquatic biodiversity (bed substrate, morphology, water quality, etc.). Watercourses are highly sensitive to change, containing sensitive aquatic ecological receptors including salmonids, lamprey species, and a diverse macroinvertebrate community. Instream works at some watercourses will require direct excavation of the banks and bed of the watercourse, which can change the physical character of the watercourse and has the potential to degrade the quality of the baseline habitat which supports the structure, function and diversity of aquatic species.</p> <p>Water quality effects due to sedimentation: Erosion and deposition are natural process in watercourses¹³, varying naturally throughout the year. However, additional sediment contributions entering the watercourse, such as from construction works in, adjacent to or upstream of individual watercourses, can have negative implications for fish and invertebrates due to physical damage and reduced feeding/foraging, as well as negative impacts due to compaction of spawning gravels by sediment causing mortality impacts for salmonid eggs (affecting recruitment) and interfering with invertebrate life stages within gravel substrates (interstitial spaces). These impacts may be mobilised downstream and affect river reaches at a distance from the physical works.</p> <p>In addition, water quality effects due to contamination by fuels, oils or cementitious material has the potential to lead to direct toxicity events, or sub-lethal degradation of aquatic habitat quality.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, an altered hydrological regime and through secondary effects on prey item species, affect the supporting habitat quality for QI Species.</p> <p>In instances where this impact occurs outside or ex-situ the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p>	
<u>Impact Quality:</u> Negative	
Evaluation the Subject Development Impact – Decrease in instream aquatic habitat quality, within or ex-situ the Lower River Shannon SAC	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u> Of the 68 No. watercourse crossings required for the UWF Grid Connection, 63 No. are located within the regional Shannon catchment. 15 No. of these watercourses have been evaluated as locations with fisheries value. Of these 15 No. watercourses within the regional Shannon catchment, 3 no. watercourse crossings (W7 at Rockvale bridge, W45 and W53 at Anglesey Bridge) with fisheries value are within the boundary of the Lower River</p>	

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¹³ EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems,

Shannon SAC: The remaining 12 crossings occur at varying distances upstream hydrologically from the Lower River Shannon SAC e.g. up to 13.9km hydrologically for Watercourse crossing W39.

Of the 15 No. watercourses within the regional Shannon catchment, 2 No. watercourses at Mountphilips (W1, W3) will be subject of instream works and 1 No. watercourse along the 110kV UGC with fisheries value (W14) will be subject to *potential* culvert replacement works. Each of these watercourses were classed as minor 1st order streams during watercourse surveys. Overall, the magnitude of the effect on the physical instream habitat i.e. watercourse channel morphology, substrate, and water quality due to instream works at W1 and W3, and due to any culvert replacement works at W14 has been evaluated as having a Negligible magnitude with regard to availability, diversity and quality of habitat supporting aquatic species (including QI species of the River Shannon SAC). This in line with the impact magnitude evaluation presented for instream works in Chapter 11 Water (Negligible magnitude/Imperceptible significance impact taking account of instream works). The potential for decreases in aquatic habitat quality due to additional sedimentation or contamination by fuels, oils or cement, is evaluated by sub-catchment below.

The remaining 12.No watercourses with fisheries value will not require instream works or culvert replacement works. This includes the crossing of the Newport River at W7 (within the SAC boundary, but works take place over the watercourse), the crossing of the Clare (Annagh) River at W36 and the crossing of the Bilboa River at W53 – the 110kV UGC will be installed within the existing bridge structures. The installation of the 110kV UGC at the other watercourses with fisheries value (W5, W8, W9, W18, W33, W38, W39, W45, W49 and W65) will not involve instream works as the cables will be installed either under or over the existing structures. Therefore, the potential for decreases in aquatic habitat quality at the remaining 12 No. watercourses only relates to sources of additional sedimentation or contamination by fuels, oils or cement. The potential for decreases in aquatic habitat quality due to water quality impacts i.e. via additional sedimentation or contamination by fuels, oils or cement, is evaluated as having a Negligible magnitude, in line with the Negligible Impact magnitude and Imperceptible impact significance presented for instream works, sedimentation and contamination effects in Chapter 11 Water of the EIA Report (see Volume C2).

Significance of the Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for SAC Evaluation:

- Effects are considered to be Slight to Moderate at watercourses with fisheries value requiring instream works or culvert replacement works, with Slight Impacts at Sub-Catchment level-however in the context of the primarily downstream Lower River Shannon SAC this is considered unlikely to result in adverse effects on European Site integrity, considering the following;
- Application of comprehensive water quality protection measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all instream works and culvert replacement works (i.e. whether fisheries value or not);
- In-stream works at W1 & W3 and culvert replacement works at W14 will only be undertaken during the IFI specified period (July – September) (Project Design Measure), which puts works outside of key sensitivity periods for the aquatic receptors. Flow conditions during this period are also likely to be lower, with lower relative contributions from surface water run-off;
- The in-stream works will not be undertaken without isolation of flow within the watercourse, and the removal of fish within the isolated section, prior to the in-stream works commencing (Project Design Measure).;
- Implementation of the Project Design Measures for Water Quality protection (PD17 to PD50) through the Surface Water Management Plan for UWF Grid Connection
- There will be no direct discharge of pumped water into the watercourse during the works (Project Design);
- The spatial extent of effects to the watercourse channel will occur within the footprint of any works at potential culvert replacement locations;
- The frequency of such an event is once for any culvert replacement works;
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat.
- Impacts to the watercourse channel are temporary and reversible. The duration of any reductions in the quality of downstream habitats (including within the SAC) due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible; and

- It's likely only between 100 – 300m of the trench will be excavated in any day with only 1 – 3 watercourse crossings being completed in any one day (assumed 3 work crews). Therefore, taking account of the temporary nature of the works within the catchment, all effects will be brief to temporary in nature and reversible.

Qualifying Interests:

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in supporting habitat or supporting habitat quality (including prey item abundance) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2). The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value which will be subject to instream works for both UWF Grid Connection and for Other Elements, with cognisance of works proposed within adjacent tributaries of the affected catchments, but which may not be occurring on the same individual watercourses.

Neither Upperchurch Windfarm, nor UWF Replacement Forestry occur within the River Shannon catchment. Also, elements of UWF Other Activities which occur in any catchments of the River Shannon, will not require any instream works, and it is therefore evaluated that any cumulative impacts directly or indirectly affecting instream aquatic habitat quality (water quality contamination or sedimentation) will be negligible, with reference to interactions between these elements and the UWF Grid Connection, in the context of the Lower River Shannon SAC. This evaluation takes cognisance of the Surface Water Management measures in place for Upperchurch Windfarm.

UWF Related Works within the Shannon catchment will cause limited construction-related effects as UWF Related Works will not require any instream works in the Bilboa_SC_010 sub-catchment, and is not located in either the Killeengarrif_SC_010 or Newport_SC_010 sub-catchments, and cumulative impacts to instream aquatic habitat quality will be negligible – ergo no potential for cumulative effects on the Lower River Shannon SAC is considered likely.

There is potential for cumulative effects on the Lower River Shannon SAC with the Bunkimalta Windfarm and Castlewaller Windfarm and associated grid connections (should they be constructed during the same period as UWF Grid Connection), the potential for cumulative effects relates to the Newport SC 010 sub-catchment and the Killeengarrif SC 010 sub-catchment. Due to the large size and assimilation capacity of both of these catchments, the limited extent of instream works associated with UWF Grid Connection, the upstream distance from Bunkimalta Windfarm works to the nearest point of overlap with the 110kV UGC works at or near the Lower River Shannon SAC (>12km), the temporary duration of these works, and the implementation of surface water management plans for both windfarms (in particular for Castlewaller Windfarm which is directly adjacent to the 110kV UGC), the cumulative impact magnitude is evaluated as Negligible to Low (in line with the cumulative magnitude evaluated in the Water chapter of the accompanying EIAR, **Volume C2**) in respect of European Sites.

Significance of the Cumulative Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- Effects are considered to be Imperceptible to Moderate in the local context, with No adverse effects on downstream European Site integrity
- In-stream works or culvert replacement works in watercourses with fisheries value for UWF Grid Connection will only occur in the Killeengarrif SC 010 sub-catchment and will only be undertaken during the IFI specified period (July – September) (Project Design Measure);

- No instream works or culvert replacement works in watercourses with fisheries value are required for UWF Grid Connection on watercourses of fisheries value arising from the UWF Grid Connection in the Newport_SC_010, the Bilboa_SC_010;
- Application of comprehensive water quality protection measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all instream works and culvert replacement works (i.e. whether fisheries value or not);
- There will be no direct discharge of pumped water into the watercourse during the UWF Grid Connection works (Project Design);
- The spatial extent of effects to the watercourse channel is limited to the footprint of instream works or culvert replacement works, and;
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat, and
- Impacts to the watercourse channel are temporary and reversible with reinstatement.
- The duration of any reductions in the quality of downstream habitats due to siltation are considered to be short-term to temporary and not reversible – although the resultant magnitude of any irreversible siltation effect on the SAC is not considered to be sufficient to result in adverse effects on site integrity.

Other Projects

- The upstream separation distance to the potential Bunkimalta Windfarm and the location of Castlewaller Windfarm turbines in the Newport SC_010 sub catchment where there are no instream or culvert replacement works required on any watercourse for the UWF Grid Connection, and the location of their respective grid connections predominately on roadways, with works spread over two catchments, in addition to the relatively large surface water catchment area of the Newport SC 010 or Killeengarrif SC 010 sub-catchments, and the temporary duration of construction works;
- No instream works, and no works within 5m of the watercourse in relation to Newport Town Plan works
- The separation distance and physical isolation of the existing quarry at Rearcross;
- No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area.
- Application of Best Practice measures to protect downstream water quality and aquatic habitats in relation to Rearcross Quarry, Newport Town Park, Castlewaller Windfarm and the potential future Bunkimalta Windfarm.

Qualifying Interests:

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in supporting habitat or supporting habitat quality (including prey item abundance) are expected.

Cumulative Information: Other Elements of the Whole UWF Project

Element 2: UWF Related Works

Impact Magnitude: Works at, or in close proximity to, watercourses have potential to cause decreases in instream habitat quality directly through instream works and indirectly through sediment laden/contaminated runoff into the watercourse.

There are 32 no. watercourse crossings required by the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works. 31 no. of the total 32 no. crossings are located within the Suir SC 030 sub-catchment and 1 no. in the Bilboa SC 010 sub-catchment. Of these 31 no. crossings the Suir SC 030 sub-catchment, in-stream works will be required at 25 no. of these locations - 5 No. of which were evaluated as having fisheries value.

The River Suir SAC is excluded from consideration in this table, hence only WW23, located in the Bilboa SC 010 sub-catchment is relevant in respect of the Lower River Shannon SAC. The 1 no. watercourse crossing remaining – WW23, which is located in the Bilboa_SC_010 (and hence the regional Lower River Shannon SAC catchment) will not require any instream works. This watercourse has no fisheries suitability and comprises a dry field drain. The proposed crossing method involves the installation of cabling over or under the structure.

The effect magnitude on the physical instream habitat within this tributary of the Bilboa i.e. watercourse channel morphology, substrate, and flow character due to instream works is evaluated as negligible in the context of a single

<p>watercourse crossing, with no associated instream works, 4.9km upstream hydrologically from the nearest boundary of the Lower River Shannon SAC.</p>
<p>Significance of the Impact: No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Effects will be Imperceptible to Moderate in the local (ex-situ) context, with no adverse effect on the downstream European Site; • Separation distance from the SAC under consideration; • The receiving watercourse in the Bilboa catchment is a field drain with no fisheries potential; • No instream works are required.
<p>Element 3: UWF Replacement Forestry -</p>
<p>Impact Magnitude: UWF Replacement Forestry is located at Foilnaman townland, near Upperchurch, County Tipperary, and is entirely within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence effects due to the planting or growth stage works onsite are only applicable in the context of the evaluation of the River Suir SAC. It is excluded from further consideration in respect of the Lower River Shannon SAC on the basis that it cannot contribute to likely significant or adverse effects on QI habitats or Species within the Lower River Shannon regional catchment or SAC. In relation to indirect impacts via transportation routes, which could be through the regional Shannon catchment, negligible magnitude of effects (if any) due to the location of all deliveries or transportation associated with this element being on public road networks, in the context of the extremely low volumes of traffic associated with this element.</p>
<p>Significance of the Impact: No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Separation from the SAC under consideration;
<p>Element 4: Upperchurch Windfarm</p>
<p>Impact Magnitude: There is 1 no. watercourse crossing within the Upperchurch Windfarm Site, evaluated as having fisheries value (Class 1, WW2), located in the River Suir regional catchment and hence upstream (ex-situ) from the River Suir SAC. This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Baseline conditions indicated that the aquatic species were present year-round, and works in close proximity to this watercourse were evaluated as being of high magnitude for aquatic species. However, it was identified that significant impacts were not probable/not likely post-mitigation. The 2013 EIS concluded that water quality effects will not be significant.</p>
<p>Significance of the Impact: No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Only a single watercourse crossing WW2, is associated with the wind farm, which is not connected to the Lower River Shannon SAC. • A clear-span bridge will be used where a natural stream (Class 1 watercourse) will be crossed and therefore no in-stream works are required; • All effects were evaluated as reversible and temporary in the short-term and impacts were associated with construction phase works.
<p>Element 5: UWF Other Activities</p>
<p>The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. There is no potential for aquatic habitat effects within or ex-situ to the River Shannon SAC as there are no instream works or sediment creating activities adjacent to watercourses required as a result of UWF Other Activities (including Overhead Line Activities, Haul Route Activities). No potential for disturbance effects to aquatic receptors due to the small scale of activities and no activities within the riparian corridor of Class 1 or Class 2 watercourses. The Upperchurch Hen harrier Scheme is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence upstream or <i>ex-situ</i> to the River Suir SAC (excluded from consideration in this table). No potential for impacts to aquatic habitat quality arising from the spread of invasive species, as there are no instream works or activities adjacent to watercourses required as a result of UWF Other Activities. The proposed Activities include all environmental protection measures, including measures for invasive species management and monitoring associated with the Upperchurch Hen Harrier Scheme; as set out in Appendix 5.6 of the accompanying EIAR (Volume C4). No potential for impacts to aquatic habitats due to tree felling, as no tree felling of conifer plantations is required. Overall magnitude is evaluated as negligible.</p>

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<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Evaluation of Other Cumulative Impacts – Decrease in instream aquatic habitat quality</p>
<p>Whole UWF Project Effect</p>
<p><u>Magnitude:</u> The watercourse crossing works required for the UWF Grid Connection (68 No. total) are largely located within the River Shannon catchment (63 No.) while the watercourse crossings required for the Upperchurch Windfarm (1 No. natural stream) and UWF Related Works (32 No. watercourses in total) are largely located in the Suir_SC_030 sub-catchment.</p> <p>For the Whole UWF Project within the River Shannon Catchment and hence potentially where the pathways under consideration exist to the Lower River Shannon SAC, a potential decrease in aquatic habitat quality due to instream/culvert replacement works is identified at a total of 3 No. watercourses evaluated as having fisheries value – all in respect of UWF Grid Connection.</p> <p>The spatial extent of habitat quality effects arising from Whole UWF Project impacts, due to instream works or water quality contamination, will potentially occur within the footprint of the instream/culvert replacement works, taking account of Project Design measures and implementation of mitigation measures stipulated for individual Project Elements. These effects will be dispersed between two regional catchments and within several local sub-catchments. Impact range is located downstream of the lowest point in the waterbody where Whole UWF Project works are required, with reference to the zone of sediment transport. It is evaluated that the cumulative impact magnitude will be Low to Medium in the context of one of the above referenced regional catchments, namely the River Shannon regional catchment, wherein the Lower River Shannon SAC is located. Magnitude evaluated as negligible overall.</p>
<p>Significance of the Whole Project Effect: No adverse effects on the Integrity of the Lower River Shannon SAC</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Effects are considered to be Imperceptible to Moderate in the local context with no adverse effects on downstream (Lower River Shannon SAC) European Site integrity • The presence of sensitive salmonid fish habitat within the works area and protected Annex II (and Annex IV listed) species downstream. • The low number of watercourses (3 No. in total) with fisheries value and subject to instream/culvert replacement works, in the context of the Lower River Shannon SAC. • the location of works within a large regional catchment with significant assimilation capacity; • the linear nature of the UWF Grid Connection 110kV UGC works over a large c.23km latitudinal distance; • The spatial extent of effects to watercourse channels will occur within the footprint of the instream works, • The once off frequency and brief to temporary duration of works within or adjacent to the aquatic habitat. • Impacts at the works site are temporary and reversible; however, any reduction in habitat quality due to potential downstream siltation effects are considered to be short-term to temporary and not reversible – although the resultant magnitude of any irreversible siltation effect on the SAC is not considered to be sufficient to result in adverse effects on site integrity. • No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected. • No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected. • No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected. • No effects on QI Species Otter via reductions in supporting habitat or supporting habitat quality (including prey item abundance) are expected. <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected. • No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected. • No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected. • No effects on QI Species Otter via reductions in supporting habitat or supporting habitat quality (including prey item abundance) are expected.

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All Elements of the Whole UWF Project with Other Projects or Activities
<p><u>Cumulative Impact Magnitude:</u></p> <p>In relation to cumulative effects within the Killeengarriff_SC_010 sub-catchment; Approximately 13.7km of the 110kV UGC and the Mountphilips Substation site and part of a potential Bunkimalta Windfarm footprint and 0.2km of the consented grid connection, and 9.6km of the potential grid connection route for Castlewaller Windfarm are located within the Killeengarriff_SC_010. There are no other elements of the Whole UWF Project requiring instream works, or contributing to aquatic habitat deterioration (water quality contamination or deterioration) within this sub-catchment.</p> <p>In relation to cumulative effects within the Newport (Tipperary)_SC_010 sub-catchment; Approximately 3.5km of the 110kV UGC, along with part of a potential Bunkimalta Windfarm footprint and 6.4km of the potential consented Bunkimalta Windfarm grid connections, and all of the Castlewaller Windfarm and 4.8km of the potential Castlewaller Windfarm grid connection and all of the Newport Town Park are located within the Newport (Tipperary)_SC_010 sub-catchment. There are no other elements of the Whole UWF Project requiring instream works, or contributing to aquatic habitat deterioration (water quality contamination or deterioration) within this sub-catchment.</p> <p>The remaining elements of the Whole UWF Project are located in the Bilboa River sub-catchment and in the Suir_SC_030 sub-catchment (excluded in this table) and are therefore spatially distant and hydrologically separated from any cumulative interactions due to instream works with Other Projects and Activities.</p> <p>The magnitude of cumulative impact is negligible to low, taking account of the impact evaluations for the Whole UWF Project and those of the Other Projects and Activities identified in the wider study area, with cognisance of the aquatic sensitivities in the affected catchments.</p> <p>Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Shannon SAC</p> <p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> ● Effects are considered to be slight to Moderate overall, however no adverse effect on the downstream SAC is expected. ● The presence of sensitive salmonid fish habitat within the works area and protected Annex II (and Annex IV listed) species downstream. ● The low number of watercourses (8 No. in total) with fisheries value and subject to instream/culvert replacement works. ● the location of works in two separate regional catchments; ● the linear nature of the UWF Grid Connection 110kV UGC works over a large c.23km latitudinal distance; ● The spatial extent of effects to watercourse channels will occur within the footprint of the instream works, ● The once off frequency and brief to temporary duration of works within or adjacent to the aquatic habitat. ● Impacts at the works site are temporary and reversible; however, any reduction in habitat quality due to potential downstream siltation effects are considered to be short-term to temporary and not reversible. The location of the grid connections for Bunkimalta Windfarm (consented) and Castlewaller Windfarm (potential) predominately on existing forestry/public roads within the catchment; ● The large surface water catchment area of the Killeengarriff_SC_10 sub-catchment (122km²) and Newport (Tipperary)_SC_010 sub-catchment(95km²); ● The relatively large upstream distance of the potential Bunkimalta Windfarm site (~10km) from the 110kV works; ● The absence of instream works required for the Newport Town Park; ● Sediment Control Plans expected to be implemented for the consented Newport Town Park project, and for the potential Bunkimalta Windfarm and associated consented grid connection, consented Castlewaller Windfarm (and potential grid connection) as per best practice and to ensure no adverse effects to downstream SACs. ● the location of the grid connections for Bunkimalta Windfarm (consented) and Castlewaller Windfarm (potential) predominately on existing forestry/public roads within the catchment. <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> ● No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.

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- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in supporting habitat or supporting habitat quality (including prey item abundance) are expected.

3.6.3.1.2 Effects on QI habitats and/or species along Pathways 1, 2, 3, 6 & 8 from changes to flow regime within or ex-situ the Lower River Shannon SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> instream works; culvert replacement works; movement of soils and machinery; excavation works; new crossing structures</p> <p><u>Cumulative Impact Source:</u> Instream works; new crossing structures; movement of soils and machinery;</p> <p><u>Impact Pathway:</u> Surface water;</p> <p><u>Impact Description:</u> Watercourse morphology relates to the shape of a watercourse channel, its bed and banks and how erosion, transportation of water, sedimentation and the composition of riparian vegetation changes this shape over time. As per Section 11.2.4.3 of Chapter 11: Water, in the accompanying EIAR Volume C2, direct impacts are identified to channel morphology and geomorphology (bed and banks of watercourses) due to instream works. The potential for indirect effects which would lead to sediment deposition at a scale to alter channel morphology or the flow regime are considered unlikely; with reference to Project Design measures. However, direct effects may impact European Sites, where watercourse crossings overlap SAC boundaries or occur immediately adjacent. In this table consideration is given to impact pathways via changes to flow regime on the River Shannon SAC.</p> <p>Aquatic species are likely to be present in fishery value watercourses at instream construction works locations at W1 and W3 (new crossing locations at Mountphilips Substation site) and at W14 along the 110kV UGC on the Regional Road (potential culvert replacement works). Any change in watercourse morphology which affects channel flow regimes can result in cross factor effects on aquatic ecological communities, within or <i>ex-situ</i> an SAC. Aquatic species are reliant on instream habitat heterogeneity (riffle/glide/pool structure); along with the availability of peak flow flushes (flood/spate); the provision of flows for upstream/downstream migration and the avoidance of barriers to passage; and avoidance of channel constriction during low flow.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, an altered hydrological regime and through secondary effects on prey item species, affect the supporting habitat quality for QI Species.</p> <p>In instances where this impact occurs outside or ex-situ the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>Instream works are limited to the individual crossing points (W1 and W3) and include trenching works for underground cables, installation of temporary (W1) or permanent (W3) crossing structures and reinstatement works. Works for the UWF Grid Connection also involve the replacement of some existing culverts under public road pavements, with 1 no. culvert (W14) potentially requiring replacement at a watercourse with fisheries value. However, no culvert replacement will take place within the boundary of the Lower River Shannon SAC.</p> <p>As per project design, instream construction works at the watercourse crossings W1, W2 (no fisheries value) and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1,</p>	

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W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. As per project design, culvert replacement works at W14 and the 12 no. other watercourse crossings (no fisheries value) will be subject to reinstatement works which will include site-specific bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles. These measures will be overseen supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. However, no reinstatement work is required within the boundary of the Lower River Shannon SAC.

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

Project Design Measures also include the use of culverts at all new permanent watercourse crossings which will be a minimum of 900mm in diameter and will be bottomless or clear spanning at W1, W2, W3 and W14 watercourse crossings. In addition, in-stream works will only be undertaken during dry weather within the IFI instream works window (July – September inclusive), and will include for the equilibrated reinstatement of flow and the use of diffuser plates where required.

Impact Quality: Negative

Evaluation the Subject Development Impact – Changes to Flow Regime

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Works at, or in close proximity to, watercourses have potential to indirectly affect aquatic species and habitats through changes to flow regimes which can be caused directly by morphological changes due to instream works.

15 No. of the 63 No. watercourses within the UWF Grid Connection site (within the regional River Shannon catchment) are evaluated as having fisheries value (i.e. Class 1 or Class 2). Of these 15, 3 no. watercourse crossings (W7-located at Rockvale bridge, W45 and W53) with fisheries value are within the boundary of the Lower River Shannon SAC: The remaining 12 crossings occur at varying distances upstream hydrologically from the Lower River Shannon SAC -e.g. W39 is 13.9km hydrologically upstream of the Lower River Shannon SAC.

At Mountphilips Substation 3 no. watercourse crossings are proposed, two of these watercourses (W1 and W3 – both outside the SAC but within the regional River Shannon catchment) have fisheries value (both Class 2). Instream works at these two watercourses will involve the installation of one temporary crossing structure (W1) and one permanent crossing structure (W3). Changes to the flow regime will be temporary at W1 and permanent at W3.

The 60 No. watercourse crossings along the UWF Grid Connection 110kV UGC, outside of the Mountphilips Substation site, but within the regional Shannon Catchment, all exist along the public road network and along the private paved road near the Consented UWF Substation. Outside of Mountphilips, 12 No. watercourses within the regional Shannon catchment have been evaluated to have fisheries value. Of these 12 No. watercourses, 1 No. will be subject to *potential* culvert replacement works (W14- outside the SAC as already noted). At W14, changes to the flow regime will be brief (1 day) and for the duration of the immediate works, restricted to the location of the works area within the footprint of, or directly adjacent to the existing crossing point in the public road. Changes to the flow regime at these crossing locations will be avoided through the isolation of flow, over pumping of the water from upstream to downstream of works, the use of deflector plates, the equilibrated restoration of flow and the sensitive restoration of the bed and banks of these watercourse following works (Project Design). The magnitude of impact is negligible to low, and the duration is long-term and permanent, taking account of Project Design.

The remaining 11 No. watercourses with fisheries value, including all required crossings of major rivers Newport, Clare and Bilboa Rivers, are all across existing crossing structures which do not require any instream works or culvert replacement works and cables will be installed either under or over the structure. Any changes to flow regime due to sedimentation will be of negligible magnitude with the implementation of Project Design Measures, such as the use of sandbags to avoid the runoff of sediment laden water from construction works

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<p>areas, and the treatment of any water pumped from excavations prior to discharge. The magnitude of impact is negligible.</p>
<p>Significance of the Impact: : No adverse effects on the Integrity of the Lower River Shannon SAC</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> ● Effects are considered to be Slight in the local context with no adverse effect on the downstream River Shannon SAC ● In-stream works at W1 and W3, and culvert replacement works at W14 will only be undertaken during dry weather within the IFI specified period (July – September) for the watercourses with fisheries value, this with fisheries value, this will also be applied to W2 and the 11 no. watercourses with sub-optimal or no fisheries value (Project Design Measure); ● The Class 1 and Class 2 watercourses at W1, W3 and W14 are characterized as small, first order streams, which have all been in some way altered by the existing landuse (i.e. agriculture or public road infrastructure); ● The limited extent of direct instream works potentially affecting flow, and the sensitive design of new/replaced crossing structures following from pre-planning consultation with IFI. ● The brief to temporary duration and reversibility of any effects. ● the implementation of comprehensive water quality protection measures as part of the Mitigation Measures which will minimize/avoid sediment laden runoff from entering watercourses; <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> ● No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected. ● No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected. ● No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected. <p>No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.</p>
<p>Element 1: UWF Grid Connection – cumulative impact</p> <p>The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2). The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value which will be subject to instream works for both UWF Grid Connection and for Other Elements.</p> <p>UWF Replacement Forestry does occur within the River Shannon regional catchment and can be excluded. Neither Upperchurch Windfarm nor UWF Other Activities will require any instream works on watercourses with fisheries value in the regional Shannon catchment, therefore there is no potential for effects via instream works.</p> <p>In relation to effects via sedimentation, as per Chapter 11 Water, in the accompanying EIAR Volume C2, it has been evaluated that any sedimentation caused by UWF Other Activities will be negligible and consequently this project element is not likely to contribute to any changes to flow regimes. In relation to Upperchurch Windfarm, due to the limited extent of Upperchurch Windfarm works in the regional Shannon catchment and the separation distance to watercourses with fisheries value, the predominance of land drains (with no fisheries value) in the windfarm site and due to the implementation of the Sediment & Erosion Control Plan for the windfarm, it is evaluated that any cumulative impacts to flow regime (due to sedimentation) will be negligible.</p> <p>UWF Related Works has limited extent in respect of the Lower River Shannon SAC and though present, will not require instream works in the <u>Bilboa SC 010 sub-catchment</u> nor is it located in either the <u>Newport SC 010</u> or <u>Killeengarrif SC 010 sub-catchments</u>, therefore cumulative impacts are not likely to occur in these sub-catchments.</p> <p>The cumulative magnitude with the Other Elements is evaluated as Negligible.</p> <p>In relation to other projects, the cumulative magnitude is evaluated as negligible due to the limited amount of instream works, the localised nature of impacts and the size of the catchments.</p>

Significance of the Cumulative Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- Effects are considered to be imperceptible;
- The absence of instream works associated with both UWF Grid Connection and UWF Related Works in the same sub-catchment;
- The absence of instream works associated with Upperchurch Windfarm or UWF Other Activities;
- The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture);
- The limited extent of direct instream works potentially affecting flow;
- The sensitive crossing designs to be implemented (Project Design);
- the implementation of comprehensive water quality protection measures as part of the Mitigation Measures which will minimize/avoid sediment laden runoff from entering watercourses;
- The brief to temporary duration and reversibility of any effects;

Other projects

- The absence of instream works and separation from watercourses for Newport Town Park and Rearcross Quarry
- The implementation of Best Practice water quality measures during construction works for Castlewaller Windfarm and the potential Bunkimalta Windfarm (assumed).
- No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area

Qualifying Interests:

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

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

Element 2: UWF Related Works

Impact Magnitude:

Works at, or in close proximity to, watercourses have potential to cause changes to flow regime through instream works and indirectly through sediment laden runoff into the watercourse. The 1 no. watercourse crossing in the Bilboa_SC_010 will not require any instream works. The magnitude of impact is negligible.

Significance of the Impact: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- Only a single watercourse crossing occurs within any sub-catchment of the Regional Shannon Catchment, with;
- No instream works required.

Element 3: UWF Replacement Forestry

UWF Replacement Forestry is located at Foilnaman townland, near Upperchurch, County Tipperary, and is entirely within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence effects are only applicable in the context of the evaluation of the River Suir SAC. It is excluded from further consideration in respect of the Lower River Shannon SAC on the basis that it cannot contribute to likely significant or adverse effects on QI habitats or Species within the Lower River Shannon SAC.

Significance of the Impact: No adverse effects on the Integrity of the Lower River Shannon SAC

Element 4: Upperchurch Windfarm

Impact Magnitude: Construction works will take place in close proximity to 1 No. watercourses with fisheries value (Class 1, WW2) – however this is located entirely within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment. No effects are possible via changes in flow regime to the River Shannon SAC.

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<u>Significance of the Impact:</u> No adverse effects on the Integrity of the Lower River Shannon SAC
Rationale for Impact Evaluation: <ul style="list-style-type: none"> ● WW2 is located entirely within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment.
Element 5: UWF Other Activities
In relation to effects via sedimentation, as per Chapter 11 Water, in the accompanying EIAR Volume C2, it has been evaluated that any sedimentation caused by UWF Other Activities will be negligible and consequently this project element is not likely to contribute to any changes to flow regimes. Impact magnitude is negligible.
<u>Significance of the Impact:</u> No adverse effects on the Integrity of the Lower River Shannon SAC
Evaluation of Other Cumulative Impacts – Changes to Flow Regime
Whole UWF Project Effect
Cumulative Impact Magnitude: A potential decrease in aquatic habitat via changes to flow regime is identified at 3 No. UWF Grid Connection watercourse crossings (W1, W3 and W14) where new instream works or culvert replacement works are required within watercourses evaluated as having fisheries value. All are located outside the SAC but within the regional River Shannon catchment and are therefore outside the SAC but hydrologically connected at varying distances (W1:3.3km, W3:3.75km and W14:6km). The potential for indirect effects which would lead to sediment deposition at a scale to alter channel morphology or the flow regime of a downstream SAC are considered unlikely. The spatial extent of such effects will occur primarily within the footprint of the instream works, extending to immediately downstream where hydrological flow character may be altered due to bank or river bed modification, recognising that cumulative effects are widely dispersed between two regional catchments and within several sub-catchments. Immediately downstream effects are not considered to extend to a distance large enough to result in noticeable negative effects on downstream SAC's. Dispersal of cumulative effects across a significant catchment size also negates the likelihood of adverse in combination effects on the SAC under consideration. Magnitude is evaluated as negligible.
Significance of the Whole Project Effect: No adverse effects on the Integrity of the Lower River Shannon SAC
<u>Rationale for Cumulative Impact Evaluation:</u> <ul style="list-style-type: none"> ● Instream works potentially affecting the flow regime are required at a limited number of locations; which require temporary works and permanent instream structures. ● Implementation of Project Design Measures at all stream/culvert crossings, instream works and culvert replacement works locations to minimize effects ● Implementation of the sensitive crossing designs developed following consultation with IFI. ● Provision of reinstatement works at new permanent crossings/replaced existing culverts including: site-specific bank stabilization measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels where necessary; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles. ● Separation distance from European Sites and dispersal factor.
<u>Qualifying Interests:</u> <ul style="list-style-type: none"> ● No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected. ● No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected. ● No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected. ● No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.
All Elements of the Whole UWF Project with Other Projects or Activities
Cumulative impact Magnitude:

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Overall magnitude is evaluated as negligible in respect of the Whole UWF Project, and the consented Castlewaller Windfarm and potential Bunkimalta Windfarm and their respective grid connections, and the additionally considered Rearcross Quarry, Newport Town Park and background activities such as Turfcutting, Forestry and Agriculture, given the limited number of locations where a potential change to Aquatic Flow Regime may occur, in addition to the localised nature of impacts and the wide dispersal area under consideration.
Overall cumulative magnitude is negligible.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Shannon SAC

Rationale for Cumulative Impact Evaluation:

- Instream works connected to the UWF Grid Connection potentially affecting the flow regime are required at a limited number of locations; which require temporary works and permanent instream structures.
- Implementation of UWF Grid Connection Mitigation Measures at all stream/culvert crossings, instream works and culvert replacement works locations to minimize effects
- Implementation of the sensitive crossing designs as part of UWF Grid Connection developed following pre-planning consultation with IFI.
- the use of deflector plates, the equilibrated restoration of flow
- Provision of reinstatement works as part of UWF Grid Connection at new permanent crossings/replaced existing culverts culverts under supervision of a member of CIEEM and the Institute of Fisheries Management.

Other Projects

- The absence of instream works and separation from watercourses for Newport Town Park and Rearcross Quarry
- The implementation of Best Practice water quality measures during construction works for Castlewaller Windfarm and the potential Bunkimalta Windfarm (assumed).
- No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area.

Qualifying Interests:

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

3.6.3.1.3 Effects on QI habitats and/or species along Pathways 1, 2, 3, 6 & 8 from Riparian habitat degradation within or ex-situ the Lower River Shannon SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> instream works, culvert replacement works; movement of soils and machinery; excavation works; reinstatement works</p> <p><u>Cumulative Impact Source:</u> Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Reinstatement</p> <p><u>Impact Pathway:</u> Soils; Direct contact</p> <p><u>Impact Description:</u> The riparian corridor along a watercourse relates to the interface between the aquatic habitat, the bankside vegetation and terrestrial environment. An intact, semi-natural riparian zone has significant beneficial services in the protection of instream aquatic habitat quality, food/nutrient contributions, and temperature regulation. Existing riparian habitat quality within the study area is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works.</p> <p>The removal of, or damage to, riparian vegetation during instream works or excavation/ground clearance works in close proximity to any watercourse has the potential to impact on the quality of riparian habitats which in turn can affect watercourse morphology, shading, bank stability, and nutrient and sediment loading and result in indirect effects on aquatic species. The magnitude of resultant effects is expected to be higher when this occurs within an SAC as to without, given that effects are naturally localised. However downstream effects may occur to European Sites where suitable connectivity exists especially if riparian habitat degradation ex-situ leads to increased downstream sediment loads, or sufficiently affects upstream spawning habitats etc. which in effect support downstream SAC qualifying interests.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, an altered hydrological regime and through secondary effects on prey item species, affect the supporting habitat quality for QI Species.</p> <p>In instances where this impact occurs outside or ex-situ the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>Impact Quality: Negative</p>	
Evaluation the Subject Development Impact – Riparian habitat degradation	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u> Of the 63 No. watercourse crossings required for the UWF Grid Connection in the River Shanonn catchment, 15 No. have been evaluated to have fisheries value. Of these 15, 3 no. watercourse crossings (W7 at Rockvale bridge, W45 and W53 at Anglesey Bridge) with fisheries value are within the boundary of the Lower River Shannon SAC. The remaining 12 crossings occur at varying distances upstream hydrologically from the Lower River Shannon SAC -e.g. W39 is 13.9km hydrologically upstream of the Lower River Shannon SAC.</p> <p>Of the 15 No. applicable watercourses, 2 No. watercourses at Mountphilips (W1, W3) will be subject of instream works. Watercourse crossings W1 and W3 are upstream of the River Shannon SAC at hydrological distances of 3.3km and 3.75km respectively.</p> <p>Riparian habitat at the W1 and W3 crossing locations consists of vegetation clearance (as necessary: topsoil stripping, scrub removal) within the boundary of the temporary construction works area at the Mountphilips</p>	

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Substation site. As per Project Design, following works at W1 and W3, reinstatement works will be carried out which will include site-specific bank stabilisation measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels within the bank-width of the existing river corridor, where necessary and replanting of riparian buffer zones with suitable native species to manage flood flows and buffer run-off. The duration of any loss of well-structured riparian habitat impacts is evaluated with regard to the direct aquatic habitat services provided by the riparian zone (bank stabilization and erosion control, shading and temperature regulation), as well as the indirect inputs such as habitat for invertebrate food for fish and aquatic biota, reduction in light for aquatic flora, flood control and buffering effects in relation to run-off. The context of riparian habitat quality in the study area is considered, with regard to existing intensive agriculture affecting baseline conditions at the W1 and W3 crossing points; which has resulted in degraded cover due to bank side clearance works at the majority of crossing locations. Riparian habitat impacts will be reversible with reinstatement and will be temporary to short-term, ex-situ to the SAC, limited to the construction phase and early operational stage until vegetation has re-established. The impact magnitude is negligible in the context of the downstream SAC under consideration.

Culvert replacement works will be required at **1 no.** watercourse W14 (which has fisheries value) along the 110kV UGC, and 6km upstream hydrologically of the River Shannon SAC. The replacement of the existing culvert is expected to have minimal effect on any adjacent riparian habitat degradation due to the works taking place from the road pavement above, and from either side of, the culvert, with works in the watercourse limited to the placement of sandbags and deflector plates, placement of the culvert and reinstatement works. Any reinstatement of the immediately adjacent culvert finishing works, will be of a negligible magnitude and will not result in any impact on adjacent (ex-situ to the SAC) riparian habitat.

At the remaining 12 No. watercourse crossings along the 110kV UGC route (which have fisheries value and are connected to the River Shannon SAC), including all required crossings of major rivers (Newport, Clare and Bilboa), the installation of the 110kV UGC will utilise existing crossing structures which do not require any instream works or culvert replacement works and the 110kV UGC will be installed within the existing bridge structures; or under or over the existing culverts, therefore there is no potential to damage or remove riparian habitat either side of the road corridor at these locations.

At the remaining 48 watercourse crossings locations (W2 at the Mountphilips Substation site, and 47 No. along the 110kV UGC route), works required are at existing watercourse crossing locations which have low/none fisheries value, works similarly will only involve trenching under or over the existing structure with no works in the verges, the impact magnitude of riparian habitat degradation on aquatic ecological receptors is evaluated as negligible.

Significance of the Impact : No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- Effects are considered to be Slight to Moderate in the local context with no adverse effect on the River Shannon SAC;
- Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to 3 watercourse crossing locations within minor watercourses (W1, W3 and W14), all outside the SAC boundary;
- The general context of the three watercourses affected comprises first order streams within managed agricultural lands within enclosed or fully tunneled riparian vegetation at the crossing points;
- Bank works will be required at watercourse crossing locations W1, W3, with minor clearance of riparian vegetation within the footprint of the potential culvert replacement at W14;
- Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible;
- Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions and reversible with reinstatement;
- supervision of all instream works (i.e. W1, W2 (no fisheries value) and W3) and culvert replacement works (W14 and 11 no. other locations at watercourses with sub-optimal or no fisheries value) by a member of CIEEM and the Institute of Fisheries Management

Qualifying Interests:

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.

<ul style="list-style-type: none"> • No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected. • No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected. • No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.
<p>Element 1: UWF Grid Connection – cumulative impact</p> <p><u>Cumulative Impact Magnitude:</u> The potential for cumulative impacts relates to waterbodies within which instream works or culvert replacement work for UWF Grid Connection are expected to cause degradation of riparian habitat. For UWF Grid Connection, this only relates to W1, W3 and W14. No Other Element or other project is located in close proximity to these watercourse crossings; therefore it is considered that there is no potential for cumulative impacts.</p> <p>Significance of the Cumulative Effect: No adverse effects on the Integrity of the Lower River Shannon SAC</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations, upstream from the SAC, with no overlap between UWF Grid Connection and the Other Elements, as instream works will take place in separate catchments. • Physical and spatial isolation, i.e. separation distance of Rearcross Quarry, Newport Town Park, Castlewaller Windfarm, and Bunkimalta Windfarm from the 110kV UGC works at W1, W3 and W14. • No change from existing baseline conditions in respect of Agriculture, Forestry and Turf Cutting
<p>Cumulative Information: Other Elements of the Whole UWF Project</p> <p>Element 2: UWF Related Works</p> <p><u>Impact Magnitude:</u> Riparian habitat will be affected at 6 No. watercourse crossings identified as having fisheries value, out of a total of 32 watercourse crossings within the construction works area boundary associated with the UWF Related Works. However, all are located within the Clodiagh (Tipperary) sub-catchment of the regional Suir Catchment, and therefore are applicable only to the consideration of potentially adverse effects on the River Suir SAC. The 1 no. watercourse crossing in the Bilboa_SC_010 will not require any instream works. The duration of any loss of well-structured riparian habitat impacts will not result in any possibility of adverse effects on the River Shannon SAC. Impact Magnitude is negligible.</p> <p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No hydrological connectivity to the River Shannon SAC for locations of instream works. <p>Element 3: UWF Replacement Forestry</p> <p>UWF Replacement Forestry is located at Foilnaman townland, near Upperchurch, County Tipperary, and is entirely within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence effects are only applicable in the context of the evaluation of the River Suir SAC. It is excluded from further consideration in respect of the Lower River Shannon SAC on the basis that it cannot contribute to likely significant or adverse effects on QI habitats or Species within the Lower River Shannon SAC.</p> <p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p> <p>Element 4: Upperchurch Windfarm</p> <p><u>Impact Magnitude:</u> As per the 2013 EIS, 1 No. watercourse with fisheries value will be crossed. The crossing method will utilise a clear span bridge design, which will avoid the requirement for instream works; however, works within the riparian zone will be required. However, this is located entirely within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment and is therefore cannot act in combination in respect of the River Shannon SAC. It is excluded from further consideration.</p>

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<u>Significance of the Impact:</u> No adverse effects on the River Shannon SAC	
Rationale for Impact Evaluation: <ul style="list-style-type: none"> • No requirement for instream works on fisheries value watercourses • Limited scale of works within the riparian corridor at the 1 no. stream crossing • All effects were evaluated as reversible and temporary in the short-term; • Riparian habitats within the Upperchurch Windfarm which are directly affected by construction works were not identified as being of significant conservation value. 	
Element 5: UWF Other Activities	
<p>The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities.</p> <p>In relation to effects via riparian habitat degradation, elements of Other Activities which have any potential to interact with riparian habitats are essentially linked to the UHHS, which is located in its entirety in the Clodiagh (Tipperary) sub-catchment of the River Suir Regional Catchment.</p> <p>Effects from remaining activities (i.e. Overhead Line Activities, Haul Route Activities) located in the River Shannon catchment, and hence where connectivity to the River Shannon SAC may exist, are evaluated as negligible in magnitude in the context of riparian habitat degradation as no instream works or works in immediate proximity to watercourses are required.</p>	
<u>Significance of the Impact:</u> No adverse effects on the integrity of the River Shannon SAC	
Evaluation of Other Cumulative Impacts – Riparian habitat degradation	
Whole UWF Project Effect	
<p>Cumulative Impact Magnitude: Riparian habitat will be affected at 3 No. watercourses with fisheries value which will be only be associated with works for the UWF Grid Connection in the Shannon regional catchment. The cumulative impact magnitude of the whole project on the riparian and bankside habitats within the Shannon regional catchment and hence the Lower River Shannon SAC is evaluated as Negligible.</p>	
<u>Significance of the Whole Project Effect:</u> No adverse effects on the Integrity of the Lower River Shannon SAC	
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The instream works at W1 and W3, and culvert replacement works at W14 required for the 110kV UGC are all located within the River Shannon SAC catchment, while the watercourse crossings required for the Upperchurch Windfarm and UWF Related Works are all located in the River Suir surface water catchment; • Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations, limited to the direct footprint of the temporary works areas; alternatives to temporary riparian clearance are not available – however these all occur ex-situ i.e. outside the SAC. • The duration of the impact are generally once-off, restricted to the period of works within or adjacent to the aquatic habitat; relate to individual watercourses removed from the SAC and are thus not subject to sequential project effects. • Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible. <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected. • No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected. • No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected. • No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected. 	

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<p>All Elements of the Whole UWF Project with Other Projects or Activities</p> <p>Impact Magnitude: Whole UWF Project magnitude is limited to where riparian habitat will be affected at 3 No. watercourses with fisheries value which will be associated with UWF Grid Connection 110kV UGC works. The impact magnitude of the whole project on the riparian and bankside habitats within the Shannon regional catchment and hence the Lower River Shannon SAC is evaluated as Negligible. The magnitude of effect from the considered wind farms (Bunkimalta and Castlewaller) along with their associated Grid Connection elements, Quarries within the cumulative ZOI and background activities including forestry, agriculture and turbarry is evaluated as negligible.</p> <p>Overall impact magnitude is negligible.</p> <p>Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Shannon SAC</p> <p><u>Rationale for Cumulative Impact Evaluation:</u> <u>Whole UWF Project:</u></p> <ul style="list-style-type: none"> • Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations, upstream from the SAC, with no overlap between UWF Grid Connection and the Other Elements, as instream works will take place in separate catchments. • Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to 3 watercourse crossing locations within minor watercourses (W1, W3 and W14), all outside the SAC boundary; • The general context of the three watercourses affected comprises first order streams within managed agricultural lands within enclosed or fully tunneled riparian vegetation at the crossing points; • Bank works will be required at watercourse crossing locations W1, W3, with minor clearance of riparian vegetation within the footprint of the potential culvert replacement at W14; • Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible; • Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions and reversible with reinstatement; • supervision of all instream works (i.e. W1, W2 (no fisheries value) and W3) and culvert replacement works (W14 and 11 no. other locations at watercourses with sub-optimal or no fisheries value) by a member of CIEEM and the Institute of Fisheries Management. <p><u>Other Projects:</u></p> <ul style="list-style-type: none"> • Physical and spatial isolation, i.e. separation distance of Rearcross Quarry, Newport Town Park, Castlewaller Windfarm, and Bunkimalta Windfarm from the 110kV UGC works at W1, W3 and W14. • No change from existing baseline conditions in respect of Agriculture, Forestry and Turf Cutting; <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected. • No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected. • No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected. • No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.
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3.6.3.1.4 Effects on QI habitats and/or species along Pathways 1, 2, 3, 6 & 8 from the Spread of Invasive Aquatic Species within or ex-situ the Lower River Shannon SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
Impact Source: instream works; culvert replacement works; excavation works, movement of soils and machinery;	
Cumulative Impact Source: Instream works; Excavation works, movement of soils and machinery	
Impact Pathway: Surface water; Movement of soils and machinery	
<p>Impact Description: Invasive aquatic species include non-native, terrestrial invasive species such as Japanese knotweed or Himalayan balsam, invasive riparian vegetation (such as Japanese knotweed) and also fish and mobile invertebrate fauna (such as Asian clam, Signal crayfish, or non-native shrimp species). Aquatic invasive species may be introduced to unaffected catchments or spread within infected watercourses during the course of instream works or transported via excavated material by site machinery.</p> <p>Aquatic invasive species have the potential for significant ecosystem disturbance, disrupting the predator/prey balance or causing habitat disruption within aquatic systems. The spread of aquatic invasive species is not restricted in extent to the footprint of construction/instream works, but can be transported both upstream (mobile species and 3rd party transport) and downstream (hydrological transport) within a watercourse, potentially extending throughout the catchment.</p> <p>Non-native, invasive species potentially affecting the aquatic environment can also include terrestrial species which compromise bank integrity, riparian structural diversity and riparian invertebrate production contributing to habitat diversity and feeding inputs within the aquatic system.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, an altered hydrological regime and through secondary effects on prey item species, affect the supporting habitat quality for QI Species.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>The management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plan which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided.</p>	
Impact Quality: Negative	
Evaluation of the Subject Development Impact – Spread of Aquatic Invasive Species	
Element 1: UWF Grid Connection – direct/indirect impact	
<p>Impact Magnitude:</p> <p>There is the potential for introduction of non-native, invasive species to the Lower River Shannon SAC occurs at all 63 No. watercourse crossing points associated with the Mountphilips Substation site and 110kV UGC works due to the carrying out of works at or in close proximity to watercourses, and due to the movement of machinery over watercourses at existing road crossings; these include the transport, spread or introduction of terrestrial invasive species such as Japanese knotweed or Himalayan balsam, where these species occur widely within the study area. The potential for introduction of aquatic invasive species including mobile invertebrate fauna (such as Asian clam, Signal crayfish, or non-native shrimp species) or invasive riparian vegetation (such as Japanese knotweed), is limited to the instream works areas at W1, W2 and W3 at the Mountphilips Substation site, and at the 12 No. culvert replacement locations along the route of the 110kV UGC, where works may interact with the aquatic environment to facilitate introduction or spread of aquatic species.</p>	

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The management of invasive species will be subject to a bespoke Invasive Species Management Plan which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided.

Significance of the Impact: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, spread of aquatic invasive species is evaluated as non-reversible; however
- All instream works are outside the SAC, and significantly upstream in some instances, with;
- the implementation of the Invasive Species Management Plan and adherence to best practice Biosecurity Protocols (IFI, 2010) ensuring that there is no likelihood of this effect occurring to the River Shannon SAC.

Qualifying Interests

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
 - No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
 - No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: As evaluated above, there is potential for the spread of invasive species either along the riparian corridor, or within the aquatic environment, at the 63 No. watercourse crossing points associated with UWF Grid Connection within the River Shannon SAC regional catchment due to the carrying out of works at or in close proximity to watercourses, and due to the movement of machinery over watercourses along the road verge, where existing infestations of negative species occur (e.g. Japanese knotweed, Himalayan balsam, etc.).

The risk of the spread of invasive species is increased where additional works due to the Other Elements take place within a local catchment area, also within the greater River Shannon SAC catchment, where these works (or traffic associated with these works) in turn will occur within or in close proximity to watercourses.

UWF Grid Connection works will occur in the same catchment as the UWF Related Works and the consented Upperchurch Windfarm namely the Bilboa SC 010 sub-catchment (of the River Shannon),

In the Bilboa SC 010, works for UWF Grid Connection will take place at or in close proximity (20m) to 24 No. watercourses, with works at 1 No. watercourse within the Bilboa_SC_010 also required for UWF Related Works. No works in close proximity to watercourses are required for Upperchurch Windfarm. The cumulative impact magnitude for the Bilboa_SC_010 sub-catchment is evaluated as Medium.

In relation to Other Projects: it is expected that Best Practice biosecurity measures will be implemented for the potential Bunkimalta Windfarm (and consented grid connection) to prevent the spread of invasive species by those developments to ensure compliance with legislative requirements. While the consented Castlewaller Windfarm includes the implementation of Best Practice including a monitoring and evaluation Programme in respect of Japanese Knotweed to be implemented as part of its EMP, cumulative impact magnitude is evaluated as Low in the Killeengarriff SC 010 and Newport SC 010 sub-catchments.

In relation to Rearcross Quarry, this quarry is evaluated as unlikely to result in cumulative effects in relation to the spread of Invasive species to aquatic ecology-based receptors. Whilst traffic to and from the quarry along the R503 may pass in close proximity to identified infestations, the ISMP measures implemented as part of UWF Grid Connection will avoid the influence of quarry related traffic as vectors for the spread of aquatics. In combination magnitude is evaluated as negligible.

Agriculture, forestry and turf cutting are on-going and form part of the baseline conditions. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.

However the management of non-native, invasive species at UWF Grid Connection works locations will be subject to a bespoke Invasive Species Management Plan for UWF Grid Connection which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species (by UWF Grid Connection) is avoided, and therefore it is considered that this cumulative impact is unlikely to occur.

Overall magnitude is evaluated as Low -Medium.

Significance of the Cumulative Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, the spread of aquatic invasive species is evaluated as non-reversible.
- The location of the UWF Grid Connection predominately in a separate catchment to the Other Elements of the Whole UWF Project;
- The implementation of the Invasive Species Management Plan for UWF Grid Connection will prevent the UWF Grid Connection contributing to any effects from Other Elements or Other Projects on the River Shannon SAC.

Other projects

- Separation buffers to other projects;
- Limited records of invasive species and/or invasive infestations in baseline studies for other projects;
- In addition, the construction of the other projects under consideration, will be obliged to meet its statutory requirements with regard to the introduction or spread of invasive species as set out in the European Communities (Birds and Natural Habitats) Regulations 2011, with specific reference to species listed in Annex III of those regulations.
- No change from existing baseline conditions in respect of Agriculture, Forestry and Turf Cutting;

Qualifying Interests

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
 - No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
 - No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

Cumulative Information: Other Elements of the Whole UWF Project

Element 2: UWF Related Works

Impact Magnitude:

There is the potential for introduction of non-native, invasive aquatic species at all 32 No. watercourse crossings associated with the UWF Related Works. Of the 32 no. watercourse crossings required by the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works. 31 no. of the total 32 no. crossings are located within the Suir_SC_030 sub-catchment and 1 no. in the Bilboa_SC_010 sub-catchment. Hence only one is applicable for consideration here. However the management of non-native, invasive species at Upperchurch Windfarm locations will be subject to Best Practice biosecurity measures and invasive species control, along with supervision by an invasive species specialist, as provided in the UWF Grid Connection Invasive Species Management Plan, this will ensure that the spread of invasive species is avoided, and therefore it is considered that this impact is unlikely to occur
Magnitude is evaluated as negligible.

Significance of the Impact: No adverse effect on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

<ul style="list-style-type: none"> • The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication. • In this respect, the spread of aquatic invasive species is evaluated as non-reversible, however • the implementation of the Invasive Species Management Plan, including best practice biosecurity protocols (IFI, 2010) will ensure that there is no likelihood of this effect occurring, • Thus avoiding the likelihood of adverse effects on the integrity of the River Shannon SAC.
<p>Element 3: UWF Replacement Forestry</p>
<p>UWF Replacement Forestry is located at Foilnahan townland, near Upperchurch, County Tipperary, and is entirely within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence effects are only applicable in the context of the evaluation of the River Suir SAC. It is excluded from further consideration in respect of the Lower River Shannon SAC on the basis that it cannot contribute to likely significant or adverse effects on QI habitats or Species within the Lower River Shannon SAC.</p>
<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Element 4: Upperchurch Windfarm</p>
<p>Impact Magnitude: There is the potential for introduction of non-native, invasive aquatic species at the 1 No. watercourse crossing associated with the Upperchurch Windfarm works. As per the 2013 EIS, 1 No. watercourse with fisheries value will be crossed. The crossing method will utilise a clear span bridge design, which will avoid the requirement for instream works; however, works within the riparian zone will be required. However, this is located entirely within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment and is therefore cannot act in combination in respect of the River Shannon SAC. It is excluded from further consideration.</p>
<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The Upperchurch Windfarm single watercourse crossing is not located within the River Shannon SAC Catchment. • Best practice biosecurity and invasive species control measures will be implemented during construction works to prevent the spread of invasive species, which will meet regulatory requirements.
<p>Element 5: UWF Other Activities</p>
<p>The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. In relation to effects via the spread of invasive species, elements of Other Activities which have any potential to interact with aquatic habitats are essentially linked to activities such as Overhead Line Activities, Haul Route Activities located in the River Shannon catchment, and hence where connectivity to the River Shannon SAC may exist. However, as no watercourse crossing works are required, effects can be reasonably excluded.</p>
<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No watercourse crossing works required for UWF Other Activities
<p>Evaluation of Other Cumulative Impacts – Spread of Aquatic Invasive Species</p>
<p>Whole UWF Project Effect</p>
<p>Cumulative Impact Magnitude: There is the potential for introduction of non-native, invasive aquatic species at 63 No. watercourse crossing works locations, spread over the River Shannon SAC regional catchment, associated with the Whole UWF Project. The impact magnitude is evaluated as Medium due to the presence of invasive species throughout the study area, established as the baseline condition and thus contributing to the risk of spread where infestations from one location to another. Effects are mitigated heavily with the implementation of a bespoke Invasive Species Management Plan (ISMP). However the management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plans for both UWF Grid Connection (which includes for Upperchurch Windfarm) and UWF Related Works which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will</p>

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ensure that the spread of invasive species is avoided, and therefore it is considered that this impact is unlikely to occur.

Significance of the Whole Project Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Cumulative Impact Evaluation:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, the spread of aquatic invasive species is evaluated as non-reversible.
- The location of the UWF Grid Connection predominately in a separate catchment to the Other Elements of the Whole UWF Project
- The implementation of the Invasive Species Management Plan for UWF Grid Connection and UWF Related Works, including best practice Biosecurity Protocols (IFI, 2010), and the implementation of best practice measures for Upperchurch Windfarm will ensure that there is no likelihood of this effect occurring.

Qualifying Interests

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

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

Cumulative Impact Magnitude:

There is the potential for introduction of non-native, invasive aquatic species at **63 No.** watercourse crossing works locations, spread over the River Shannon hydrometric area, and associated with the Whole UWF Project. The impact magnitude is evaluated as Medium due to the presence of invasive species throughout the study area, established as the baseline condition and thus contributing to the risk of spread where infestations from one location to another.

With regard to Other Projects, it is considered that while Castlewaller Windfarm and the potential Bunkimalta Windfarm both have potential to spread invasive species that it is not likely to occur due to the expected implementation and adherence to Best Practice in the eradication and treatment of invasive species to ensure compliance with legislative requirements. Similarly the effects from agriculture, turbary and forestry are evaluated as negligible in magnitude as no contrast is expected in the context of background trends.

Effects are mitigated effectively with the implementation of a Best Practice derived Invasive Species Management Plan (ISMP) for UWF Grid Connection.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Shannon SAC

Rationale for Cumulative Impact Evaluation:

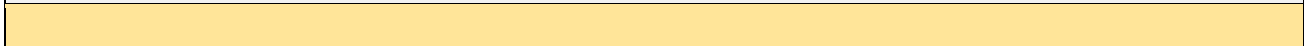
Whole UWF Project:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the Whole UWF Project, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, the spread of aquatic invasive species are evaluated as non-reversible, however
- The implementation of the Invasive Species Management Plan for UWF Grid Connection and Upperchurch Windfarm, and UWF Related Works, including best practice biosecurity protocols (IFI, 2010), and supervision by an invasive species specialist, will ensure that there is no likelihood of this effect occurring.
- In addition, the construction of the other projects under consideration, will be obliged to meet its statutory requirements with regard to the introduction or spread of invasive species as set out in the European

Communities (Birds and Natural Habitats) Regulations 2011, with specific reference to species listed in Annex III of those regulations.

Qualifying Interests

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.



3.6.3.2 Evaluation of SAC Impacts 4, 5, & 7

3.6.3.2.1 Effects on QI species (Fisheries and Other Species) along Pathways 4, 5 & 7 from Direct mortality, within or ex-situ the Lower River Shannon SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<u>Impact Source:</u> Instream works; culvert replacement works; operating machinery; excavation works; reinstatement	
<u>Cumulative Impact Source:</u> Instream works, operating machinery; excavation works; reinstatement	
<u>Impact Pathway:</u> Direct contact;	
<p><u>Impact Description:</u> No instream works are proposed within the River Shannon SAC. Works such as cable trenching, road raising will occur at bridge locations within the official SAC boundary but which span over the SAC natural locations for fisheries- thus pathways exist for direct inadvertent mortality within the SAC in the absence of mitigation.</p> <p>Although Fish are likely to mobilise outside of their territories due to human disturbance, and return once the disturbance effect diminishes some individuals may remain, and in the absence of intervention be subject to contact related pathways for mortality. Aquatic invertebrates are less sensitive to mortality arising from works/human activity and are scoped out from evaluation of mortality related effects. The extent of mortality of aquatic QI ecological receptors, i.e. fish, will be limited to the direct footprint of any instream works within watercourses which support anadromous Atlantic salmon and resident Brown trout populations – i.e. Class 1 or Class 2 watercourses. Any mortality is irreversible.</p> <p>Instream works and machinery operation within or in close proximity to any (i.e. <i>ex-situ</i>) upstream, hydrologically connected watercourse, has the potential to directly injure or kill salmonid fish and aquatic species within fish-bearing streams, which in turn interact with the natural functions of the downstream SAC.</p> <p>Were the impacts described above to occur within a SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as distribution and numbers of adults and/or juveniles and through secondary effects on prey item species, affect the supporting habitat quality for other QI Species.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>Impact Quality: Negative</p>	
Evaluation the Subject Development Impact – Mortality to Fisheries ex-situ the SAC	
Element 1: UWF Grid Connection – direct/indirect impact	
<p>Impact Magnitude:</p> <p>Of the 63 No. watercourse crossings required for the UWF Grid Connection within the River Shannon catchment, 15 No. have been evaluated as locations with fisheries value.</p> <p>Of these 15, 3 no. watercourse crossings (W7 at Rockvale bridge, W45 and W53 at Anglesey Bridge) with fisheries value are within the boundary of the Lower River Shannon SAC. The remaining 12 crossings occur at varying distances upstream hydrologically from the Lower River Shannon SAC e.g. up to 13.9km hydrologically for Watercourse crossing W39.</p> <p>Of the 15 No. watercourses within the regional Shannon catchment, 2 No. watercourses at Mountphilips (W1, W3) will be subject of instream works and 1 No. watercourse along the 110kV UGC with fisheries value (W14) will be subject to potential culvert replacement works.</p> <p>The remaining 12. No watercourses with fisheries value will not require instream works or culvert replacement works and can be excluded from further consideration. However, the crossing of the Newport River at W7, the</p>	

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crossing of the Clare (Annagh) River at W36 and the crossing of the Bilboa River at W53 – where works will occur within the SAC boundary, but works take place over the watercourse crossing structure where the 110kV UGC will be installed within the existing bridge structures – may result in pathways for inadvertent mortality in the event of debris from parapet raising/re-surfacing material etc. falling over the bridge.

As part of Project Design, all works within the boundary of the Lower River Shannon SAC will take place during dry weather in the dryer parts of the year (PD40, see Section 3.5.1), and all instream works will be supervised by a member of CIEEM and the Institute of Fisheries Management (PD41)- in addition all works will be carried out in line with Best Practice (IFI, 2016 as per PD49) and culvert replacement works will not take place without the isolation of flow within the respective watercourse, and translocation of fish by licensed fisheries personnel (PD50). Finally, all works to bridge parapet walls will only be undertaken with the use of debris netting, affixed to the outside of walls to prevent debris falling into the river (PD31). Given this the magnitude of any effect is evaluated as negligible.

Significance of the Impact: No adverse effects on the Integrity of the Lower River Shannon SAC.

Rationale for Impact Evaluation:

- UWF Grid Connection Mitigation Measures for the protection of fisheries during works;;
- Separation buffers and Distance upstream from the SAC.

Qualifying Interests

- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2).

The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value which will be subject to instream works or works in close proximity for both UWF Grid Connection and for Other Elements. Neither UWF Replacement Forestry nor UWF Other Activities will require any instream works, it is therefore evaluated that the magnitude of any cumulative mortality impacts will be negligible. Neither Upperchurch Windfarm nor UWF Related Works require instream works in the Bilboa SC 010 sub-catchment, and neither are located in the Newport SC 010 or Killeengarriff SC 010 sub-catchments. The potential for cumulative disturbance effects is limited to the Suir SC 030 sub-catchment, where both Upperchurch Windfarm and UWF Related Works will occur and will require instream works in watercourses with fisheries value -excluded from consideration in this table. UWF Related Works will not involve instream works on watercourses (with fisheries value) in the River Shannon SAC regional catchment. UWF will not involve any instream works within the River Shannon regional catchment.

In respect of other plans or projects, the cumulative magnitude is evaluated as negligible given that it is expected that there will be adherence to setback buffers from watercourses, separation distance from watercourses for certain projects, the implementation of consented mitigation, and the absence in contrast from baseline conditions expected for background activities such as Forestry, Agriculture and Turf-cutting, and the expected inclusion of Best Practice mitigation measures in any future applications for Bunkimalta Windfarm or Castlewaller grid connection.

Therefore, the magnitude of any cumulative effects will be Negligible.

Significance of the Cumulative Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- UWF Grid Connection Mitigation Measures for the protection of fisheries during works; and;
- Absence of instream works in watercourses (of fisheries value) within the regional River Shannon SAC from other Project Elements.
- Construction activities for Castlewaller Windfarm and the potential Bunkimalta Windfarm (assumed) will be at least a minimum of 50m from watercourses where possible; and it is expected that Best Practice measures in

<p>relation to the protection of aquatic species will be included in any future application for the Castlewaller grid connection or any future Bunkimalta Windfarm proposal.</p> <ul style="list-style-type: none"> • No instream works, and no works within 5m of the watercourse in relation to Newport Town Plan works • No instream works associated with Rear Cross quarry. The separation distance and physical isolation of the existing quarry at Rearcross; • No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area, with limited potential for instream works in watercourses from these activities. <p><u>Qualifying Interests</u></p> <ul style="list-style-type: none"> • No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected. • No effects on QI Species Otter via reductions in Abundance or distribution, supporting habitat or supporting habitat quality (including prey item abundance) are expected.
<p>Cumulative Information: Other Elements of the Whole UWF Project</p>
<p>Element 2: UWF Related Works</p>
<p>Impact Magnitude: The 1 no. watercourse crossing which is located in the Bilboa_SC_010 (and hence the regional Lower River Shannon SAC catchment) will not require any instream works. This watercourse has no fisheries suitability and comprises a dry field drain. The proposed crossing method involves the installation of cabling over or under the structure.</p>
<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation: • No instream works are required in the regional River Shannon SAC catchment.</p>
<p>Element 3: UWF Replacement Forestry</p>
<p>Impact Magnitude: No instream works are required. Magnitude is zero.</p>
<p><u>Significance of the Impact:</u> No adverse effects on European Site Integrity.</p>
<p>Rationale for Impact Evaluation: No instream works are required in the regional River Shannon SAC catchment.</p>
<p>Element 4: Upperchurch Windfarm</p>
<p>Impact Magnitude: None: 1 No. watercourse with fisheries value occurs within the footprint of the Upperchurch Windfarm site which is located in the regional catchment of the River Suir SAC.</p>
<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation: • Absence of connectivity between instream works and the River Shannon SAC.</p>
<p>Element 5: UWF Other Activities</p>
<p>There is no potential for aquatic habitat effects within or ex-situ to the River Shannon SAC as there are no instream works required as a result of UWF Other Activities (including Overhead Line Activities, Haul Route Activities, and the Upperchurch Hen harrier Scheme).</p>
<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation: Absence of connectivity. - no instream works</p>
<p>Evaluation of Other Cumulative Impacts – Disturbance or Displacement</p>
<p>Whole UWF Project Effect</p>
<p>Cumulative Impact Magnitude: Whole project effects are limited to the UWF Grid Connection element only where, works or activities at 4 no. locations in total have the potential to be affect fisheries through mortality. Remaining project elements are anticipated to result in effects of negligible magnitude.</p>

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Substantial Mitigation Measures will be in place to avoid adverse effects on European Site Integrity with respect to the UWF Grid Connection element of the whole UWF Project. Remaining project elements are or other projects are primarily located in a differing regional catchment (the River Suir) and/or include or will include Project Design or Mitigation around instream works and the protection of the Aquatic Environment’s receiving species.

Overall magnitude is evaluated as negligible in the context of the primarily downstream European Site under consideration.

Significance of the Whole Project Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- UWF Grid Connection Mitigation Measures for the protection of fisheries during works;
- The placement of the locations of instream works in respect of other Project Elements in a different regional catchment, and;
- Mitigation & Project Design in respect of other Elements/activities considered, in addition to separation buffers, and limited sources of direct mortality to fisheries;
- The low number of watercourses (4No. in total) with fisheries value and subject to works with the potential to result in mortality to fisheries;

Qualifying Interests

- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

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

Impact Magnitude:

Magnitude of effects from the Whole UWF Project is negligible, primarily due to the limited footprint of instream works- recognition is also made of Mitigation Measures for the protection of fish. In respect of other plans or projects, the cumulative magnitude is evaluated as negligible given that it is expected that there will be adherence to setback buffers from watercourses, separation distance from watercourses for certain projects, the implementation of consented mitigation, and the absence in contrast from baseline conditions expected for background activities such as Forestry, Agriculture and Turf-cutting, and the expected inclusion of Best Practice mitigation measures in any future applications for Bunkimalta Windfarm or Castlewaller grid connection.

Overall Cumulative magnitude is negligible.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- UWF Grid Connection Mitigation Measures for the protection of fisheries during works;
- The placement of the locations of instream works in respect of other Project Elements in a different regional catchment, and;
- Mitigation & Project Design in respect of other Elements/activities considered, in addition to separation buffers, and limited sources of direct mortality to fisheries;
- The low number of watercourses (6 No. in total) with fisheries value and subject to works with the potential to result in mortality to fisheries;

Other projects

- Construction activities for Castlewaller Windfarm and the potential Bunkimalta Windfarm (assumed) will be at least a minimum of 50m from watercourses where possible; and it is expected that Best Practice measures in relation to the protection of aquatic species will be included in any future application for the Castlewaller grid connection or any future Bunkimalta Windfarm proposal.
- No instream works, and no works within 5m of the watercourse in relation to Newport Town Plan works
- No instream works associated with Rear Cross quarry. The separation distance and physical isolation of the existing quarry at Rearcross;
- No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area, with limited potential for instream works in watercourses from these activities.

Qualifying Interests

- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

3.6.3.2.2 Effects on QI species (Fisheries and Other Species) along Pathways 4, 5 & 7 from Disturbance or Displacement within or ex-situ the Lower River Shannon SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> instream works; culvert replacement works; operating machinery; excavation works; noise and human disturbance; drilling works; reinstatement works</p> <p><u>Cumulative Impact Source:</u> Instream works, operating machinery; excavation works; noise and human disturbance; reinstatement</p> <p><u>Impact Pathway:</u> direct contact; ground and air vibrations</p> <p><u>Impact Description:</u> Instream works and machinery operation within or in close proximity to any watercourse either comprising natural locations within the SAC or ex-situ supporting locations upstream, has the potential to directly disturb or displace salmonid fish and aquatic species within fish-bearing streams, or sensitive aquatic receptors. Fish are likely to mobilise outside of their territories due to human disturbance, but will return once the disturbance effect diminishes (i.e. brief temporary effect). Aquatic invertebrates are less sensitive to disturbance and displacement arising from human activity and are scoped out from evaluation of disturbance/displacement effects in the context of European Sites. The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the direct footprint of any instream works within watercourses which support anadromous Atlantic salmon and resident Brown trout populations – i.e. Class 1 or Class 2 watercourses either within or ex-situ the SAC. Disturbance or displacement effects will be brief to temporary in nature, lasting for the duration of works at or in close proximity to Class 1 or Class 2 watercourses.</p> <p>Were the impacts described above to occur within a SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as distribution and numbers of adults and/or juveniles and through secondary effects on prey item species, affect the supporting habitat quality for other QI Species.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>Impact Quality: Negative</p>	
Evaluation the Subject Development Impact – Disturbance or Displacement	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u> Of the 63 No. watercourse crossings required for the UWF Grid Connection in the River Shannon catchment, 15 No. have been evaluated to have fisheries value.</p> <p>Of the 15 No. watercourses, 2 No. watercourses at Mountphilips (W1, W3) will be subject of new instream works and 1 No. watercourse along the 110kV UGC (W14) will be subject to culvert replacement works. All are located outside the SAC but within the regional River Shannon catchment and are therefore outside the SAC but hydrologically connected at varying distances (W1:3.3km, W3:3.75km and W14:6km).</p> <p>Due to the location of works in the watercourse, there will be some localised effects at these discrete locations, however the magnitude of disturbance effects at these locations is evaluated as Slight to Moderate in the local context. There will no disturbance to fisheries in their natural location within the SAC and given the separation distances involved, the impact magnitude on the SAC is evaluated as negligible.</p> <p>The remaining 12. No watercourses with fisheries value will <u>not</u> require either new instream works or culvert replacement works. This includes the crossing of the Newport River at W7, the crossing of the Clare River at W36 and the crossing of the Bilboa River at W53 – where the 110kV UGC will be installed within the existing bridge structures with works also required to raise the road level and increase the height of parapet walls, within the</p>	

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SAC boundary but not within natural locations for fish or aquatic species. The installation of the 110kV UGC at the other watercourses with fisheries value (W5, W8, W9, W18, W33, W38, W39, W45, W49) will not involve instream works or culvert replacement works within the SAC as the cables will be installed either under or over the existing structures, therefore the magnitude of disturbance effects at these locations only relates to works in the public road pavements and is evaluated as Negligible to low. There may be occasional, very short duration disturbance to fish populations utilising habitat beneath bridges; however, this will not result in displacement, loss of territory, or holding habitat to any noticeable degree and effects on SAC QI Species are evaluated as negligible in this regard for the watercourses considered above.

Disturbance may also occur at drilling locations (W8, W9) with the magnitude of disturbance impacts due to noise or vibration evaluated as Low. Similarly, due to the very short duration and nature of drilling works, these works will not result in displacement, loss of territory, or holding habitat. It should be noted that the drilling works at W8 and W9 are not within the Lower River Shannon SAC boundary. The Magnitude of any disturbance on the SAC QI Species under consideration is evaluated as negligible.

Proposed works including trench excavation, bridge works, culvert replacement, directional drilling, and resurfacing may give rise to disturbance to fish and aquatic biodiversity receptors present within Class 1 and Class 2 watercourses over a period of c.1 – 2 days at each crossing location (and c. 2 to 5 days at drilling locations). The frequency of these disturbance effects is once only for cables trenches with or without new permanent culverts.

As part of Project Design, all works within the boundary of the Lower River Shannon SAC will take place during dry weather in the dryer parts of the year (PD40, see Section 3.5.1), and all instream works will be supervised by a member of CIEEM and the Institute of Fisheries Management (PD41)- in addition all works will be carried out in line with Best Practice (IFI, 2016 as per PD49) and culvert replacement works will not take place without the isolation of flow within the respective watercourse, and translocation of fish by licensed fisheries personnel (PD50). Finally, all works to bridge parapet walls will only be undertaken with the use of debris netting, affixed to the outside of walls to prevent debris falling into the river (PD31).

Significance of the Impact: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- No instream works will take place within the SAC;
- In-stream works which do occur will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design);
- The Class 1 and Class 2 watercourses W1, W3 and W14, where in-stream works are required, are small first order streams ex-situ the SAC and therefore are likely to have relatively low flows during July to September;
- The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing. All fish and Annex II listed species (White-clawed crayfish) will be translocated to suitable habitat in immediate proximity downstream, within the same watercourse. This will be completed under license and following standard protocols; (Project Design);
- The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the direct footprint of instream works at W1 and W3 and any potential culvert replacement works at W14.
- The frequency of disturbance effects will be once for works at W1, W3 and W14,
- The duration of any disturbance impacts is considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.
- The implementation of UWF Grid Connection Mitigation Measures for the protection of fisheries

Qualifying Interests:

- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality and/or extent are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, supporting habitat or supporting habitat quality (including prey item abundance) are expected

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2).

The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value which will be subject to instream works or works in close proximity for both UWF Grid Connection and for Other Elements, which are also located within the River Shannon SAC. Locations where works will occur as part of other Project Elements, but which are not located in the River Shannon catchment can reasonably be excluded. As Replacement Forestry is not located within the regional catchment of the River Shannon, it can be excluded. As neither Upperchurch Windfarm nor UWF Other Activities will require any instream works in the River Shannon catchment, and UWF Other Activities in close proximity to watercourses will be small in scale, with no works for Upperchurch Windfarm in close vicinity of watercourses with fisheries value; it is therefore evaluated that the magnitude of any cumulative disturbance impacts will be negligible in the context of the River Shannon SAC. UWF Related Works will not require instream works in the Bilboa SC 010 sub-catchment, and will not be located in the Newport SC 010 or Killeengarrif SC 010 sub-catchments, therefore it can be excluded from further consideration in this table.

In respect of other plans or projects, the cumulative magnitude is evaluated as negligible given that it is expected that there will be adherence to setback buffers from watercourses, separation distance from watercourses for certain projects, the implementation of consented mitigation, and the absence in contrast from baseline conditions expected for background activities such as Forestry, Agriculture and Turf-cutting, and the expected inclusion of Best Practice mitigation measures in any future applications for Bunkimalta Windfarm or Castlewaller grid connection.

Overall magnitude is evaluated as negligible and purely in the order of effects from the UWF Grid Connection.

Significance of the Cumulative Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- No instream works will take place within the SAC;
- Limited works from other project elements within the River Shannon regional catchment with the potential to disturb fisheries;
- The frequency of disturbance effects will be once;
- Implementation of UWF Grid Connection Mitigation Measures for the protection of fisheries.
- Construction activities for Castlewaller Windfarm and the potential Bunkimalta Windfarm (assumed) will be at least a minimum of 50m from watercourses where possible; and it is expected that Best Practice measures in relation to the protection of aquatic species will be included in any future application for the Castlewaller grid connection or any future Bunkimalta Windfarm proposal.
- No instream works, and no works within 5m of the watercourse in relation to Newport Town Plan works
- No instream works associated with Rear Cross quarry. The separation distance and physical isolation of the existing quarry at Rearcross;
- No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area, with limited potential for instream works in watercourses from these activities

Qualifying Interests:

- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality and/or extent are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, supporting habitat or supporting habitat quality (including prey item abundance) are expected

Cumulative Information: Other Elements of the Whole UWF Project

Element 2: UWF Related Works

Impact Magnitude:

The 1 no. watercourse crossing which is located in the Bilboa_SC_010 (and hence the regional Lower River Shannon SAC catchment) will not require any instream works. This watercourse has no fisheries suitability and comprises a dry field drain. The proposed crossing method (A1) involves the installation of cabling over or under the structure. The magnitude of any disturbance on fisheries is evaluated as negligible.

Significance of the Impact: No adverse effect on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- No instream works are required in the regional River Shannon SAC catchment.

Element 3: UWF Replacement Forestry	
<u>Impact Magnitude:</u> No instream works are required. Magnitude is zero.	
<u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC	
<u>Rationale for Impact Evaluation:</u> No instream works are required in the regional River Shannon SAC catchment.	
Element 4: Upperchurch Windfarm	
Impact Magnitude: None: 1 No. watercourse with fisheries value occurs within the footprint of the Upperchurch Windfarm site and is located within The River Suir regional catchment. No works in close proximity to watercourse in the River Shannon catchment	
<u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC	
<u>Rationale for Impact Evaluation:</u> ● Absence of connectivity between instream works and the River Shannon SAC.	
Element 5: UWF Other Activities	
There is no potential for aquatic habitat effects within or ex-situ to the River Shannon SAC as there are no instream works required as a result of UWF Other Activities (including Overhead Line Activities, Haul Route Activities, and the Upperchurch Hen Harrier Scheme). The Upperchurch Hen Harrier scheme is located entirely within the regional River Suir catchment.	
<u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC	
<u>Rationale for Impact Evaluation:</u> Absence of connectivity between instream works and the River Shannon SAC.	
Evaluation of Other Cumulative Impacts – Disturbance or Displacement	
Whole UWF Project Effect	
<u>Cumulative Impact Magnitude:</u> Direct disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the footprint of any instream works or culvert replacement works and directly upstream and downstream of all crossings, temporary and permanent instream works structures, bank-side works and construction works adjacent to watercourses and over existing crossing structures and is limited to the effects of the Grid Connection Element within the River Shannon Regional Catchment where no works will take place within the SAC - evaluated as negligible.	
As part of Project Design, all works within the boundary of the Lower River Shannon SAC will take place during dry weather in the dryer parts of the year (PD40, see Tab 1 of the accompanying EMP), and all instream works will be supervised by a member of CIEEM and the Institute of Fisheries Management (PD41)- in addition all works will be carried out in line with Best Practice (IFI, 2016 as per PD49) and culvert replacement works will not take place without the isolation of flow within the respective watercourse, and translocation of fish by licensed fisheries personnel (PD50). Finally, all works to bridge parapet walls will only be undertaken with the use of debris netting, affixed to the outside of walls to prevent debris falling into the river (PD31).	
Significance of the Whole Project Effect: No adverse effects on the Integrity of the Lower River Shannon SAC	
<u>Rationale for Impact Evaluation:</u> ● No instream works will take place within the SAC; ● Implementation of UWF Grid Connection Mitigation Measures for the protection of fisheries ● Implementation of Mitigation Measures (other elements) for the protection of fisheries; ● Limited works from other project elements within the River Shannon regional catchment with the potential to disturb fisheries; ● The frequency of disturbance effects will be once; ● The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.	

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<p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality and/or extent are expected. • No effects on QI Species Otter via reductions in Abundance or distribution, supporting habitat or supporting habitat quality (including prey item abundance) are expected.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p> <p>Impact Magnitude: Magnitude of effects from the Whole UWF Project is negligible, primarily due to the limited footprint of instream works- recognition is also made of Project Design measures for the protection of fish. In respect of other plans or projects, the cumulative magnitude is evaluated as negligible given that it is expected that there will be adherence to setback buffers from watercourses, separation distance from watercourses for certain projects, the implementation of consented mitigation, and the absence in contrast from baseline conditions expected for background activities such as Forestry, Agriculture and Turf-cutting, and the expected inclusion of Best Practice mitigation measures in any future applications for Bunkimalta Windfarm or Castlewaller grid connection. Overall Cumulative magnitude is negligible.</p>
<p>Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p><u>Rationale for Impact Evaluation:</u></p> <p>Whole UWF Project:</p> <ul style="list-style-type: none"> • No instream works will take place within the SAC; • Project design measures for the protection of fisheries; • Limited works from other project elements within the River Shannon regional catchment with the potential to disturb fisheries; • The frequency of disturbance effects will be once; • The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible. <p>Other Plans or Projects:</p> <ul style="list-style-type: none"> • Construction activities for Castlewaller Windfarm and the potential Bunkimalta Windfarm (assumed) will be at least a minimum of 50m from watercourses where possible; and it is expected that Best Practice measures in relation to the protection of aquatic species will be included in any future application for the Castlewaller grid connection or any future Bunkimalta Windfarm proposal. • No instream works, and no works within 5m of the watercourse in relation to Newport Town Plan works • No instream works associated with Rear Cross quarry. The separation distance and physical isolation of the existing quarry at Rearcross; • No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area, with limited potential for instream works in watercourses from these activities. <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality and/or extent are expected. • No effects on QI Species Otter via reductions in Abundance or distribution, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

3.6.3.2.3 Effects on QI species (Otter) along Pathways 4, 5 & 7 from Direct mortality, within or ex-situ the Lower River Shannon SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> instream works; culvert replacement works; operating machinery; excavation works; reinstatement works</p> <p><u>Cumulative Impact Source:</u> Instream works, operating machinery; excavation works; reinstatement</p> <p><u>Impact Pathway:</u> direct contact</p> <p><u>Impact Description:</u> Otter are rated as a very high sensitivity receptor (based on International importance ratings) and may be sensitive to mortality through inadvertent collision with moving vehicles or machinery, in particular during hours of darkness. As no active holts were located within 300m (upstream or downstream) of works locations in proximity to suitable Otter habitat (i.e. at watercourse crossing locations) then effects are reduced to potential mortality of foraging or resting animals, primarily within aquatic habitats but also within adjacent riparian corridors and /or whilst crossing roads in close proximity to proposed works. Many of the watercourses present form part of or are hydrologically connected to the River Shannon SAC which includes Otter as a Qualifying Interest.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as a decline in range and/or distribution and numbers of individuals within the River Shannon SAC.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude ,degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on connected or supporting populations for downstream but ecologically connected Qualifying Interest (QI) species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>These effects are reduced by an adherence to completing works during daylight hours only as part of Project Design (PD04). All works will be completed in line with the traffic management plan which forms part of the accompanying EMP (PD10) and traffic movements will be limited in respect of refuelling near watercourses (PD39 and PD42), in addition to specific measures around the protection of Otter, such as confirmatory surveys (PD52), the limiting of works within 150m of any confirmed active Otter holts (PD53, PD54, PD55) and the establishment of a prohibited area associated with confirmed active Otter holts (PD56). Traffic management measures (restriction of vehicular speeds, e.g. 25km/hr at Mountphilips Substation site – PD05) will also contribute to reducing potential collision mortality.</p> <p>Impact Quality: Negative</p>	
Evaluation of the Subject Development Impact – Otter: Disturbance/Displacement	
Element 1: UWF Grid Connection – direct/indirect impact	
<p>Impact Magnitude:</p> <p>Out of the 68 watercourse crossings along the UWF Grid Connection route, 26 watercourses were identified from surveys of all watercourse crossing locations, as having potential to support Otter and were therefore surveyed 300m upstream and downstream of the crossing for the presence of Otter – all located within the regional catchment of the River Shannon SAC. Out of these 26 watercourses surveyed, evidence of Otter was found at three watercourse crossings locations or their environs (W33, W36 and W53). No active breeding or resting sites (Holts or Couches) were identified however.</p> <p>The evidence of Otter found at three watercourse crossings locations (W53, W33 and W36) relates to a total of four records of Otter within the UWF Grid Connection study area, consisting of slides and spraints. One of the four records was recorded along the River Bilboa within the Lower River Shannon SAC, and consisted of an Otter slide, recorded approximately 60 metres downstream of watercourse crossing W53. Two records were recorded along the Tooreenbrien Lower River, consisting of an Otter spraint approximately 45 metres downstream of watercourse crossing W33 with an Otter print recorded underneath the W33 bridge structure. The fourth Otter</p>	

record relates to an Otter slide which was recorded along the Annagh (Clare) River, approximately 135 metres upstream of watercourse Crossing W36. No Otters were observed, although this is typical in respect of a species where most activity takes place at night.

110kV UGC works over, and in close proximity to W53, W33 and W36 will involve the excavation of cable trenches and installation of ducting, and reinstatement of the trench. No instream works or culvert replacement works will be required at any of these crossings with the 110kV UGC installed in the road over the existing bridge structures, and although the parapet walls will need to be raised/built higher at W53 and W36, these works are not expected to be longer than 2 weeks in duration (expected duration range 1 day to 2 weeks dependant on location) with all works to parapet walls taking place from the road surface over the bridges.

All of the above plus additional trenching and cable laying works will require traffic movements and/or the operation of machinery with which Otter could conceivably undergo direct contact resulting in mortality.

However, considering the temporary duration of works at watercourse crossings and the scale of the proposed works, along with project design measures in place during works to protect Otter and ensure works take place during daylight hours, the magnitude of impact in relation to direct mortality of Otter is expected to be negligible.

When the absence of holts within 300m is taken into account, it is considered that there is no likelihood of significant disturbance/displacement impacts.

Significance of the Impact: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- Implementation of UWF Grid Connection Mitigation Measures for the protection of Otter;
- The very high sensitivity rating of the species, and Negligible magnitude of impact;
- Recorded Otter evidence in close proximity to 3 identified crossings, in particular W53 where parapet works will take place over the Lower River Shannon SAC, however;
- No Holts or resting places occur in close proximity, and;
- Works will take place during daylight hours, with;
- In the context of works at larger watercourses will take place in an existing public road subject to the passage of traffic, to which Otter will be habituated;
- The brief-temporary duration of disturbance events and any corresponding effect, with
- Effects expected to be reversible.

Qualifying Interest:

- No effects on QI Species Otter via reductions in Abundance or distribution (range), are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: There is potential for cumulative effect where the UWF Grid Connection comes in close proximity to the UWF Related Works and Upperchurch Windfarm construction works areas, and remains within the River Shannon Regional Catchment.

Two watercourse crossings (W62 & W63) within the zone of overlap with UWF Related Works and Upperchurch Windfarm and which are associated with the UWF Grid Connection are Class 4 drains have marginal habitat value to Otter, with limited prey availability (no fisheries potential). Therefore, the magnitude of cumulative impacts in relation to disturbance of Otter is expected to be negligible – as Otter are unlikely to be present.

In relation to other projects, consideration is given to the traffic requirement for Rearcross Quarry as a potential source of mortality, however no records of Otter mortality were found in a review of roadkill on Biology.ie¹⁴, overlapping the R503 (where in combination effects could reasonably be considered likely) or regional roads facilitating access to Castlewaller or Bunkimalta proposed development locations. Otter will also be habituated to existing traffic. Thus no contrast to existing baseline conditions is anticipated, and it is therefore considered that the magnitude of any potential cumulative effects is evaluated as negligible.

¹⁴ <http://www.biology.ie/mapf.php?m=npws>

In relation to Castlewaller Windfarm, no Otter recorded in Baseline Studies to inform the Castlewaller EIS. This is primarily due to the upland location of the windfarm. It is assumed that Otter numbers will be similarly low at the potential Bunkimalta Windfarm site. However, it is assumed that Otter could occur at larger watercourse crossings along the associated grid connection routes.

Cumulative impacts in relation to Newport Town Park will be negligible with the implementation of Mitigation Measures for Otter and the separation distance to UWF Grid Connection works.

Forestry, agriculture and turf-cutting activities have limited exposure to pathways likely to result in direct mortality i.e. any requirement for instream works and/or traffic movements likely to result in collision mortality. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.

Significance of the Cumulative Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- The 2 no. watercourses within the zone of cumulative impacts are drains which have marginal habitat value to Otter;
- Works will take place during daylight hours only, and;
- Be of brief-temporary duration, with;
- Implementation of UWF Grid Connection Mitigation Measures for the protection of Otter.

Other Projects

- Absence of Otter records from baseline studies for Castlewaller Windfarm and Bunkimalta Windfarm (2013)
- Construction activities for Castlewaller Windfarm and the potential Bunkimalta Windfarm are expected to be at least a minimum of 50m from watercourses where possible; and these projects including their grid connections, are expected to include measures to protect Otter, given the location of the SAC downstream of both sites.
- No instream works, and no works within 5m of the watercourse in relation to Newport Town Plan works; the implementation of Mitigation Measures for Otter and the separation distance to UWF Grid Connection works;
- The separation distance and physical isolation of the existing quarry at Rearcross;
- No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area, with limited potential for mortality related pathways from these activities.
- Absence of baseline records of roadkill from the area under consideration, suggesting little contrast to existing baseline conditions.

Qualifying Interest:

- No effects on QI Species Otter via reductions in Abundance or distribution (range), are expected.

Cumulative Information: Other Elements of the Whole UWF Project

Element 2: UWF Related Works

Impact Magnitude: 32 No. watercourse crossings in total are required for UWF Related Works with instream works required at 25 No. of these crossings. However only 1 no. watercourse crossing is located in the Bilboa_SC_010 (and hence the regional Lower River Shannon SAC catchment) and will not require any instream works. This watercourse has no fisheries suitability and comprises a dry field drain. The proposed crossing method (A1) involves the installation of cabling over or under the structure. The Magnitude of any effects through direct contact with Otter at this location is evaluated as Negligible.

Significance of the Impact: No adverse effect on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- Application of project design measures for the protection of Otter,
- No active holts were identified overlapping the construction area boundaries or within 150m, suggesting limited usage by Otter, and;
- The nature of the single watercourse crossing in the Bilboa sub-catchment.
- Works will take place during daylight hours only, and;
- Be of brief-temporary duration.

Element 3: UWF Replacement Forestry

Impact Magnitude: No active holts or resting places were recorded in baseline studies and all planting will be done by hand. All works are located in the River Suir regional catchment. Therefore, impact magnitude is expected to be zero.

<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No works are to take place within the regional River Shannon catchment. • No active holts or resting places were recorded in baseline studies, and; • All planting will be done by hand, and; • Undertaken during daylight hours, and • Of temporary duration; • Any effect will be reversible, given the low magnitude of source disturbance.
<p>Element 4: Upperchurch Windfarm</p>
<p><u>Impact Magnitude:</u> No Otter were recorded during windfarm surveys; therefore, the impact magnitude in respect of potential mortality is expected to be Negligible. Only 1 no. water course crossing is required, located within the regional River Suir catchment.</p>
<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No watercourse crossings are located within the regional River Shannon catchment; • No active holts or resting places were recorded in baseline studies for the windfarm; • watercourses in the windfarm area generally comprise drains which have marginal habitat value to otter and; • Works will be of temporary duration.
<p>Element 5: UWF Other Activities</p>
<p><u>Impact Magnitude:</u> No otter holts or resting places were recorded at Haul Route Activity locations, and the locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours with minimal machinery as a potential source of collision mortality. Works as part of the Upperchurch Hen Harrier Scheme will take place within the catchment of the River Suir SAC and can be excluded. Therefore, the impact magnitude is expected to be Negligible</p>
<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No otter holts or resting places were recorded at Haul Route Activity locations, and; • Locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours, with; • Limited machinery to act as potential sources of collision mortality;
<p>Evaluation of Other Cumulative Impacts – Otter: Disturbance/Displacement</p>
<p>Whole UWF Project Effect</p>
<p>Magnitude: Construction works involving the use of machinery and excavation work at watercourse crossing points (both existing and new crossing points) will occur across a wide area within the River Shannon catchment. There is potential to cause mortality of otter at larger watercourse crossing points and/or through traffic and machinery movements. These larger watercourses occur along the UWF Grid Connection, whereas the single watercourses on the UWF Related Works requiring consideration is essentially a field drain with marginal habitat value to otter.</p> <p>In relation to in-combination effects of the whole project, there is no potential for cumulative additive effects to Otters from the UWF Related Works due to the absence of Otter recorded at the watercourses common to both these project elements and the River Shannon SAC regional catchment. There is no potential for cumulative effects of the UWF Replacement Forestry with the Other Elements due to the location of UWF Replacement Forestry within the River Suir SAC regional catchment. The magnitude of the in-combination effect of the whole project, where considered in its entirety is in the order of UWF Grid Connection – i.e. Negligible. In total 3 no. watercrossing points (W33, W36 and W53) along the public road had signs of Otter use within 150m, the nearest of these crossing points (W53) is separated from UWF Related Works by ca.3km (to the nearest outlying works location- with most locations ca.4km or more) therefore there is no likelihood of additive cumulative effects to individual Otters from both the UWF Grid Connection works and UWF Related Works.</p>

Significance of the Whole Project Effect: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- Implementation of UWF Grid Connection Mitigation Measures for the protection of Otter;
- Project Design measures (other elements) to avoid working during daylight hours and to ensure the general protection of Otter will avoid adverse effects.
- The absence of Otter records at the UWF Related Works;
- Works will take place during daylight hours, and will be brief-temporary in duration;
- The very high sensitivity of the species, and Negligible cumulative magnitude;
- in the context of crossing locations as part of UWF Grid Connection comprising trenching works/parapet or road raising works within existing bridges where the works overlap the Lower River Shannon SAC, which has Otter as a Qualifying Interest, with;
- Recorded evidence of Otter in close proximity.

Qualifying Interest:

- No effects on QI Species Otter via reductions in Abundance or distribution (range), are expected.

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

Impact Magnitude:

The magnitude of impact predicted for the Whole UWF Project is essentially in the order of the UWF Grid Connection element, given the limited geographical overlap and records of Otter from other Project elements within the regional River Shannon SAC catchment.

In relation to other projects, consideration is given to the traffic requirement for Rearcross Quarry as a potential source of mortality, however no records of Otter mortality were found in a review of roadkill on Biology.ie¹⁵, overlapping the R503 (where in combination effects could reasonably be considered likely) or regional roads facilitating access to Castlewaller or Bunkimalta proposed development locations. Otter will also be habituated to existing traffic. Thus no contrast to existing baseline conditions is anticipated, and it is therefore considered that the magnitude of any potential cumulative effects is evaluated as negligible.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- Implementation of UWF Grid Connection Mitigation Measures for the protection of Otter;
- Project Design measures (Other Element) to avoid working during daylight hours and to ensure the general protection of Otter will avoid adverse effects.
- The absence of Otter records at the UWF Related Works;
- Works will take place during daylight hours, and will be brief-temporary in duration;
- The very high sensitivity of the species, and Negligible cumulative magnitude;
- in the context of crossing locations as part of UWF Grid Connection comprising trenching works/parapet or road raising works within existing bridges where the works overlap the Lower River Shannon SAC, which has Otter as a Qualifying Interest, with;
- Recorded evidence of Otter in close proximity.

Other Plans or Projects:

- Absence of Otter records from baseline studies for Castlewaller Windfarm and Bunkimalta Windfarm (2013)
- Construction activities for Castlewaller Windfarm and the potential Bunkimalta Windfarm are expected to be at least a minimum of 50m from watercourses where possible; and these projects including their grid connections, are expected to include measures to protect Otter, given the location of the SAC downstream of both sites.
- No instream works, and no works within 5m of the watercourse in relation to Newport Town Plan works
- The separation distance and physical isolation of the existing quarry at Rearcross;
- No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area, with limited potential for mortality related pathways from these activities.
- Absence of baseline records of roadkill from the area under consideration, suggesting little contrast to existing baseline conditions.

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¹⁵ <http://www.biology.ie/mapf.php?m=npws>

Qualifying Interest:

- No effects on QI Species Otter via reductions in Abundance or distribution (range), are expected.

3.6.3.2.4 Effects on QI species (Otter) along Pathways 4, 5 & 7 from Disturbance / Displacement, within or ex-situ the Lower River Shannon SAC

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: noise and human disturbance; visual intrusion

Cumulative Impact Source: Noise and Visual Intrusion

Impact Pathway: air, visibility

Impact Description: Otter are rated as a very high sensitivity receptor (based on International importance ratings) and do not tolerate disturbance at or near holts (breeding dens) that are in active use (breeding may occur at any time of the year, but most likely during the Summer/early Autumn period). When Otters are not breeding, records suggest that Otters are less sensitive to human disturbance (Chanin, 2013). As no active holts were located within 300m (upstream or downstream) of works locations in proximity to suitable Otter habitat (i.e. at watercourse crossing locations) then effects are reduced to disturbance/displacement of foraging or resting animals, primarily within aquatic habitats but also within adjacent riparian corridors. This could include the disturbance of animals at resting places (couches). Watercourses are present which form part of or are hydrologically connected to European Sites (SAC's) suggesting the potential for secondary effects on this QI species both within and ex-situ the European Site under consideration.

Were the impacts described above to occur within an SAC watercourse it may (dependant on magnitude of source and response) result in direct adverse effects on QI Species and Conservation objectives such as a decline in range and/or distribution and numbers of individuals within the River Shannon SAC catchment.

In instances where this impact occurs outside or *ex-situ* the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on connected or supporting populations for downstream but ecologically connected Otter.

These effects are reduced by an adherence to completing works during daylight hours only as part of Project Design (PD04). All works will be completed in line with the traffic management plan which forms part of the accompanying EMP (PD10) and traffic movements will be limited in respect of refuelling near watercourses (PD39 and PD42), in addition to specific measures around the protection of Otter, such as confirmatory surveys (PD52), the limiting of works within 150m of any confirmed active Otter holts (PD53, PD54, PD55) and the establishment of a prohibited area associated with confirmed active Otter holts (PD56).

Impact Quality: Negative

Evaluation of the Subject Development Impact – Otter: Disturbance/Displacement

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Out of the 63 watercourse crossings along the UWF Grid Connection route within the River Shannon catchment, 26 watercourses were identified from surveys of all watercourse crossing locations, as having potential to support Otter and were therefore surveyed 300m upstream and downstream of the crossing for the presence of Otter. Out of these 26 watercourses surveyed, evidence of Otter was found at three watercourse crossings locations or their environs. No active breeding or resting sites (Holts or Couches) were identified, however.

The evidence of Otter found at three watercourse crossings locations (W53, W33 and W36) relates to a total of four records of Otter within the UWF Grid Connection study area, consisting of slides and spraints. One of the four records was recorded along the River Bilboa within the Lower River Shannon SAC, and consisted of an Otter slide, recorded approximately 60 metres downstream of watercourse crossing W53. Two records were recorded

along the Tooreenbrien Lower River, consisting of an Otter spraint approximately 45 metres downstream of watercourse crossing W33 with an Otter print recorded underneath the W33 bridge structure. The fourth Otter record relates to an Otter slide which was recorded along the Annagh (Clare) River, approximately 135 metres upstream of watercourse Crossing W36. No Otters were observed, although this is typical in respect of a species where most activity takes place at night.

110kV UGC works over, and in close proximity to W53, W33 and W36 will involve the excavation of cable trenches and installation of ducting, and reinstatement of the trench. No instream works or culvert replacement works will be required at any of these crossings with the 110kV UGC installed in the road over the existing bridge structures, and although the parapet walls will need to be raised/built higher at W53 and W36, these works are not expected to be longer than 2 weeks in duration (expected duration range 1 day to 2 weeks dependant on location) with all works to parapet walls taking place from the road surface over the bridges.

Considering the temporary duration of works at watercourse crossings and the scale of the proposed works, along with measures in place during works (GC-OCM-17) the magnitude of impact in relation to disturbance of Otter is expected to be negligible.

Significance of the Impact: No adverse effects on the Integrity of the Lower River Shannon SAC

Rationale for Impact Evaluation:

- The very high sensitivity rating of the species, and Negligible magnitude of impact;
- Recorded Otter evidence in close proximity to 3 identified crossings, in particular W53 where parapet works will take place over the Lower River Shannon SAC, however;
- No Holts or resting places occur in close proximity, and;
- Works will take place during daylight hours, and from the surface of the bridge only, with;
- Very slight contrast to existing baseline conditions is expected, given the majority of works take place in an existing road subject to heavy passage of traffic, to which Otter will be habituated;
- The brief-temporary duration of disturbance events and any corresponding effect, with
- Effects expected to be reversible, and;
- Application of UWF Grid Connection Mitigation Measures for the protection of Otter, including at all watercourse crossing locations.

Qualifying Interest:

- No effects on QI Species Otter via reductions in Abundance or distribution (range), are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: There is potential for cumulative effect where the UWF Grid Connection comes in close proximity to the UWF Related Works construction works areas within the River Shannon SAC regional catchment – however only one watercourse crossing (of the Bilboa sub-catchment) is included in this subset.

Two watercourse crossings (W62 & W63) within the zone of overlap with UWF Related Works and Upperchurch Windfarm and which are associated with the UWF Grid Connection are Class 4 drains have marginal habitat value to Otter, with limited prey availability (no fisheries potential). Therefore, the magnitude of cumulative impacts in relation to disturbance of Otter is expected to be negligible – as Otter are unlikely to be present.

In relation to in-comination effects with Rearcross Quarry, Newport Town Park, Castlewaller Windfarm (and potential grid connection), and the potential Bunkimalta Windfarm (and consented grid connection), it is considered that the magnitude of any cumulative effects will be negligible due to the upland nature of the windfarm sites and the absence of otter evidence during baseline studies, and the limited zone of effect (spatial and temporal) and the separation distance upstream from the UWF Grid Connection, and no instream works or works in close proximity to a watercourse are required as part of Rearcross Quarry or Newport Town Park.

In relation to in-comination effects with forestry, agriculture and turf-cutting activities: these activities are on-going, form part of the baseline conditions, and have limited exposure to pathways likely to result in disturbance/displacement given a likely degree of habituation to these background activities. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.

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Significance of the Cumulative Effect: No adverse effects on the Integrity of the Lower River Shannon SAC	
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The 2 no. watercourses within the zone of cumulative impacts are drains, with no evidence of Otter recorded; • Works will take place during daylight hours only, and; • Be of brief-temporary duration, with; • Very Low probability of any impact on Otter or European Sites designated for same, and; • Application of UWF Grid Connection Mitigation Measures for the protection of Otter. <p>Other Projects</p> <ul style="list-style-type: none"> • Absence of Otter records from baseline studies for Castlewaller Windfarm and Bunkimalta Windfarm (2013) • Construction activities for Castlewaller Windfarm and the potential Bunkimalta Windfarm are expected to be at least a minimum of 50m from watercourses where possible; and these projects including their grid connections, are expected to include measures to protect Otter, given the location of the SAC downstream of both sites. • No instream works, and no works within 5m of the watercourse in relation to Newport Town Plan works • The separation distance and physical isolation of the existing quarry at Rearcross; • No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area, with limited potential for mortality related pathways from these activities. • Habituation to these background forestry, agriculture and turf-cutting activities. <p>Qualifying Interest:</p> <ul style="list-style-type: none"> • No effects on QI Species Otter via reductions in Abundance or distribution (range), are expected. 	
Cumulative Information: Other Elements of the Whole UWF Project	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> 32 No. watercourse crossings in total are required for UWF Related Works with instream works required at 25 No. of these crossings. However only 1 no. watercourse crossing is located in the Bilboa_SC_010 (and hence the regional Lower River Shannon SAC catchment) and will not require any instream works. This watercourse has no fisheries suitability and comprises a dry field drain. The proposed crossing method involves the installation of cabling over or under the structure. The Magnitude of any effects through noise or visual intrusion with Otter at this location is evaluated as Negligible.</p>	
<u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC	
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Only a single watercourse crossing of a field drain comprising marginal habitat for Otter is relevant in combination; • Application of project design measures for the protection of Otter, • No active holts were identified overlapping the construction area boundaries or within 150m, and; • Works will take place during daylight hours only, and; • Be of brief-temporary duration. 	
Element 3: UWF Replacement Forestry	
<p><u>Impact Magnitude:</u> No active holts or resting places were recorded in baseline studies and all planting will be done by hand. All works are within the regional River Suir catchment. Therefore impact magnitude is expected to be zero.</p>	
<u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC	
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Zero overlap with regional catchment of the River Shannon SAC; • No active holts or resting places were recorded in baseline studies, and; • All planting will be done by hand, and; • Undertaken during daylight hours, and • Of temporary duration; • No significant contrast to baseline conditions is expected. • Any effect will be reversible, given the low magnitude of source disturbance. 	
Element 4: Upperchurch Windfarm	
<p><u>Impact Magnitude:</u> No Otter were recorded during windfarm surveys; and as the wind farm is located almost entirely within the regional River Suir catchment, therefore the impact magnitude of any disturbance is expected to be Negligible.</p>	

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<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No active holts or resting places were recorded in baseline studies for the windfarm; • watercourses in the windfarm area generally comprise drains which have marginal habitat value to otter and; • works will be of temporary duration.
<p>Element 5: UWF Other Activities</p>
<ul style="list-style-type: none"> • Impact Magnitude: No otter holts or resting places were recorded at Haul Route Activity locations, and the locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours. • Riparian zone enhancement as part of UHHS will take place within the regional River Suir catchment. • Therefore, the impact magnitude is expected to be Negligible
<p><u>Significance of the Impact:</u> No adverse effect on the Integrity of the Lower River Shannon SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No otter holts or resting places were recorded at Haul Route Activity locations, and; • Locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours; • The offsetting effects of long-term management activities for the Upperchurch Hen Harrier Scheme which will promote and enhance existing Otter habitat – including the enhancement of riparian corridors. • The low reversibility of the above described management.
<p>Evaluation of Other Cumulative Impacts – Otter: Disturbance/Displacement</p>
<p>Whole UWF Project Effect</p>
<p>Magnitude:</p> <p>Construction works involving the use of machinery and excavation work at watercourse crossing points (both existing and new crossing points) will occur across a wide area within the River Shannon catchment. There is potential to cause disturbance or displacement of otter at larger watercourse crossing points. These larger watercourses occur along the UWF Grid Connection, whereas the watercourses on the UWF Related Works where they overlap the regional River Shannon SAC catchment are mainly drains and larger drains/watercourses with marginal habitat value to otter. Sequential effects could occur where Otters foraging or transiting along watercourses experience multiple sources of instruction/disturbance in quick succession such as encountering work crews undertaking construction activities.</p> <p>In relation to in-combination effects of the whole project, there is no potential for cumulative additive effects to Otters from both the UWF Related Works and the Upperchurch Windfarm due to the absence of Otter recorded at the watercourses within these sites and the placement of most of Upperchurch Windfarm within the River Suir SAC Regional catchment. There is no potential for cumulative effects of the UWF Replacement Forestry with the Other Elements due to the UWF Replacement Forestry also being located in the River Suir regional catchment. The magnitude of the in-combination effect of the whole project, where considered in its entirety is in the order of UWF Grid Connection – i.e. Negligible. In total 3 no. watercrossing points (W33, W36 and W53) along the public road had signs of Otter use within 300m.</p>
<p>Significance of the Whole Project Effect: No adverse effects on the Integrity of the Lower River Shannon SAC</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Application of UWF Grid Connection Mitigation Measures for the protection of Otter; • The absence of Otter records at the UWF Related Works, UWF Replacement Forestry and UWF study areas and the geographical placement of substantial works within a differing regional catchment to that under consideration, and the inclusion of project design measures (other elements) for the protection of otter; • Works will take place during daylight hours, and will be brief-temporary in duration; • The very high sensitivity of the species, and Negligible cumulative magnitude; • in the context of crossing locations as part of UWF Grid Connection comprising trenching works/parapet or road raising works within existing bridges where the works overlap the Lower River Shannon SAC, which has Otter as a Qualifying Interest, with; • Recorded evidence of Otter in close proximity, and

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<ul style="list-style-type: none"> ● Potential (albeit unlikely) for sequential effects <p><u>Qualifying Interest:</u></p> <ul style="list-style-type: none"> ● No effects on QI Species Otter via reductions in Abundance or distribution (range), are expected.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p> <p>Impact Magnitude: Impact magnitude from the Whole UWF Project has been evaluated as negligible, and is essentially in the order of the proposed UWF Grid Connection, the project element which has specific design/mitigation measures for the avoidance of effects on Otter.</p> <p>In relation to in-comination effects with Rearcross Quarry, Newport Town Park, Castlewaller Windfarm (and potential grid connection), and the potential Bunkimalta Windfarm (and consented grid connection), it is considered that the magnitude of any cumulative effects will be negligible due to the upland nature of the windfarm sites and the absence of otter evidence during baseline studies, and the limited zone of effect (spatial and temporal) and the separation distance upstream from the UWF Grid Connection, and no instream works or works in close proximity to a watercourse are required as part of Rearcross Quarry or Newport Town Park.</p> <p>In relation to in-comination effects with forestry, agriculture and turf-cutting activities: these activities are on-going, form part of the baseline conditions, and have limited exposure to pathways likely to result in disturbance/displacement given a likely degree of habituation to these background activities. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area.</p> <p>Overall Impact Magnitude is negligible.</p> <p>Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Shannon SAC</p> <p><u>Rationale for Impact Evaluation:</u> <u>Whole UWF Project:</u></p> <ul style="list-style-type: none"> ● Application of UWF Grid Connection Mitigation Measures for the protection of Otter; ● The absence of Otter records at the UWF Related Works, UWF Replacement Forestry and UWF study areas and the geographical placement of substantial works within a differing regional catchment to that under consideration, and the inclusion of project design measures (other elements) for the protection of otter; ● Works will take place during daylight hours, and will be brief-temporary in duration; ● The very high sensitivity of the species, and Negligible cumulative magnitude; ● in the context of crossing locations as part of UWF Grid Connection comprising trenching works/parapet or road raising works within existing bridges where the works overlap the Lower River Shannon SAC, which has Otter as a Qualifying Interest, with; ● Recorded evidence of Otter in close proximity, and ● Potential (albeit unlikely) for sequential effects <p><u>Other Plans or Projects:</u></p> <ul style="list-style-type: none"> ● Absence of Otter records from baseline studies for Castlewaller Windfarm and Bunkimalta Windfarm (2013) ● Construction activities for Castlewaller Windfarm and the potential Bunkimalta Windfarm are expected to be at least a minimum of 50m from watercourses where possible; and these projects including their grid connections, are expected to include measures to protect Otter, given the location of the SAC downstream of both sites. ● No instream works, and no works within 5m of the watercourse in relation to Newport Town Plan works ● The separation distance and physical isolation of the existing quarry at Rearcross; ● No material changes to existing baselines in respect of Agriculture, Forestry and Turf-cutting are expected or planned in the area, with limited potential for mortality related pathways from these activities. ● Habituation to these background forestry, agriculture and turf-cutting activities. <p><u>Qualifying Interest:</u></p> <ul style="list-style-type: none"> ● No effects on QI Species Otter via reductions in Abundance or distribution (range), are expected.

3.6.4 Summary of the Impact of UWF Grid Connection on Qualifying Interests of the Lower River Shannon SAC

This section of the NIS has provided further evaluation of the source-impact pathways identified at Stage 1 Screening as having the potential to result in likely significant effects on the River Shannon SAC and its respective Qualifying Interests screened in for further appraisal.

This has included potential effects on QI habitats and species from decreases in instream aquatic habitat quality, changes to flow regime, riparian habitat degradation, and the spread of invasive species. Potential effects on QI Species examined have included direct mortality of fisheries and other aquatic species, disturbance to or displacement of fisheries, along with mortality of and disturbance to or displacement of Otter. The Qualifying Interests screened in for evaluation at Stage 2 were:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260]
- Alluvial Forests (91E0)* (priority habitat)
- Atlantic Salmon [1106]
- Sea Lamprey [1095]
- Brook Lamprey [1096]
- River Lamprey [1099]
- Otter [1355]

The above Qualifying Interests both habitats and species have been subject to further examination in respect of their specific sensitivities & Conservation Objectives as to whether the identified pathways/effects can be considered likely to result in adverse effects on European Site Integrity via effects on Conservation Objectives; this has concluded that:

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

Cognisance has been given at this stage to the various Mitigation Measures designed to specifically avoid adverse effects on European Site Integrity, and to in-combination effects with both other project elements of the Whole Upperchurch Windfarm Project in addition to other plans or activities, or consented projects within the defined temporal and spatial overlap for cumulative or in combination effects. Effects both within and without (i.e. ex-situ) the European Site under consideration have been considered.

The evaluation herein has found, that following the examination and analysis presented, it can be concluded on a reasoned basis, that the proposed development will not result in adverse effects on the Integrity of the River Shannon SAC, in circumstances where no reasonable scientific doubt remains.

Table 13, overleaf in Section 3.6.5 summarises the evaluation of the impact of the UWF Grid Connection on the Integrity of the Lower River Shannon SAC.

3.6.5 Evaluation of the impact of UWF Grid Connection on the Integrity of the Lower River Shannon SAC

Using the checklist in the Table below, the UWF Grid Connection is examined, both alone and in-combination with other projects, for adverse impacts on the integrity of the Lower River Shannon SAC.

Table 13: Integrity of Site checklist

<i>Does the project or plan have the potential to: Yes/No</i>	
- cause delays in progress towards achieving the conservation objectives of the site?	No
- interrupt progress towards achieving the conservation objectives of the site?	No
- disrupt those factors that help to maintain the favourable conditions of the site?	No
- interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No
- change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No
- interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No
- reduce the area of key habitats?	No
- reduce the population of key species?	No
- change the balance between key species?	No
- reduce diversity of the site?	No
- result in disturbance that could affect population size or density or the balance between key species?	No

3.7 Evaluation of Adverse Impacts to the Lower River Suir SAC

The Screening stage evaluated the potential for UWF Grid Connection to impact the Lower River Suir SAC via identified impact pathways (Sections 2.9). The potential for impacts was identified with regard to individual Qualifying Interests of the SAC. These impacts are evaluated further within this Section 3.6 of the Appropriate Assessment report, to determine whether the UWF Grid Connection project (either alone or in-combination) will affect the conservation status of these Qualifying Interests, and thus the overall integrity of the Lower River Suir SAC.

The evaluation of the impacts of UWF Grid Connection on the integrity of the Lower River Suir SAC takes account of the following information:

- conservation objectives, outlined at Section 3.7.1 below, for the Qualifying Interests of the Lower River Suir SAC which were screened in for evaluation at Stage 2;
- the potential impact pathways to Qualifying Interests which were screened in for evaluation, these impact pathways are identified in Section 3.4;
- The description of the UWF Grid Connection project as described in Section 3.2 of this report, and its Mitigation Measures as described in see Section 3.5 of this report;
- the descriptions of the other projects as outlined in Section 3.2.7.

3.7.1 Conservation Objectives of Lower River Suir SAC (002137)

The site-specific conservation objectives of the Lower River Suir SAC aims to define favourable conservation condition for the particular habitat or species at that site. These objectives and conditions are summarised in Table 14 below in respect of the Qualifying Interests of the Lower River Suir SAC which were screened in for further evaluation.

The conservation objectives of the Lower River Suir SAC are available in full on the National Parks & Wildlife Service website at <https://www.npws.ie/protected-sites>. The conservation objectives outlined in the table below were sourced from NPWS *Conservation Objectives: Lower River Suir SAC 002137. Version 1*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 28/03/2017] and should be read in conjunction with any other supporting documentation on the referenced website as referenced above.

Table 14: Conservation Objectives of the Lower River Suir SAC (002137)

Lower River Suir SAC (002137)			
Floating River Vegetation (3260)	To maintain the favourable conservation condition of Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	The description of habitat 3260 covers upland rivers with bryophytes and macroalgae to lowland depositing rivers with pondweeds and starworts. The selection of Lower River Suir SAC used this broad interpretation. Conservation objectives for habitat 3260 concentrates on the high conservation value sub-types, however, little is known of the habitat's distribution or its sub-types in Lower River Suir SAC. There is a large number of lowland and tidal rivers in the SAC, as well as faster-flowing tributaries. Note: rooted macrophytes should be absent or trace (<5% cover) in freshwater pearl mussel (<i>Margaritifera margaritifera</i>) habitat. The freshwater pearl mussel (1029) conservation objective takes precedence over this objective for habitat 3260 in the Clodiagh River (Portlaw) within this SAC, because the mussel requires environmental conditions close to natural background levels.

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Lower River Suir SAC (002137)			
Habitat distribution	Occurrence	No decline, subject to natural processes	Further study is needed of Irish sub-types and their conservation value to interpret the broad description of habitat 3260 (European Commission, 2013). As noted above, little is known about the distribution of the habitat and its sub-types in Lower River Suir SAC. The uncommon, protected opposite-leaved pondweed (<i>Groenlandia densa</i>) was recorded in the SAC from floodplain ditches of the Suir near Carrickon-Suir and Clonmel, as well as the Clodiagh near Portlaoigh (Colgan and Scully, 1898; NPWS internal files). See NPWS (2012) for information on the requirements of opposite-leaved pondweed. There are no known records for rare or threatened bryophytes from the rivers in the SAC (Lockhart <i>et al.</i> , 2012). The rivers in the SAC are mainly lowland, depositing and tidal, and are likely dominated by marginal and submerged higher plants. Some fast-flowing rivers also occur that should, naturally, be dominated by macroalgae and bryophytes, with limited submerged or emergent higher plants.
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	High conservation value sub-types are associated with natural hydrology. A natural flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river type (Hatton-Ellis and Grieve, 2003). For many sub-types, high flows are required to maintain the substratum necessary for the characteristic species. Flow variation can be particularly important, with high and flood flows being critical to the hydromorphology. Other aspects of hydrology, such as tidal regime, are important for certain sub-types of the habitat. The rivers in the SAC vary from naturally flashy, through depositing to tidal reaches.
Hydrological regime: groundwater discharge	Metres per second	Maintain appropriate hydrological regime	Even small groundwater contributions can significantly alter hydrochemistry, particularly where there is basic bedrock and/or soils. Freshwater seepages can be very important in tidal reaches
Hydrological regime: tidal influence	Daily water level fluctuations - metres	Maintain natural tidal regime	Opposite-leaved pondweed (<i>Groenlandia densa</i>) is typical of the tidal reaches of large Irish rivers, e.g. Suir, Slaney, Shannon and Blackwater (see Preston and Croft, 2001; Preston, 2003). This species is listed as Near Threatened (Wyse Jackson <i>et al.</i> , 2016) and is protected on the Flora (Protection) Order, 2015 (Statutory Instrument No. 356 of 2015). Both the disturbance and substratum associated with the tidal regime may be important drivers
Substratum composition: particle size range	Millimetres	Maintain appropriate substratum particle size range, quantity and quality, subject to natural processes	Many of the high conservation value sub-types are dominated by coarse substrata, and it is likely that bedrock, boulders, cobbles and coarse gravels were naturally abundant in many tributaries in this SAC, particularly where the freshwater pearl mussel (<i>Margaritifera margaritifera</i>) occurred. Fine substrata are naturally abundant in depositing and tidal reaches. The size and distribution of particles are largely determined by the river flow. The chemical composition (particularly minerals and nutrients) of the substratum is also important. The quality of finer sediment particles is a notable driver of rooted plant communities. Note: increased fine sediment is contributing to the unfavourable status of the freshwater pearl mussel in the Clodiagh. See the freshwater pearl mussel (1029) conservation objective
Water quality	Various	Maintain appropriate water quality to support the natural structure and functioning of the habitat	The specific targets may vary among sub-types. Deposit and tidal stretches of rivers may, naturally, be more nutrient-rich and, therefore Water Framework Directive (WFD) good status may suffice in terms of nutrient and oxygenation standards, and EQRs (Ecological Quality Ratios) for macroinvertebrates and phytoplankton. Faster flowing tributaries that are naturally dominated by bryophytes and macroalgae typically require WFD high status. High status targets apply to freshwater pearl mussel (<i>Margaritifera margaritifera</i>) habitat in the Clodiagh (see The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 - S.I. No. 296 of 2009). See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009), Environmental Protection Agency (EPA) river

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			water quality reports (e.g. Bradley <i>et al.</i> , 2015) and Ní Chatháin <i>et al.</i> (2013)
Typical species	Occurrence	Maintain typical species in good condition, including appropriate distribution and abundance	The sub-types of this habitat are poorly understood and their typical species have not yet been fully defined. The typical species may include higher plants, bryophytes, macroalgae and microalgae, and invertebrates. As noted above, the protected vascular plant species opposite-leaved pondweed (<i>Groenlandia densa</i>) is associated with rivers and floodplains in the SAC. The banks of the Suir, particularly its tidal stretches, support a notable population of the rare <i>Rumex crispus subsp. uliginosus</i> (Green, 2008)
Floodplain connectivity	Hectares	Maintain floodplain connectivity necessary to support the typical species and vegetation composition of the habitat	River connectivity with the floodplain is important for the functioning of this habitat. Channels with a naturally functioning floodplain are better able to maintain habitat and water quality (Hatton-Ellis and Grieve, 2003). Floodplain connectivity is particularly important in terms of sediment sorting and nutrient deposition. High conservation value rivers are intimately connected to floodplain habitats and function as important wildlife corridors, connecting otherwise isolated or fragmented habitats in the wider countryside (Hatton-Ellis and Grieve, 2003; Mainstone <i>et al.</i> , 2016). Alluvial woodland (91E0) is an important feature of rivers in Lower River Suir SAC (see the conservation objective for 91E0)
Fringing habitats Hectares	Hectares	Maintain marginal fringing habitats that support the typical species and vegetation composition of the habitat	Riparian habitats (including those along lake shores), particularly natural/semi-natural woodlands and wetlands, are an integral part of the structure and functioning of river systems, even where they do not form part of a natural floodplain. Fringing habitats can contribute to the aquatic food web (e.g. allochthonous matter such as leaf fall), provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates, assist in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling. Shade may also be important in suppressing algal growth in enriched rivers and moderating temperatures. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern. See Mainstone <i>et al.</i> (2016). Alluvial and riparian woodland is important for the rivers in Lower River Suir SAC
Alluvial Forests* (91E0) To restore the favourable conservation condition of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) in the Lower River Suir SAC, which is defined by the following list of attributes and targets:			
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least c.32.9ha for sites surveyed. See map 5	Alluvial forest was surveyed in Lower River Suir SAC by Perrin <i>et al.</i> (2008) as part of the National Survey of Native Woodlands (NSNW) at Fiddown (NSNW site code: 0022), Mountbolton (NSNW site code: 1823) and Ballycanvan Big (NSNW site code: 1839). Fiddown (0022) was also included in a national monitoring survey (O'Neill and Barron, 2013). The area of alluvial woodlands in the surveyed sites within the SAC is estimated to be 32.9ha. It is important to note that further unsurveyed areas of alluvial forest are present within the SAC, for example at islands below Carrick-on-Suir, at Shanbally (Coillte LIFE project site), Tibberaghny Marshes, along the lower stretches of the more westerly of the Suir tributaries and along both banks of the Suir as far east as the Dawn River (NPWS internal files). Map 5 shows the alluvial woodlands surveyed by Perrin <i>et al.</i> (2008)
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 5	Distribution based on Perrin <i>et al.</i> (2008). NB further areas are likely to be present within the SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, topographical constraints may restrict expansion

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		in size and "small" woods at least 3ha in size	
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; sub canopy layer with semi- mature trees and shrubs; and well-developed herb layer	Described in Perrin <i>et al.</i> (2008) and NPWS internal files
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin <i>et al.</i> (2008) and NPWS internal files
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Alder (<i>Alnus glutinosa</i>) and oak (<i>Quercus</i> spp.) tend to regenerate poorly. Ash (<i>Fraxinus excelsior</i>) often regenerates in large numbers although few seedlings reach pole size
Hydrological regime: flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river floodplains, but not for woodland around springs/seepage areas
Woodland structure: dead wood	m ³ per hectare; number per hectare	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-listed and other rare or localised species. Perrin and Daly (2010) identify the site Ballycanvan Big (NSNW site code: 1839) as being "possible ancient woodland"
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin <i>et al.</i> (2008) and NPWS internal files
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp),	Species reported in Perrin <i>et al.</i> (2008) and NPWS internal files

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		oak (<i>Quercus robur</i>), ash (<i>Fraxinus excelsior</i>) and birch (<i>Betula pubescens</i>)	
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	Norway spruce (<i>Picea abies</i>) and sycamore (<i>Acer pseudoplatanus</i>) occur at Shanbally (NPWS internal files). Spread of Japanese knotweed (<i>Fallopia japonica</i>) is a problem at Tibberaghny (NPWS internal files). Cherry laurel (<i>Prunus laurocerasus</i>) and rhododendron (<i>Rhododendron ponticum</i>) have been reported as occurring in part of Ballycanvan Big (NSNW site code: 1839) by Perrin et al. (2008), but not within the alluvial woodland.
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340]	To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels habitat has not been mapped in detail for Lower River Suir SAC and thus the total area of the qualifying habitat in the SAC is unknown. The lowland type communities of the habitat are considered to occur in association with the various areas of alluvial forest (91E0) within the SAC, notably at Fiddown, below Carrick-on-Suir and at Tibberaghny Marshes. This habitat type would also be expected to occur in association with other woodland types in fringe areas along the river and with areas of open marsh or wet grassland within the SAC (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes on area above
Hydrological regime: Flooding depth/height of water table	Metres	Maintain appropriate hydrological regime	This habitat requires winter inundation, which results in deposition of naturally nutrient-rich sediment
Vegetation composition: positive indicator species	Number of species at a representative number of monitoring stops	At least three positive indicator species present	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species is also presented
Vegetation composition: positive indicator species	Percentage cover at a representative number of monitoring stops	Cover of positive indicator species at least 40%	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species is also presented
Vegetation composition: non native species	Percentage cover at a representative number of monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013). The spread of Japanese knotweed (<i>Fallopia japonica</i>) is noted as a threat at Tibberaghny (NPWS internal files)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Cover of negative indicator species not more than 33%	Attribute and target based on O'Neill et al. (2013), where the list of negative indicator species is also presented
Vegetation composition: scrub, bracken	Percentage at a	Cover of scrub, bracken (<i>Pteridium aquilinum</i>) and	Attribute and target based on O'Neill et al. (2013)

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and heath	representative number of monitoring stops	heath not more than 5%	
Vegetation structure: height	Height (centimetres) at a representative number of monitoring stops	Herb height at least 50cm	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Cover of bare soil not more than 10%	Attribute and target based on O'Neill et al. (2013)
Physical structure: grazing and disturbance	Square metres in local vicinity of a representative number of monitoring stops	Area of the habitat showing signs of serious grazing or disturbance less than 20m ²	Attribute and target based on O'Neill et al. (2013)
Taxus baccata woods of the British Isles [91J0]	To restore the favourable conservation condition of Taxus baccata woods of the British Isles* in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 29.3ha for sites surveyed. See map 4	Old sessile oak woods with Ilex and Blechnum were surveyed in Lower River Suir SAC by Perrin et al. (2008) as part of the National Survey of Native Woodlands (NSNW) at Lyranearla (NSNW site code: 1834) and Inchinsquillib Wood (NSNW site code: 1898). The area of old oak woodlands in the surveyed sites within the SAC is estimated to be 29.3ha. It is important to note that further unsurveyed areas are present within the SAC, including at Portlaw Wood within the Curraghmore Estate and other small pockets within the SAC (NPWS internal files). Map 4 shows the old oak woodlands surveyed by Perrin et al. (2008)
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 4	Distribution shown based on Perrin et al. (2008). NB further unsurveyed areas are present within this SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, topographical constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semimature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008) and NPWS internal files
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008) and NPWS internal files
Woodland structure: natural	Seedling: sapling: pole	Seedlings, saplings and	Oak (Quercus petraea) generally regenerates poorly. In suitable sites, ash (Fraxinus excelsior) can regenerate in large numbers although few

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regeneration	ratio	pole age-classes occur in adequate proportions to ensure survival of woodland canopy	seedlings reach pole size
Woodland structure: dead wood	m ³ per hectare; number per hectare	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands (see Perrin and Daly, 2010), archaeological and geological features as well as red-listed and other rare or localised species. The rare lichen tree lungwort (<i>Lobaria pulmonaria</i>), an indicator of ancient woodlands, is found in Portlaw Wood (NPWS internal files)
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (<i>Quercus petraea</i>) and birch (<i>Betula pubescens</i>)	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	Rhododendron (<i>Rhododendron ponticum</i>) infestation at Portlaw Wood is noted as being serious, as well as the occurrence of beech (<i>Fagus sylvatica</i>), sycamore (<i>Acer pseudoplatanus</i>) and silver fir (<i>Abies alba</i>) in the woodland (NPWS internal files). Beech was reported from Lyraneerla (NSNW site code: 1834) by Perrin et al. (2008)
Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	To restore the favourable conservation condition of Freshwater Pearl Mussel in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution	Kilometres	Restore distribution to 10.4km. See map 6	The conservation objective applies to the Clodiagh freshwater pearl mussel (<i>Margaritifera margaritifera</i>) population, which is listed on The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. (S.I. 296 of 2009). Full baseline distribution and abundance mapping was conducted in 2006 (Ross, 2006). Mussel habitat is widespread in the Clodiagh, with mussels almost continually present in low numbers from downstream of Clonea to above Portlaw (Ross, 2006). Mussels were nowhere abundant; maximum density was 3 per square metre (Ross, 2006). The habitat is significantly below carrying-capacity. The distribution in the Clodiagh has contracted since the 1990s (Ross, 2006). The target is for the species to be sufficiently widespread to maintain itself on a long-term basis as a viable component of the Clodiagh system. See NPWS (2010) for further information

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Population size	Number of adult mussels	Restore population to at least 10,000 adult mussels	Ross (2006) counted 1,206 mussels and estimated a total population of 2,412, concluding that, given the large areas of physically suitable habitat, a much larger population was previously present and a major population decline had occurred. Ross (2009) measured an 18.5% decline in mussel numbers between 2006 and 2009 at transect 1, indicating continued losses. Ross <i>et al.</i> (2017) recorded 'rapid and alarming' declines of 56-94% between 2006 and 2016 at five monitoring locations (67% decline overall). Moorkens (2010) estimated the population to be less than 10,000. The target of 10,000 is considered appropriate for a functional, self-sustaining population. NPWS (2013), in producing a national population estimate, assumed the Clodiagh population had declined at a rate of 3% per year. The target is for the species to be sufficiently abundant to maintain itself on a long-term basis as a viable component of the Clodiagh system
Population structure: recruitment	Percentage per size class	Restore to at least 20% of each population no more than 65mm in length; and at least 5% of each population no more than 30mm in length	Mussels ≤65mm are 'young mussels' and found buried in the substratum or beneath adult mussels. Mussels ≤30mm are 'juvenile mussels' and always buried in the substratum. See the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Clodiagh failed both targets in 2006, 2009 and 2016 (Ross, 2006, 2009; NPWS, 2010; Ross <i>et al.</i> , 2017). Ross (2006) found no juveniles, ≤65mm extremely uncommon, smallest individual was 45.4mm and 97% was >80mm. In 2009, the smallest mussel was 78mm and (based on Ross, 1988) 15-20 years old (Ross, 2009). The smallest of 21 mussels measured in 1986 was 48.6mm (Ross, 1988). NPWS (2010) concluded there had been no successful recruitment from 1986 to 2009. The Clodiagh population is considered to be unsustainable owing to lack of survival of juvenile and adult mussels. The target is for sufficient juvenile recruitment to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	5% is considered the cut-off between the combined errors associated with natural fluctuations and sampling methods and evidence of true population decline. 1% of dead shells is considered to be indicative of natural losses. The Clodiagh failed both targets in 2009 (Ross, 2009; NPWS, 2010) and, as noted above, a major population decline has occurred (Ross, 2006; Ross <i>et al.</i> , 2017), and is presumed to be on-going. In 2009, 1 transect and 1 delimited count were counted: T1 numbers had fallen from 27 in 2006 to 22, representing a 18.5% decline, while numbers were the same in C2. Seven dead shells were found among 23 live mussels at one location, indicating high mortality in parts of the Clodiagh. In 2016, 67 mussels were counted at five monitoring sites that had 205 mussels in 2006 (Ross <i>et al.</i> , 2017). The target is for sufficient survival of adults to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system.
Suitable habitat: extent	Kilometres	Restore suitable habitat in more than 8.8km in the Clodiagh system and any additional stretches necessary for salmonid spawning	Mussel habitat in the Clodiagh is known to occur from Clonea to Portlaw, and is sparsely occupied from c.630m downstream of Clonea to c.1.8km above Portlaw (Ross, 2006). Mussels were recorded at Portlaw as recently as the 1990s and downstream of Portlaw in the early 20th century. It is possible that some mussel habitat occurs upstream or downstream of the mapped stretches, but few mussels are likely to be found (Ross, 2006). The mussel habitat has been severely impacted for a significant period by sedimentation, other hydromorphological changes, organic pollution and eutrophication (NPWS, 2010). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Suitable habitat: condition	Kilometres	Restore condition of suitable habitat	The species' habitat is a combination of the area of 1) habitat adult and juvenile mussels can occupy; 2) spawning and nursery habitats host fish can occupy. Fish nursery and mussel habitat typically overlap. Fish spawning habitat is generally adjacent to mussel habitat but may lie upstream of the generalised mussel distribution. Only spawning areas that regularly contribute juvenile fish to adult mussel habitat should be considered. Availability of mussel and fish habitat is determined by flow

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			and substratum conditions. It is highly sensitive to hydromorphological changes, sedimentation and enrichment. Pressures throughout the catchment contribute to such impacts. Mussel habitat is widespread in the Clodiagh but in unfavourable condition owing to sedimentation, other hydromorphological changes and nutrient enrichment. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system.
Water quality: Macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality - macroinvertebrates : EQR greater than 0.90 (Q4-5 or Q5); phytobenthos: EQR greater than 0.93	The EQRs correspond to high ecological status for these two Water Framework Directive biological quality elements. They represent high water quality with very low nutrient concentrations (oligotrophic conditions). In 2009, the habitat in the Clodiagh system failed the macroinvertebrate target, but passed the phytobenthos target (Morgan, 2009; Ní Chatháin, 2010; NPWS, 2010). Q values in the mussel habitat were Q3-Q4 (Morgan, 2009). There has been a gradual decline in quality at several main-channel sites since the late 1970s (Morgan, 2009). Sewage discharge at Clonea is impacting water quality downstream of Clonea Bridge (Ross, 2006; Morgan, 2009; Ní Chatháin, 2010; NPWS, 2010). See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Substratum quality: filamentous algae (macroalgae); macrophytes (rooted higher plants)	Percentage	Restore substratum quality - filamentous algae: absent or trace (less than 5%); macrophytes: absent or trace (less than 5%)	The Clodiagh failed the macrophyte target, but marginally passed the macroalgal target in 2009 (NPWS, 2010). Patches of abundant <i>Ranunculus</i> were recorded by all surveyors, with up to 40% cover in places (Morgan, 2009; Ross, 2009; Ní Chatháin, 2010; NPWS, 2010). Ross (2006) also recorded widespread and, in places, abundant (up to 80%) <i>Ranunculus</i> . Algae were generally absent in 2009, however up to 10% Cladophora cover was recorded downstream of Clonea Bridge (Ní Chatháin, 2010; NPWS, 2010), where sewage fungus had previously been recorded (Ross, 2006). Algae were also sparse in 2006 and 2016 (Ross, 2006; Ross <i>et al.</i> , 2017). Tree shade may be suppressing plant growth over much of the mussel habitat (Ross <i>et al.</i> , 2017). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system.
Substratum quality: sediment	Occurrence	Restore substratum quality - stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	The Clodiagh failed the target for the Sub-basin Management Plan in 2009 and 2016, with strong silt plumes recorded in mussel habitat (Ross, 2009; NPWS, 2010; Ross <i>et al.</i> , 2017). Ross <i>et al.</i> (2017) recorded extremely heavy silt plumes at every site, even in fast riffles. Ross (2006) recorded significant siltation of the mussel habitat and observed river bank erosion and collapse, and livestock entry to the river. Silt in the Clodiagh is providing a rooting medium for macrophytes. Sufficient survival of juvenile and adult mussels is being prevented by the poor condition of the river substratum. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Substratum quality: oxygen availability	Redox potential	Restore to no more than 20% decline from water column to 5cm depth in substrate	Differences in redox potential between the water column and the substrate correlate with differences in oxygen levels. Juvenile mussels require full oxygenation while buried in gravel. In suitable habitat, there should be very little loss of redox potential between the water column and underlying gravels. Average redox was very poor, 23-28% at four sites monitored in 2016, only three of the 40 measurements was <20% (Ross <i>et al.</i> , 2017). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Hydrological regime: flow variability	Metres per second	Maintain appropriate hydrological regime	The availability of suitable freshwater pearl mussel habitat is largely determined by flow (catchment geology being the other key factor). To restore the habitat for the species, flow variability over the annual cycle must be such that: 1) high flows can wash fine sediments from the substratum; 2) high flows are not artificially increased so as to cause excessive scour of mussel habitat; 3) low flows do not exacerbate the

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			deposition of fine sediment or growth of Zlgae/macrophytes and 4) low flows do not cause stress to mussels in terms of exposure, water temperatures, food availability or aspects of the reproductive cycle; see Moorkens and Killeen (2014). Groundwater inflow to the substratum contributes to water-cycling. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of Clodiagh system.
Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae	Salmonid fish are host to the larval stage of the freshwater pearl mussel and essential to completion of the life cycle. 0+ and 1+ fish are typically used, both because of habitat overlaps and the development of immunity with age in fish. Fish presence is sufficient, as higher fish density and biomass is indicative of enriched conditions in mussel rivers. Geist <i>et al.</i> (2006) found that higher densities of host fish coincided with eutrophication, poor substrate quality for mussels and a lack of mussel recruitment, while significantly lower host fish density and biomass were associated with high juvenile mussel numbers. Fish movements must be such that 0+ fish remain in the mussel habitat until their 1+ summer. No fish stocking should occur within the mussel habitat, nor any works that may change the salmonid balance or residency time. No glochidia were found on young Clodiagh fish in May 2009, although six trout and 38 salmon were caught (Johnston, 2009; NPWS, 2010).
Fringing habitat: area and condition	Hectares	Restore the area and condition of fringing habitats necessary to support the population	Riparian habitats, including those along lake fringes, particularly natural/semi-natural woodlands and wetlands, even where they do not form part of a natural floodplain, are an integral part of the structure and functioning of river systems. Fringing habitats aid in the settlement of fine suspended matter, protect banks from erosion, contribute to nutrient cycling and to the aquatic food web (e.g. allochthonous matter such as leaf fall) and provide habitat for life-stages of fish, birds and aquatic invertebrates. Shade may also be important in suppressing algal and macrophyte growth in enriched rivers (e.g. along parts of the Clodiagh) and moderating temperatures. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
White-clawed Crayfish (<i>Austropotamobius pallipes</i>)	To maintain the favourable conservation condition of White-clawed Crayfish in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution	Occurrence	No reduction from baseline. See map 7	White-clawed crayfish (<i>Austropotamobius pallipes</i>) occurs extensively on the River Suir and on many of its tributaries. On the River Suir main channel, the species has been recorded on almost the entire length of non-tidal river from the most upstream point at Cabragh, near Thurles, to downstream of Kilsheelan. It is also present on the following tributaries: Anner and lashawley, Clodiagh and Owenbeg, Multeen, Tar, Nier, and Clodiagh Lower
Population structure: recruitment	Occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in all occupied tributaries	See Reynolds <i>et al.</i> (2010) for further details
Negative indicator species	Occurrence	No alien crayfish species	Alien crayfish species are identified as a major direct threat to this species and as a disease vector. Ireland is currently free of non-native invasive crayfish species. See Reynolds (1998) for further details
Disease	Occurrence	No instances of disease	Disease is identified as a major threat and crayfish plague has occurred in Ireland even in the absence of alien vectors. Disease can, in some circumstances, be introduced through contaminated equipment and water in the absence of vector species. See Reynolds (1998) for further details

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Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA	Target taken from Demers and Reynolds (2002). Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)
Habitat quality: heterogeneity	Occurrence of positive habitat features	No reduction in habitat heterogeneity or habitat quality	Crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus, such as leaf litter. These conditions must be available on the whole length of occupied habitat
Sea Lamprey (<i>Petromyzon marinus</i>)	To restore the favourable conservation condition of Sea Lamprey in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas (Gargan <i>et al.</i> , 2011; Rooney <i>et al.</i> , 2015). Float-over surveys by Inland Fisheries Ireland (IFI) point to little success of sea lamprey adults in passing the weirs in Clonmel in Lower River Suir SAC. Modifications to these weirs would facilitate upstream passage of sea lamprey. IFI has embarked on a programme of detailed survey of major barriers in SAC catchments, in the context of sea lamprey passage, using the SNIFFER (Scotland and Northern Ireland Forum for Environmental Research) WFDIII methodology
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007). A catchment wide larval lamprey survey was completed by IFI in 2016. The data are currently being analysed
Juvenile density in fine sediment	Juveniles/m ²	Juvenile density at least 1/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003). A catchment-wide larval lamprey survey was completed by IFI in 2016. The data are currently being analysed
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by IFI. Lampreys spawn in clean gravels. Substantial areas of suitable spawning habitat are available from Cahir to Carrick-on-Suir, but access to areas upstream of Clonmel is problematic
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King <i>et al.</i> , 2015). However, it is vital that such sedimenting habitats are retained
Brook Lamprey (<i>Lampetra planeri</i>)	To restore the favourable conservation condition of Brook Lamprey in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to lampreys' migration both up- and downstream, thereby possibly limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol <i>et al.</i> , 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007). It is impossible to distinguish between brook and river lamprey juveniles in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m ² in optimal conditions and more than 2/m ² on a catchment basis. A

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		brook/river lamprey at least 2/m ²	catchment-wide larval lamprey survey was completed by Inland Fisheries Ireland (IFI) in 2016. The data are currently being analysed
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by IFI. Brook lampreys spawn in clean gravels where they excavate shallow nests and can spawn communally (Rooney <i>et al.</i> , 2013)
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King <i>et al.</i> , 2015). However, it is vital that such sedimenting habitats are retained
River Lamprey (<i>Lampetra fluviatilis</i>)	To restore the favourable conservation condition of River Lamprey in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Access to all water courses down to first order streams	Artificial barriers can block river lampreys' migration both up- and downstream, thereby limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol <i>et al.</i> , 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007). It is impossible to distinguish between river and brook lamprey juveniles in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m ² in optimal conditions and more than 2/m ² on a catchment basis. A catchment-wide larval lamprey survey was completed by Inland Fisheries Ireland (IFI) in 2016. The data are currently being analysed
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). River lampreys spawn in clean gravels where they excavate shallow nests and can spawn communally in numbers (Rooney <i>et al.</i> , 2013)
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King <i>et al.</i> , 2015). However, it is vital that such sedimenting habitats are retained
Salmon (<i>Salmo salar</i>)	To restore the favourable conservation condition of Atlantic Salmon in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmon's' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Adult spawning fish	Number	Conservation limit (CL) for each system	A conservation limit (CL) is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from

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		consistently exceeded	the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee on Salmon (SSCS) annual model output of CL attainment levels. See SSCS (2016). Attainment of CL estimates are derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Suir is currently below CL, meeting 79% of CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	The target is the threshold value for rivers currently exceeding their conservation limit (CL). The average electrofishing value for the Suir in 2016 was 10.2 salmon fry, which is below the 17 fry target
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (<i>Lepeophtheirus salmonis</i>)
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels. Artificial barriers are generally not currently preventing salmon from accessing suitable spawning habitat in Lower River Suir SAC
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)
Otter (<i>Lutra lutra</i>)	To maintain the favourable conservation condition of Otter in Lower River Suir SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. Favourable Conservation Status (FCS) target, based on 1980/81 survey findings, is 88% in SACs. Current range is estimated at 93.6% (Reid <i>et al.</i> 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 116.17ha above high water mark (HWM) and 726.61ha along river banks	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 712.27ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (Kruuk, 2006; NPWS, 2007)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 382.31km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk and Moorhouse, 1991; Kruuk, 2006)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006; Reid <i>et al.</i> , 2013) and wrasse and rockling in coastal waters (Kingston <i>et al.</i> , 1999)

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Barriers to connectivity	Number	No significant increase	Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

3.7.2 Qualifying Interests and potential impact pathways which were screened in for evaluation

The Qualifying Interests of the Lower River Suir SAC and potential impact pathways which were screened in for evaluation are:

Table 15: Qualifying Interest Screened In due to potential for UWF Grid Connection to cause effects

Qualifying Interest of the Lower River Suir SAC Screened In due to potential or likelihood of UWF Grid Connection causing effects	Impact Screened in for further consideration at Stage 2
<ul style="list-style-type: none"> Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260] Alluvial Forests (91E0)* (priority habitat) Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Yew Woodlands* Taxus baccata woods of the British Isles [91J0] (priority habitat) Old sessile oak woods with Ilex and Blechnum in the British Isles 	SAC Pathway 2, 3
<ul style="list-style-type: none"> Freshwater Pearl Mussel [1029] White-clawed Crayfish [1092] Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099] Atlantic Salmon [1106] 	SAC Pathway 4, 5, 6, 7, 8
<ul style="list-style-type: none"> Otter [1355] 	SAC Pathway 4, 5, 6, 7, 8

The SAC Impacts 1 to 8 are described below:

SAC Pathway 2: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC
SAC Pathway 3: Indirect Effects to Qualifying Interest habitats , of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC
SAC Pathway 4: Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) ex-situ the SAC
SAC Pathway 5: Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within the SAC
SAC Pathway 6: Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC
SAC Pathway 7: Indirect effects to Qualifying Interest species of the SAC Site (i.e. disturbance /displacement) ex-situ to the SAC

SAC Pathway 8: Indirect effects to **Qualifying Interest species** of the SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ the SAC.

3.7.3 Evaluation of the Impact of UWF Grid Connection on Qualifying Interests of the Lower River Suir SAC

In order to evaluate the effect of UWF Grid Connection on the integrity of the Lower River Suir SAC, the impact pathways identified above are examined in detail, through a number of focused impact evaluations, as per:

SAC Pathway 2 SAC Pathway 3 SAC Pathway 6 SAC Pathway 8	<i>Will be examined through these impact evaluations:</i>	Decrease in instream aquatic habitat quality Changes to flow regime Riparian habitat degradation Spread of invasive aquatic species
SAC Pathway 4 SAC Pathway 5 SAC Pathway 7	<i>Will be examined through these impact evaluations::</i>	<ul style="list-style-type: none"> • Direct Mortality of Fish and Aquatic Species • Disturbance or displacement of fish and aquatic species • Direct Mortality of Otter • Disturbance/Displacement of Otter.

For the purposes of the appraisal herein, effects on aquatic QI Habitats (and their respective conservation objectives) within the Lower River Suir SAC (direct, secondary, within or Ex-Situ) as defined via possible pathways SAC Pathway 2, 3, 6 and 8 can be characterised under a number of specific impact types. This includes general decreases in instream aquatic habitat quality, changes to flow regime, degradation of riparian habitat and potential cross-factor effects on QI Habitats via the spread of Aquatic invasive species.

Potential effects (direct, indirect within and ex-situ) on those QI species (and their respective conservation objectives) for which the Lower River Suir is designated, as defined via possible pathways SAC Pathway 4, 5 and 7 also fall under a number of typical impact categories, primarily related to the mortality of, or disturbance or displacement of aquatic species, both mammalian and fisheries. Direct mortality of mammals is considered on a precautionary basis, due to the exclusion of Mitigation Measures (which would prevent inadvertent mortality) from consideration at Stage 1, in line with EU Guidance¹⁶.

Evaluation of In-Combination Effects:

The evaluations of the impact of UWF Grid Connection on the Qualifying Interests of the Lower River Suir takes into account the in-combination effect with the Other Elements of the Whole UWF Project, and with the following other unrelated projects and activities:

- Curraghduff Quarry
- Agriculture, Forestry and Turf-cutting in the surrounding area.

A description of the other projects is included in Section 3.2.7.

¹⁶ Managing Natura 2000 Sites: The Provisions of Article 6 of the ‘Habitats Directive’ 92/43/EEC, European Commission, 2018. See Section 3.5.1, pg 40/41.

The location of the UWF Grid Connection, and the other projects, in relation to the Lower River Suir SAC is illustrated on the following mapping, which are contained in **Appendix A9: Accompanying Figures** of this Appropriate Assessment Report:

AA Figure 5: Location of UWF Grid Connection in relation to Lower River Suir SAC

AA Figure 13: Location of UWF Grid Connection and other projects in relation to Lower River Suir SAC.

3.7.3.1 Evaluation of SAC Impacts 2, 3, 6 & 8

3.7.3.1.1 Effects on QI habitats and/or species along Pathways 2, 3, 6 & 8 from decreases in instream aquatic habitat quality, within or ex-situ the Lower River Suir SAC

Impact Description:

Project Life Cycle Stage: Construction stage

Impact Source: culvert replacement works; movement of soils and machinery; excavation works; use of hydrocarbons & cement-based compounds; reinstatement works

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

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

Impact Description: Aquatic habitat relates to the instream features supporting aquatic biodiversity (bed substrate, morphology, water quality, etc.). Watercourses are highly sensitive to change, containing sensitive aquatic ecological receptors including salmonids, lamprey species, and a diverse macroinvertebrate community.

Instream works at some watercourses will require direct excavation of the banks and bed of the watercourse, which can change the physical character of the watercourse and has the potential to degrade the quality of the baseline habitat which supports the structure, function and diversity of aquatic species.

Water quality effects due to sedimentation: Erosion and deposition are natural process in watercourses¹⁷, varying naturally throughout the year. However, additional sediment contributions entering the watercourse, such as from construction works in, adjacent to or upstream of individual watercourses, can have negative implications for fish and invertebrates due to physical damage and reduced feeding/foraging, as well as negative impacts due to compaction of spawning gravels by sediment causing mortality impacts for salmonid eggs (affecting recruitment) and interfering with invertebrate life stages within gravel substrates (interstitial spaces). These impacts may be mobilised downstream and affect river reaches at a distance from the physical works.

In addition, water quality effects due to contamination by fuels, oils or cementitious material has the potential to lead to direct toxicity events, or sub-lethal degradation of aquatic habitat quality.

Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, effects on underlying water quality, and/or in turn vegetative composition of QI habitats, or an altered hydrological regime. It may also result in secondary effects on prey item species, which may affect the supporting habitat quality for QI Species.

In instances where this impact occurs outside or *ex-situ* the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.

Impact Quality: Negative

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

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Approximately 1.5km of the 110kV UGC exists within an upper headwater tributary of the Clodiagh River catchment. Effects on surface water are likely to arise mainly from trench excavation works within the road and at watercourse crossings of one minor watercourse and small drains at existing road bridge and culvert locations.

¹⁷ EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems,

There are 5 No. watercourse crossings within the Clodiagh (Tipperary) River catchment (W64-W68), of which 1 No. have fisheries value (W65). This watercourse crossing is outside the SAC site boundary but upstream hydrologically. No culvert/instream replacement works are required at this location. Trench and joint bay excavation works have potential to cause effects to surface water quality, which can then indirectly affect aquatic habitat quality. The magnitude of the effect on the physical instream habitat i.e. watercourse channel morphology, substrate, and flow character is evaluated as Negligible with regard to availability, diversity and quality of habitat supporting aquatic species.

The potential for decreases in aquatic habitat quality due to additional sedimentation or contamination by fuels, oils or cement is evaluated as having a Negligible magnitude,

Significance of the Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- All watercourse crossings (5 No.) are within the River Suir catchment of a single local surface water body of the upper Clodiagh sub-catchment. The majority of these crossings (4 of 5 No.) have no fisheries value and are classified as drains (Class 4 watercourses) and therefore the potential for downstream water quality effects is limited due to small size and low or absent flows;
- No requirement for instream works within the Clodiagh (Tipperary) sub-catchment of the regional River Suir catchment - only 1 No. crossing of a Class 2 first order stream is required (W65) and there is no requirement to replace the existing culvert at this location; therefore,
- the potential for downstream water quality effects is limited due to small size and low or absent flows with regard to the scale of works within this sub-catchment.
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat.
- Impacts to the watercourse channel are temporary and reversible. The duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible; and
- Separation distance to downstream QI's such as Freshwater Pearl Mussel will avoid any adverse effect.
- Application of comprehensive water quality protection Mitigation Measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all instream works and culvert replacement works (i.e. whether fisheries value or not).

Qualifying Interests:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, are expected.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, Altered structure and vegetative composition are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, & reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2). The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value also within the regional River Suir catchment which will be subject to instream works for both UWF Grid Connection and for Other Elements, with cognisance of works proposed within adjacent tributaries of the affected catchments, but which may not be occurring on the same individual watercourses.

Neither Upperchurch Windfarm, nor UWF Replacement Forestry, nor UWF Other Activities will require any instream works within the regional River Suir catchment (although Upperchurch Hen Harrier Scheme will involve planting and fencing in close proximity to watercourses), and it is therefore evaluated that any cumulative impacts directly or indirectly affecting instream aquatic habitat quality (water quality contamination or sedimentation) will be negligible, with reference to interactions between these elements and the UWF Grid Connection. This evaluation takes cognisance of the Surface Water Management measures in place for Upperchurch Windfarm.

The potential for cumulative effects with UWF Related Works therefore relates to the Suir_SC_030 sub-catchment, where UWF Related Works also occurs and will require instream works. In the Suir_SC_030 sub-catchment, the UWF Grid Connection does not require any instream works, or culvert replacement works to existing culverts on watercourses with fisheries value; while the UWF Related Works will involve instream works on five watercourses (with fisheries value) within the Suir_SC_030 sub-catchment. One of the UWF Related Works (W22) instream works will be within c.20m of UWF Grid Connection crossing W65 (which will not require any culvert replacement works as it is within the road pavement). The temporal extent of both works components is short-term and water quality contamination effects arising from the UWF Grid Connection works are restricted to the duration of the cable trench works only, in the road corridor, and will not overlap temporally with the UWF Related Works at this watercourse crossing point along this road segment (Project Design). In addition, the spatial extent of any potential physical cumulative effects will occur within the footprint of the UWF Related Works instream works, and also downstream within the zone of sediment transport. Therefore, the zone of cumulative effects extends from the watercourse crossing points to the lower end of any waterbody. Due to the limited spatial extent of works associated with the UWF Grid Connection, it is evaluated that the magnitude of any cumulative impacts with regard to interactions with the UWF Related Works to instream aquatic habitat quality will be negligible.

In relation to other projects, the magnitude of cumulative impacts with Curraghduff Quarry is considered to be negligible, given the location of this quarry in a separate local body catchment to the UWF Grid Connection (albeit within the River Suir regional catchment) and the application of mitigation measures to protect the downstream SAC for this other project. Agriculture, forestry and turf-cutting are on-going and form part of the baseline conditions. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- No instream works or culvert replacement works are required for UWF Grid Connection on watercourses of fisheries value arising from works in the Suir_SC_030 sub-catchment.
- potential in-combination with UWF Related Works only relate to small headwater streams (5 No.), all outside the SAC, with works completed during the period July to September and the in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing;
- Application of comprehensive water quality protection measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all instream works and culvert replacement works (i.e. whether fisheries value or not);
- The spatial extent of effects to the watercourse channel is limited to the footprint of instream works or culvert replacement works, and;
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat, and
- Impacts to the watercourse channel are temporary and reversible with reinstatement.
- The duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible.

Other Projects

- Implementation of Mitigation as part of Curraghduff Quarry operation consent;

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- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.
- Qualifying Interests:
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
 - No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
 - No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, are expected.
 - No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, Altered structure and vegetative composition are expected.
 - No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
 - No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, & reductions in water or habitat quality are expected.
 - No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
 - No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
 - No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

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

Element 2: UWF Related Works

Impact Magnitude: Works at, or in close proximity to, watercourses have potential to cause decreases in instream habitat quality directly through instream works and indirectly through sediment laden/contaminated runoff into the watercourse. There are 32 no. watercourse crossings required by the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works. 31 no. of the total 32 no. crossings are located within the Suir SC 030 sub-catchment and 1 no. in the Bilboa SC 010 sub-catchment (excluded from further consideration as the Bilboa is within the regional River Shannon catchment). Of these 31 no. crossings the Suir SC 030 sub-catchment, in-stream works will be required at 25 no. of these locations - 5 No. of which were evaluated as having fisheries value.

The spatial extent of such effects will occur within the footprint of the instream works (direct effects), and also downstream of construction works (indirect water quality effects) within the zone of sediment transport. The closest watercourse crossing to the River Suir SAC however is at least 4.3km (WW15).

Significance of the Impact: No adverse effects on European Site Integrity

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses ((UWF Related Works Project Design Measure));
- The Class 1 and Class 2 watercourses where in-stream works are required (5 No.) are largely small headwater streams and therefore are likely to have relatively low flows during July to September;
- The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing. This will be completed by over pumping, flume (pipe) or channel diversion methods (UWF Related Works Project Design Measure);
- There will be no direct discharge of pumped water into the watercourse during the works (UWF Related Works Project Design Measure));
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat, and
- Impacts to the watercourse channel are temporary and reversible with reinstatement.
- The duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible.

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Element 3: UWF Replacement Forestry
<p>Impact Magnitude: The UWF Replacement Forestry is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment. One Class 1 stream flows through the UWF Replacement Forestry lands. Environmental protection measures which form part of the design of the UWF Replacement Forestry include planting by hand, no use of pesticide or fertilizer, no refuelling or storage of fuels onsite, a 10m water setback are, and the planting and management of the site in accordance with Best Practice.</p>
<p>Significance of the Impact: No adverse effects on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Neutral habitat deterioration impacts arising from the UWF Replacement Forestry, as there is no requirement for instream works and no sources of significant sediment creation as planting will be carried out by hand. • There is no potential for habitat quality impacts, as the riparian strips/grassland adjacent to the existing watercourse will be maintained as part of the forestry layout as a water quality protection measure. • There is no potential for aquatic habitat degradation due to nitrogen deposition, as the new forestry will be a permanent native woodland, therefore no tree-felling/harvesting will be carried out. • There is no potential for acidification effects during the growth stage, as the UWF Replacement Forestry will be deciduous in nature. • There is no risk of pollution events as herbicide or fertilizers will not be used and the use of machinery will be minimal. • There is no risk of aquatic habitat degradation (as a result of nitrogen deposition) as commercial tree felling will not be required – UWF Replacement Forestry will be a permanent native woodland.
Element 4: Upperchurch Windfarm
<p>Impact Magnitude: There is 1 no. watercourse crossing within the Upperchurch Windfarm Site, evaluated as having fisheries value (Class 1, WW2 – within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment). This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Baseline conditions indicated that the aquatic species were present year-round, and works in close proximity to this watercourse were evaluated as being of high magnitude for aquatic species. However, it was identified that significant impacts were not probable/not likely post-mitigation. The 2013 EIS concludes that water quality effects will not be significant</p>
<p>Significance of the Impact: No adverse effects on European Site Integrity</p>
<p>Rationale for Impact Evaluation: A clear-span bridge will be used where a natural stream (Class 1 watercourse) will be crossed and therefore no in-stream works are required;</p> <ul style="list-style-type: none"> • All effects were evaluated as reversible and temporary in the short-term and impacts were associated with construction phase works.
Element 5: UWF Other Activities
<p>Impact Magnitude: The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. There is no potential for aquatic habitat effects within or ex-situ to the River Suir SAC as there are no instream works or sediment creating activities adjacent to watercourses required as a result of UWF Other Activities including Haul Route Activities or the Upperchurch Hen Harrier Scheme (UHHS). The Upperchurch Hen harrier Scheme is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence upstream or ex-situ to the River Suir SAC. The proposed Activities include all environmental protection measures, including measures for invasive species management and monitoring associated with the UHHS; as set out in Appendix 5.6 of the accompanying EIAR (Volume C4). No potential for impacts to aquatic habitats due to tree felling, as no tree felling of conifer plantations is required. Overall magnitude is evaluated as negligible.</p>
<p>Significance of the Impact: No adverse effects on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No requirement for instream works • Implementation of Project Design and Best Practice Environmental Measures
Evaluation of Other Cumulative Impacts – Decrease in instream aquatic habitat quality
Whole UWF Project Effect
<p>Magnitude: The watercourse crossing works required for the UWF Grid Connection (68 No. total) are largely located within the River Shannon catchment (63 No.) while the watercourse crossings required for the</p>

Upperchurch Windfarm (1 No.) and UWF Related Works (32 No. total) are largely located in the Suir SC 030 sub-catchment. For the Whole UWF Project, a potential decrease in aquatic habitat quality due to instream/culvert replacement works is identified at a total of **5 No.** watercourses evaluated as having fisheries value – 0 no. for UWF Grid Connection (as no instream works will occur in the regional Suir catchment) and 5 no. for UWF Related Works. The closest watercourse crossing location as part of Related works is 4.3km upstream hydrologically from the River Suir SAC boundary.

The spatial extent of habitat quality effects arising from Whole UWF Project impacts in the context of the Lower River Suir SAC, due to instream works or water quality contamination, will potentially occur within the footprint of the instream/culvert replacement works, taking account of Project Design measures and implementation of mitigation measures stipulated for individual Project Elements. These effects will be dispersed within the Suir regional catchment – primarily upstream of the European Site. Impact range is located downstream of the lowest point in the waterbody where Whole UWF Project works are required, with reference to the zone of sediment transport.

It is evaluated that the cumulative impact magnitude will be Negligible.

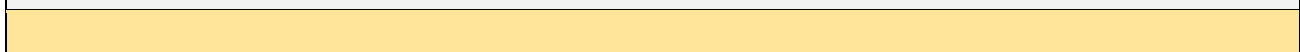
Significance of the Whole Project Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- The presence of sensitive salmonid fish habitat within the works area and protected Annex II (and Annex IV listed) species downstream.
- The low number of watercourses (5 No. in total) with fisheries value and subject to instream/culvert replacement works.
- The spatial extent of effects to watercourse channels will occur within the footprint of the instream works,
- The once off frequency and brief to temporary duration of works within or adjacent to the aquatic habitat.
- Impacts at the works site are temporary and reversible; however, any reduction in habitat quality due to potential downstream siltation effects are considered to be short-term to temporary and not reversible, however;
- This is not considered significant in the context of the conservation objectives around aquatic species and habitat, given the negligible magnitude, project design and separation buffers and distance to the European Site under consideration.

Qualifying Interests

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, are expected.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, Altered structure and vegetative composition are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, & reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.



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

Cumulative Impact Magnitude:

The elements of the Whole UWF Project which are located in the Suir_SC_030 sub-catchment and which have any potential to result in effects on aquatic habitat quality, are essentially UWF Related works, the magnitude of which is evaluated as negligible, given only 5 no. watercourse crossings are required, all of which are located upstream of the SAC and which will be subject to Project Design measures to avoid adverse effects on European Site Integrity.

The magnitude of effects from Curraghduff quarry is evaluated as negligible and from background agriculture, forestry and turbary, negligible.

The overall magnitude of cumulative impact is Negligible taking account of the impact evaluations for the Whole UWF Project and those of the Other Projects and Activities identified in the wider study area, with cognisance of the aquatic sensitivities in the affected catchments.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Suir SAC

Rationale for Cumulative Impact Evaluation:

Whole Windfarm Project:

- The presence of sensitive salmonid fish habitat within the works area and protected Annex II (and Annex IV listed) species within the affected catchments downstream.
- The low number of watercourses (5 No. in total) with fisheries value and subject to instream/culvert replacement works.
- The spatial extent of effects to watercourse channels will occur within the footprint of the instream works,
- The once off frequency and brief to temporary duration of works within or adjacent to the aquatic habitat.
- Impacts at the works site are temporary and reversible; however, any reduction in habitat quality due to potential downstream siltation effects are considered to be short-term to temporary and not reversible, however;
- No adverse effects in the context of the conservation objectives around aquatic species and habitat, given the negligible magnitude, project design and separation buffers and distance to the European Site under consideration.
- Application of comprehensive water quality protection measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all instream works and culvert replacement works (i.e. whether fisheries value or not.

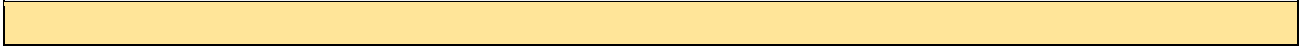
Other Plans or Projects:

- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.
- Implementation of conditioned Mitigation as part of Curraghduff Quarry operation consent

Qualifying Interests:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, are expected.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, Altered structure and vegetative composition are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, & reductions in water or habitat quality are expected.

- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.



3.7.3.1.2 Effects on QI habitats and/or species along Pathways 2, 3, 6 & 8 from changes to flow regime within or ex-situ the Lower River Suir SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> culvert replacement works; movement of soils and machinery; excavation works; new crossing structures</p> <p><u>Cumulative Impact Source:</u> Instream works; new crossing structures;</p> <p><u>Impact Pathway:</u> Surface water; Land cover</p> <p><u>Impact Description:</u> Watercourse morphology relates to the shape of a watercourse channel, its bed and banks and how erosion, transportation of water, sedimentation and the composition of riparian vegetation changes this shape over time. As per Section 11.2.4.3 of the EIAR Chapter 11: Water, direct impacts are identified to channel morphology and geomorphology (bed and banks of watercourses) due to instream works. The potential for indirect effects which would lead to sediment deposition at a scale to alter channel morphology or the flow regime are considered unlikely; with reference to Project Design measures.</p> <p>Aquatic species are likely to be present in fishery value watercourses at instream construction works locations. Any change in watercourse morphology which affects channel flow regimes can result in cross factor effects on aquatic ecological communities. Aquatic species are reliant on instream habitat heterogeneity (riffle/glide/pool structure); along with the availability of peak flow flushes (flood/spate); the provision of flows for upstream/downstream migration and the avoidance of barriers to passage; and avoidance of channel constriction during low flow.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, or an altered hydrological regime. It may also result in secondary effects on prey item species, which may affect the supporting habitat quality for QI Species.</p> <p>In instances where this impact occurs outside or ex-situ the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>Instream works are limited to the individual crossing points and include trenching works for underground cables, installation of temporary or permanent crossing structures and reinstatement works. Works for the UWF Grid Connection also involve the replacement of some existing culverts under public road pavements, with 1 no. culvert (W14 – located in the regional River Shannon catchment) potentially requiring replacement at a watercourse with fisheries value.</p> <p>The creation of adverse flow conditions or habitat limitations due to changes to flow or morphology will be limited to the specific works period within or adjacent to the aquatic habitat.</p> <p>As per project design, culvert replacement works will be subject to reinstatement works which will include site-specific bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles. These measures will be overseen supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.</p> <p>Project Design Measures include the use of culverts at all new permanent watercourse crossings which will be a minimum of 900mm in diameter and will include for the equilibrated reinstatement of flow and the use of diffuser plates where required.</p> <p>Impact Quality: Negative</p>	

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Evaluation the Subject Development Impact – Changes to Flow Regime
<p>Element 1: UWF Grid Connection – direct/indirect impact</p> <p>Impact Magnitude: Works at, or in close proximity to, watercourses have potential to indirectly affect aquatic species and habitats through changes to flow regimes which can be caused directly by morphological changes due to instream works.</p> <p>Approximately 1.5km of the 110kV UGC exists within an upper headwater tributary of the Clodiagh River catchment. There are 5 No. watercourse crossings within the Clodiagh (Tipperary) River catchment (W64-W68), of which 1 No. have fisheries value, which will not require culvert replacement or instream works. Trench and joint bay excavation works in close proximity to watercourses have potential to result in altered flow regime, which can then indirectly affect aquatic habitat quality.</p> <p>Only 1 No. watercourse (WC crossing W65) with fisheries value is located within the regional River Suir SAC catchment, outside the site boundary but upstream hydrologically. No new instream/culvert replacement works are required at this location.</p> <p>The magnitude of effect on the physical instream habitat i.e. watercourse channel morphology, substrate, and flow character is evaluated as Negligible with regard to availability, diversity and quality of habitat supporting aquatic species.</p> <p>Any changes to flow regime due to sedimentation will be negligible with the implementation of Project Design Measures, such as the use of sandbags to avoid the runoff of sediment laden water from construction works areas, the treatment of any water pumped from excavations prior to discharge.</p> <p>Significance of the Impact: No adverse effects on the Integrity of the Lower River Suir SAC</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No requirement for instream works, in watercourses with fisheries value, within the Clodiagh (Tipperary) sub-catchment of the regional River Suir catchment; • Application of comprehensive water quality protection measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all instream works and culvert replacement works (i.e. whether fisheries value or not); • There will be no direct discharge of pumped water into the watercourse during the works (Project Design); • The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat; • Impacts to the watercourse channel are temporary and reversible. The duration of any reductions in the quality of downstream habitats due to siltation and/or altered flow regime are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible; and • It's likely only c.100m of the trench will be excavated in any day with only 1 watercourse crossing being completed in any one day (assumed 1 work crew). Therefore, taking account of the temporary nature and limited locations of the works within the River Suir catchment, all effects will be brief to temporary in nature and reversible. • All watercourse crossings (5 No.) are within the catchment of a single local surface water body of the upper Clodiagh sub-catchment. The majority of these crossings (4 of 5 No.) have no fisheries value and are classified as drains (Class 4 watercourses) and therefore the potential for downstream altered flow regime effects is limited due to small size and low or absent flows; • Only 1 No. crossing of a Class 2 first order stream is required (W65) and there is no requirement to replace the existing culvert at this location; therefore, the potential for downstream flow regime effects is limited due to small size and low or absent flows with regard to the scale of works within this sub-catchment. <p>Qualifying Interests:</p> <ul style="list-style-type: none"> • No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected. • No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.

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- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected. No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

Element 1: UWF Grid Connection – cumulative impact

The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value also within the regional River Suir catchment which will be subject to instream works or works in close proximity to watercourses for both UWF Grid Connection and for Other Elements, with cognisance of works proposed within adjacent tributaries of the affected catchments, but which may not be occurring on the same individual watercourses.

Neither Upperchurch Windfarm nor UWF Replacement Forestry nor UWF Other Activities will require any instream works, and UWF Grid Connection will not require any instream works/culvert replacement works on watercourses with fisheries value in the catchment areas of these Other Elements, therefore there is no potential for effects via instream works. In relation to effects via sedimentation, as per Chapter 11 Water (of the EIAR, Volume C2), it has been evaluated that any sedimentation cause by UWF Replacement Forestry and UWF Other Activities will be negligible and consequently these project elements are not likely to contribute to any changes to flow regimes. The Upperchurch Hen Harrier Scheme, which is part of Other Activities will include riparian habitat enhancement through planting, however this will not result in any negative quality effects. In relation to Upperchurch Windfarm, due to the limited extent of Upperchurch Windfarm works in proximity to UWF Grid Connection works, the predominance of land drains (with no fisheries value) in the windfarm site and due to the implementation of the Sediment & Erosion Control Plan for the windfarm, it is evaluated that any cumulative impacts to flow regime (due to sedimentation) will be negligible.

The potential for cumulative effects with UWF Related Works is limited to the Suir SC 030 sub-catchment, where construction works for both UWF Grid Connection and UWF Related Works will take place within the Clodiagh (Tipperary)_010 local surface water body. The UWF Grid Connection will not require any culvert replacement works on watercourses with fisheries value in the Suir_SC_030 sub-catchment, while UWF Related Works will involve instream works on five watercourses (with fisheries value) within the local surface water body. One watercourse (an unnamed tributary of the Clodiagh Upper) will be subject to instream works for UWF Related Works at WW22, c.20m upstream of the trenching works over an existing public road culvert (W65) for the 110kV UGC; however, there is no spatial or temporal overlap between these works. Furthermore, in the absence of instream works for the trench works for the proposed 110kV UGC works at W65 will not give rise to an alteration to the flow regime at this crossing point. The spatial extent of any cumulative flow regime effects will occur within the footprint of the instream works or culvert replacement works, extending to immediately downstream where hydrological flow character may be altered locally due to bank or river bed modification or hydrological modification works; however, there is no cumulative overlap in physical or spatial extent with regard to the UWF Grid Connection with the UWF Related Works in this respect, and therefore cumulative changes to flow regime due to instream works are not expected.

In relation to other projects, the magnitude of cumulative impacts with Curraghduff Quarry is considered to be negligible, given the quarry is physically isolated from watercourses associated with UWF Grid Connection, and

does not involve works likely to result in altered flow regimes locally or downstream within the River Suir SAC, and the application of mitigation measures to protect the downstream SAC. Agriculture, forestry and turf-cutting are on-going and form part of the baseline conditions. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.

The cumulative magnitude is evaluated as Negligible.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- The absence of instream works (in watercourses with fisheries value) associated with both UWF Grid Connection and UWF Related Works in the same sub-catchment;
- The absence of instream works associated with Upperchurch Windfarm, UWF Replacement Forestry or UWF Other Activities;
- The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture);
- The limited extent of direct instream works potentially affecting flow;
- The sensitive crossing designs to be implemented (Project Design) and other measures such as reinstatement;
- The brief to temporary duration and reversibility of any effects.

Other Projects

- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interests:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.

No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected. No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.



Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 2: UWF Related Works	
<p><u>Impact Magnitude:</u> Works at, or in close proximity to, watercourses have potential to cause changes to flow regime through instream works and indirectly through sediment laden runoff into the watercourse. There are 32 no. watercourse crossings required by the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works. 31 no. of the total 32 no. crossings are located within the Suir_SC_030 sub-catchment and 1 no. in the Bilboa_SC_010 sub-catchment (regional River Shannon SAC catchment). Of these 31 no. crossings the Suir_SC_030 sub-catchment, in-stream works will be required at 25 no. of these locations - 5 No. of which were evaluated as having fisheries value. The closest watercourse crossing to the River Suir SAC however is at least 4.3km (WW15). The spatial extent of changes to flow regime effects will occur within the footprint of the instream works and also <i>immediately</i> downstream where hydrological flow character is altered due to bank or river bed modification. The potential for indirect effects which would lead to sediment deposition at a scale to alter channel morphology or the flow regime are considered unlikely. Instream works in watercourses with fisheries value (5 No.) relate to 3 temporary crossings for Internal Windfarm Cabling trenching works and/or the installation of a temporary crossing structure, while the remaining 2 No. relate to the installation of permanent crossing structures. The spatial extent of any flow regime effects will occur within the footprint of the instream works, and also immediately downstream where hydrological flow character is altered due to bank or river bed modification. The magnitude of impact is negligible on the downstream SAC.</p>	
<u>Significance of the Impact:</u> No adverse effect on European Site Integrity	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure); • The Class 1 and Class 2 watercourses where in-stream works are required are mostly small headwater streams; • The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture); • The limited extent of direct instream works potentially affecting flow, • The sensitive crossing designs developed following consultation with IFI. • The brief to temporary duration and reversibility of any effects. 	
Element 3: UWF Replacement Forestry	
<p><u>Impact Magnitude:</u> The UWF Replacement Forestry is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment. One Class 1 stream flows through the UWF Replacement Forestry lands. Environmental protection measures which form part of the design of the UWF Replacement Forestry include planting by hand, no use of pesticide or fertilizer, no refuelling or storage of fuels onsite, a 10m water setback are, and the planting and management of the site in accordance with Best Practice.</p>	
<u>Significance of the Impact:</u> No adverse effect on European Site Integrity	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Neutral habitat deterioration impacts arising from the UWF Replacement Forestry, as there is no requirement for instream works and no sources of significant sediment creation as planting will be carried out by hand. • There is no potential for altered flow regime impacts, as the riparian strips/grassland adjacent to the existing watercourse will be maintained as part of the forestry layout as a water quality protection measure. • There is no risk of operational alteration to flow regimes as commercial tree felling will not be required – UWF Replacement Forestry will be a permanent native woodland. 	
Element 4: Upperchurch Windfarm	
<p><u>Impact Magnitude:</u> Construction works will take place in close proximity to 1 No. watercourses with fisheries value. No instream works are required at this location and this watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works and preclude direct modification to the flow regime. Changes to flow regime due to sedimentation from nearby construction works will be avoided by the implementation of the Sediment & Erosion Control Plan for the Upperchurch Windfarm during construction works. Magnitude is evaluated as negligible on this basis.</p>	
<u>Significance of the Impact:</u> No adverse effect on European Site Integrity	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No instream works are required on the watercourse crossing within the Upperchurch Windfarm site 	

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<ul style="list-style-type: none"> ● Implementation of the Sediment & Erosion Control Plan
<p>Element 5: UWF Other Activities.</p>
<p><u>Impact Magnitude:</u> The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. There is no potential for aquatic habitat effects within or ex-situ to the River Suir SAC as there are no instream works or sediment creating activities adjacent to watercourses required as a result of UWF Other Activities including Haul Route Activities or the Upperchurch Hen Harrier Scheme (UHHS). The Upperchurch Hen harrier Scheme is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence upstream or ex-situ to the River Suir SAC. This project element will include riparian habitat enhancement through planting; however, this will not result in any negative quality effects on watercourse flow regimes. Overall magnitude is evaluated as negligible.</p>
<p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> ● No requirement for instream works and/or limited works in close proximity to watercourses; ● Absence of negative quality effects from UHHS; ● Implementation of Project Design and Best Practice Environmental Measures
<p>Evaluation of Other Cumulative Impacts – Changes to Flow Regime</p>
<p>Whole UWF Project Effect</p> <p>Cumulative Impact Magnitude: A potential decrease in aquatic habitat via changes to flow regime is identified at 5 No. watercourse crossings where instream works or culvert replacement works are required within watercourses evaluated as having fisheries value – 5 no. for UWF Related Works. . The potential for indirect effects which would lead to sediment deposition at a scale to alter channel morphology or the flow regime are considered unlikely. The spatial extent of such effects will occur within the footprint of the instream works, extending to immediately downstream where hydrological flow character may be altered due to bank or river bed modification, recognising that cumulative effects are widely dispersed within a regional catchment and its respective sub-catchment.</p> <p>Cognisance is also given to Mitigation Measures (UWF Grid Connection) and Project Design measures for the other elements, including reinstatement works and measures for the protection of watercourses during works.</p> <p>Cumulative magnitude is evaluated as Negligible.</p>
<p>Significance of the Whole Project Impact: No adverse effects on the Integrity of the Lower River Suir SAC</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> ● Instream works potentially affecting the flow regime are required at a limited number of locations; half of which require temporary works and half require permanent instream structures. ● Implementation of Project Design Measures at all stream/culvert crossings, instream works and culvert replacement works locations to minimize effects ● Implementation of the sensitive crossing designs developed following consultation with IFI. ● the use of deflector plates, the equilibrated restoration of flow ● Provision of reinstatement works as part of UWF Grid Connection at new permanent crossings/replaced existing culverts culverts under supervision of a member of CIEEM and the Institute of Fisheries Management. <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> ● No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected. ● No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.

- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

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

Cumulative Impact Magnitude:

The magnitude of effect from the Whole UWF Project is essentially in the order of the UWF Related Works project element, based on 5 no. watercourse crossings with fisheries value required works within or in close proximity – with no adverse effects stemming from the UWF Grid Connection on the River Suir SAC. Given the nature of the watercourses present, the works proposed and the implementation of project design measures there is no likelihood for indirect effects occurring which would lead to sediment deposition at a scale to alter channel morphology or the flow regime.

With respect to other plans or projects considered, agriculture, forestry and turfcutting are essentially background trends which are not expected to change, therefore any contrast to baseline conditions in respect of the River Suir SAC is considered unlikely. The considered Curraghduff quarry is physically isolated from watercourses and does not involve works likely to result in altered flow regimes locally or downstream within the River Suir SAC.

Overall cumulative magnitude is evaluated as negligible.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Suir SAC

Rationale for Cumulative Impact Evaluation:

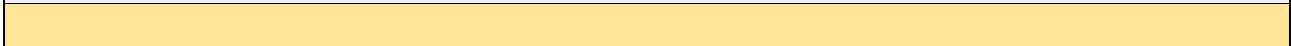
- Whole UWF Project:
- Instream works potentially affecting the flow regime are required at a limited number of locations; half of which require temporary works and half require permanent instream structures.
- Implementation of Project Design Measures at all stream/culvert crossings, instream works and culvert replacement works locations to minimize effects
- Implementation of the sensitive crossing designs developed following consultation with IFI.
- Provision of reinstatement works at new permanent crossings/replaced existing culverts including: site-specific bank stabilization measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels where necessary; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles.

Other Plans or Projects:

- Separation of quarry from watercourses affected by element of the Whole UWF Project,
- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interests:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected. No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.



3.7.3.1.3 Effects on QI habitats and/or species along Pathways 2, 3, 6 & 8 from Riparian habitat degradation within or ex-situ the Lower River Suir SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> instream works, culvert replacement works; movement of soils and machinery; excavation works; reinstatement works</p> <p><u>Cumulative Impact Source:</u> Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Reinstatement</p> <p><u>Impact Pathway:</u> Soils; Direct contact</p> <p><u>Impact Description:</u> The riparian corridor along a watercourse relates to the interface between the aquatic habitat, the bankside vegetation and terrestrial environment. An intact, semi-natural riparian zone has significant beneficial services in the protection of instream aquatic habitat quality, food/nutrient contributions, and temperature regulation. Existing riparian habitat quality within the study area is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works.</p> <p>The removal of, or damage to, riparian vegetation during instream works or excavation/ground clearance works in close proximity to any watercourse has the potential to impact on the quality of riparian habitats which in turn can affect watercourse morphology, shading, bank stability, and nutrient and sediment loading and result in indirect effects on aquatic species.</p> <p>The magnitude of resultant effects is expected to be higher when this occurs within an SAC as to without, given that effects are naturally localised. However downstream effects may occur to European Sites where suitable connectivity exists especially if riparian habitat degradation ex-situ leads to increased downstream sediment loads, or sufficiently affects upstream spawning habitats etc. which in effect support downstream SAC qualifying interests.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, altered fringing habitat and riparian vegetation such as required for Freshwater Pearl Mussel and Floating River Vegetation, or an altered hydrological regime. It may also result in secondary effects on prey item species, which may affect the supporting habitat quality for QI Species.</p> <p>In instances where this impact occurs outside or ex-situ the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>Impact Quality: Negative</p>	
Evaluation the Subject Development Impact – Riparian habitat degradation	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u> Approximately 1.5km of the 110kV UGC exists within an upper headwater tributary of the Clodiagh River catchment and hence the River Suir SAC regional catchment. There are 5 No. watercourse crossings within the Clodiagh (Tipperary) River catchment (W64-W68), of which 1 No. have fisheries value, which will not require culvert replacement or instream works.</p> <p>Remaining works required are at existing watercourse crossing locations which have low/none fisheries value, and the impact magnitude of riparian habitat degradation on aquatic ecological receptors is evaluated as negligible in the context of the downstream River Suir SAC.</p>	
Significance of the Impact: No adverse effects on the Integrity of the Lower River Suir SAC	
<u>Rationale for Impact Evaluation:</u>	

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- No damage or removal of riparian habitat during cabling works at the 1 No. watercourse with fisheries value – cables will be installed either under or over the watercourse with all works taking place from paved road surfaces.
- No works in the verges or in any watercourse habitat.

Qualifying Interests:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
 - No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
 - No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, increased grazing and /or disturbance.
 - No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition are expected.
 - No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
 - No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, reductions in water or habitat quality are expected.
 - No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected. No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value also within the regional River Suir catchment which will be subject to instream works or works in close proximity to watercourses for both UWF Grid Connection and for Other Elements, with cognisance of works proposed within adjacent tributaries of the affected catchments, but which may not be occurring on the same individual watercourses – and which are expected to cause degradation of riparian habitat.

There are 5 No. watercourse crossings within the Clodiagh (Tipperary) River catchment (W64-W68), of which 1 No. have fisheries value, which will not require culvert replacement or instream works.

Neither Upperchurch Windfarm nor UWF Replacement Forestry nor UWF Other Activities will require any instream works, and as UWF Grid Connection will not require any instream works/culvert replacement works on watercourses with fisheries value in the catchment areas of these Other Elements, therefore there is no potential for cumulative effects via instream works. The Upperchurch Hen Harrier Scheme, which is part of Other Activities will include riparian habitat enhancement through planting, however this will not result in any negative quality effects.

The potential for cumulative effects with UWF Related Works is limited to the Suir_SC_030 sub-catchment, where construction works for both UWF Grid Connection and UWF Related Works will take place within the Clodiagh (Tipperary)_010 local surface water body. The UWF Grid Connection will not require any culvert replacement works on watercourses with fisheries value in the Suir_SC_030 sub-catchment, while UWF Related Works will involve instream works on five watercourses (with fisheries value) within the local surface water body. One watercourse (an unnamed tributary of the Clodiagh Upper) will be subject to instream works for UWF Related Works at WW22, c.20m upstream of the trenching works over an existing public road culvert (W65) for the 110kV UGC; however, there is no spatial or temporal overlap between these works. Furthermore, in the absence of instream works for the trench works for the proposed 110kV UGC works at W65 will not give rise to degradation of riparian habitat at this crossing point. The spatial extent of any cumulative riparian habitat effects will occur within the footprint of

the instream works or culvert replacement works, extending to *immediately* downstream however, there is no cumulative overlap in physical or spatial extent with regard to the UWF Grid Connection with the UWF Related Works in this respect, and therefore cumulative changes to riparian habitat due to instream works are not expected.

In relation to other projects, the Curraghduff quarry is physically isolated from watercourses affected by the UWF Grid Connection and does not involve instream works and therefore cumulative impacts on the downstream SAC are considered to be negligible. With respect to agriculture, forestry and turf-cutting, these activities are essentially background trends which are not expected to change, therefore any contrast to baseline conditions in respect of the River Suir SAC is considered unlikely.

Overall magnitude is negligible.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- Riparian habitat impacts that may affect aquatic ecology (e.g. Otter) and fisheries receptors are limited to discrete locations, with
- no new instream works/culvert replacement works on watercourses with fisheries value required for UWF Grid Connection,
- no instream works on watercourses with fisheries value associated with Upperchurch Windfarm, UWF Replacement Forestry or UWF Other Activities, and
- no spatial or temporal overlap between UWF Grid Connection and UWF Replacement Works.

Other projects

- Separation of quarry from watercourses affected by UWF Grid Connection,
- No instream works, and implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interests:

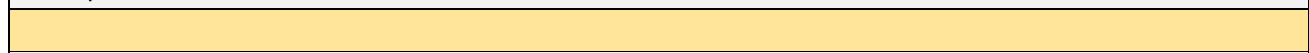
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected. No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

<p>Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project</p>
<p>Element 2: UWF Related Works</p> <p><u>Impact Magnitude:</u> Riparian habitat will be affected at 6 No. watercourse crossings identified as having fisheries value, out of a total of 32 watercourse crossings within the construction works area boundary associated with the UWF Related Works. All works are >4km from the River Suir SAC.</p> <p>The duration of any loss of well-structured riparian habitat impacts will be temporary to short-term, limited to the construction phase and early operational stage until vegetation has re-established.</p> <p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity.</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations at watercourse crossing locations within minor watercourses; • The general context of the watercourses affected comprises managed agricultural lands and open uplands with poorly-developed riparian habitat, where well-developed riparian habitat occurs it comprises willow species which regenerate quickly; • Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible; • Riparian habitat impacts will be limited to the construction phase, reversible with reinstatement, temporary and short-term and in line with baseline conditions. Bank works are required at watercourse crossing locations; alternatives to riparian clearance are not available.
<p>Element 3: UWF Replacement Forestry</p> <p><u>Impact Magnitude:</u> The UWF Replacement Forestry is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment. One Class 1 stream flows through the UWF Replacement Forestry lands. Environmental protection measures which form part of the design of the UWF Replacement Forestry include planting by hand, no use of pesticide or fertilizer, no refuelling or storage of fuels onsite, a 10m water setback are, and the planting and management of the site in accordance with Best Practice. Magnitude is negligible.</p> <p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity.</p> <p>Rationale for Impact Evaluation: no requirement for instream works no risk of operational alteration to riparian habitat as commercial tree felling will not be required – UWF Replacement Forestry will be a permanent native woodland.</p>
<p>Element 4: Upperchurch Windfarm</p> <p><u>Impact Magnitude:</u> As per the 2013 EIS, 1 No. watercourse with fisheries value will be crossed. The crossing method will utilise a clear span bridge design, which will avoid the requirement for instream works; however, works within the riparian zone will be required.</p> <p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity.</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No requirement for instream works on fisheries value watercourses • Limited scale of works within the riparian corridor at the 1 no. stream crossing • All effects were evaluated as reversible and temporary in the short-term; • Riparian habitats within the Upperchurch Windfarm which are directly affected by construction works were not identified as being of significant conservation value.
<p>Element 5: UWF Other Activities</p> <p><u>Impact Magnitude:</u> The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities.</p> <p>There is no potential for riparian habitat effects within or ex-situ to the River Suir SAC as there are no instream works or sediment creating activities adjacent to watercourses required as a result of UWF Other Activities such as Haul Route Activities. The Upperchurch Hen harrier Scheme is located within the Clodiagh (Tipperary) River sub-catchment of the</p>

<p>River Suir regional catchment, hence upstream or ex-situ to the River Suir SAC. This project element will include riparian habitat enhancement through planting; however, this will not result in any negative quality effects on watercourse flow regimes. Overall magnitude is evaluated as negligible.</p>
<p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity.</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No requirement for instream works and/or limited works in close proximity to watercourses; • Absence of negative quality effects from UHHS; • Implementation of Project Design and Best Practice Environmental Measures;
<p>Evaluation of Other Cumulative Impacts – Riparian habitat degradation</p>
<p>Whole UWF Project Effect</p>
<p>Cumulative Impact Magnitude: Riparian habitat will be affected at 5 No. watercourses with fisheries value for UWF Related Works, and 1 No. watercourse with fisheries value for Upperchurch Windfarm which will be associated with bankside works, instream works or culvert replacement works. The cumulative impact magnitude of the whole project on the riparian and bankside habitats within the Suir regional catchments is evaluated as Negligible.</p>
<p>Significance of the Whole Project Impact: No adverse effects on the Integrity of the Lower River Suir SAC</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The limited extent of instream works, within defined works areas will reduce the potential spatial area. • The Class 1 and Class 2 watercourses where in-stream works are required are small, first order streams and therefore are likely to have relatively low flows during July to September which will enable easier access; • Existing riparian habitat quality within the works areas, which comprise the baseline for evaluation of impact significance, is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works. • Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations, limited to the direct footprint of the temporary works areas; alternatives to temporary riparian clearance are not available. • The duration of the impact are generally once-off, restricted to the period of works within or adjacent to the aquatic habitat; relate to individual watercourses and are thus not subject to sequential project effects. • Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible.
<p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected. • No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected. • No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure are expected. • No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition are expected. • No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected. • No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, reductions in water or habitat quality are expected. • No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected. • No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.

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● No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.



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

Impact Magnitude:
 Whole UWF Project magnitude is based on Riparian habitat being affected at **5 No.** watercourses with fisheries value for UWF Related Works, and **1 No.** watercourse with fisheries value for Upperchurch Windfarm which will be associated with bankside works, instream works or culvert replacement works. The cumulative impact magnitude of the whole project on the riparian and bankside habitats within the Suir regional catchments is evaluated as Negligible. Magnitude of effects from other plans or projects is also negligible.
 With respect to other plans or projects considered, agriculture, forestry and turfcutting are essentially background trends which are not expected to change, therefore any contrast to baseline conditions in respect of the River Suir SAC is considered unlikely. The considered Curraghduff quarry is physically isolated from watercourses and does not involve works likely to result in riparian habitat degradation locally or downstream within the River Suir SAC. Overall cumulative magnitude is negligible.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Suir SAC

Rationale for Cumulative Impact Evaluation:

Whole UWF Project:

- The limited extent of instream works, within defined works areas will reduce the potential spatial area.
- The Class 1 and Class 2 watercourses where in-stream works are required are small, first order streams and therefore are likely to have relatively low flows during July to September which will enable easier access;
- Existing riparian habitat quality within the works areas, which comprise the baseline for evaluation of impact significance, is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works.
- Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations, limited to the direct footprint of the temporary works areas; alternatives to temporary riparian clearance are not available.
- The duration of the impact are generally once-off, restricted to the period of works within or adjacent to the aquatic habitat; relate to individual watercourses and are thus not subject to sequential project effects.
- Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible.

Other plans or Projects:

- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interests:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition, changes to physical structure are expected.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, reductions in water or habitat quality are expected.

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- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

3.7.3.1.4 Effects on QI habitats and/or species along Pathways 2, 3, 6 & 8 from the Spread of Invasive Aquatic Species within or ex-situ the Lower River Suir SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
Impact Source: instream works; culvert replacement works; excavation works, movement of soils and machinery	
Cumulative Impact Source: Instream works; Excavation works, movement of soils and machinery	
Impact Pathway: Surface water; Movement of soils and machinery	
<p><u>Impact Description:</u> Invasive aquatic species include non-native, terrestrial invasive species such as Japanese knotweed or Himalayan balsam, invasive riparian vegetation (such as Japanese knotweed) and also fish and mobile invertebrate fauna (such as Asian clam, Signal crayfish, or non-native shrimp species). Aquatic invasive species may be introduced to unaffected catchments or spread within infected watercourses during the course of instream works or transported via excavated material by site machinery.</p> <p>Aquatic invasive species have the potential for significant ecosystem disturbance, disrupting the predator/prey balance or causing habitat disruption within aquatic systems. The spread of aquatic invasive species is not restricted in extent to the footprint of construction/instream works, but can be transported both upstream (mobile species and 3rd party transport) and downstream (hydrological transport) within a watercourse, potentially extending throughout the catchment.</p> <p>Non-native, invasive species potentially affecting the aquatic environment can also include terrestrial species which compromise bank integrity, riparian structural diversity and riparian invertebrate production contributing to habitat diversity and feeding inputs within the aquatic system.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, an altered hydrological regime and through secondary effects on prey item species, affect the supporting habitat quality for QI Species. Specific Qualifying Interests of the Lower River Suir SAC such as Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340], <i>Taxus baccata</i> woods of the British Isles [91J0], or White-clawed Crayfish have Conservation Objective attributes and targets around preventing increases in the presence of negative indicator species, often invasive alien species.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>The management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plan which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided.</p>	
Impact Quality: Negative	
Evaluation the Subject Development Impact – Spread of Aquatic Invasive Species	
Element 1: UWF Grid Connection – direct/indirect impact	
<p>Impact Magnitude:</p> <p>There is the potential for introduction of non-native, invasive species at all 5 No. watercourse crossing points associated with the 110kV UGC works within the River Suir SAC regional catchment, due to the carrying out of works at or in close proximity to watercourses, and due to the movement of machinery over watercourses at existing road crossings; these include the transport, spread or introduction of terrestrial invasive species such as Japanese knotweed or Himalayan balsam, where these species occur widely within the study area. The potential for introduction of aquatic invasive species including mobile invertebrate fauna (such as Asian clam, Signal</p>	

crayfish, or non-native shrimp species) or invasive riparian vegetation (such as Japanese knotweed), is limited to the instream works areas of which there is just 1 No. (Class 4 drain) within the River Suir regional catchment. All watercourse crossing location within the River Suir regional catchment are located outside and upstream of the SAC boundary.

The management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plan which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided.

Significance of the Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, spread of aquatic invasive species is evaluated as non-reversible; however
- the implementation of the Invasive Species Management Plan and adherence to best practice Biosecurity Protocols (IFI, 2010) will ensure that there is no likelihood of this effect occurring.

Qualifying Interests:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition *including increases in non-native species of >1%*, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat *Taxus baccata* woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition *including increases in negative indicator species* are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, increases in disease such as Crayfish Plague, increased negative indicator species (Alien Crayfish Species) & reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: There is potential for the spread of invasive species either along the riparian corridor, or within the aquatic environment, at the 5 No. watercourse crossing points (W64-W68) associated with UWF Grid Connection where it is located within the regional River Suir catchment, due to the carrying out of works at or in close proximity to watercourses, and due to the movement of machinery over watercourses along the road verge, where existing infestations of negative species occur (e.g. Japanese knotweed, Himalayan balsam, etc.). The risk of the spread of invasive species is increased where additional works due to the Other Elements take place within a local catchment area, where these works (or traffic associated with these works) will occur within or in close proximity to watercourses. UWF Grid Connection works will occur in the same catchment as the UWF Related Works and the consented Upperchurch Windfarm in the Bilboa SC 010 and the Suir SC 030 sub-catchments. The Suir SC 030 sub-catchment also has potential to be affected by works for UWF Replacement

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Forestry. Works within The Bilboa are excluded from consideration as they are located within the regional Lower River Shannon SAC catchment.

In the Suir SC 030 sub-catchment, works for UWF Grid Connection will take place at or in close proximity (20m) to 5 No. watercourses, with works at 26 No. watercourse within the sub-catchment also required for UWF Related Works and works close to 1 No. watercourse required for Upperchurch Windfarm. The cumulative impact magnitude for the Suir River catchment is evaluated as Low.

However all watercourse crossing location within the River Suir regional catchment are located outside and upstream of the SAC boundary and the implementation of the Invasive Species Management Plan for UWF Grid Connection and UWF Related Works, including best practice biosecurity protocols (IFI, 2010), and the implementation of best practice measures for Upperchurch Windfarm, will ensure that there is no likelihood of this effect occurring.

In relation to Other Projects: Curraghduff Quarry and background Agriculture, forestry and Turf-cutting: it is assumed that the proposed Curraghduff Quarry will be conditioned to be implement Best Practice invasive species control measures to prevent the spread of invasive species by the development to ensure compliance with legislative requirements, and in line with the measures set out in the submitted NIS. Agriculture, forestry and turf cutting are on-going and form part of the baseline conditions. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible

Overall cumulative magnitude is evaluated as Low.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, the spread of aquatic invasive species is evaluated as non-reversible.
- The limited location of the UWF Grid Connection predominately in a separate catchment to the Other Elements of the Whole UWF Project, with much less of the project located within the Lower River Suir SAC regional catchment;
- The implementation of the Invasive Species Management Plan for UWF Grid Connection will prevent the UWF Grid Connection contributing to any effects from Other Elements or Other Projects.

Other Projects

- The operation of the potential future quarry (currently in the planning system) and its associated elements, will be obliged to meet its statutory requirements with regard to the introduction or spread of invasive species as set out in the birds and habitats regulations- with specific reference to species listed in Annex III of those regulations.
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting

Qualifying Interests:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition *including increases in non-native species of >1%*, changes to physical structure, increased grazing and /or disturbance.

- No effects on QI Habitat *Taxus baccata* woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition *including increases in negative indicator species* are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, increases in disease such as Crayfish Plague, increased negative indicator species (Alien Crayfish Species) & reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

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

Element 2: UWF Related Works

Impact Magnitude:
There is the potential for introduction of non-native, invasive aquatic species at 31 No. watercourse crossings associated with the UWF Related Works within the Suir_SC_030 sub-catchment.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, the spread of aquatic invasive species is evaluated as non-reversible, however;
- The implementation of the Invasive Species Management Plan, including best practice biosecurity protocols (IFI, 2010) will ensure that there is no likelihood of this effect occurring.

Element 3: UWF Replacement Forestry

Impact Magnitude:
The UWF Replacement Forestry is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment. One Class 1 stream flows through the UWF Replacement Forestry lands. Environmental protection measures which form part of the design of the UWF Replacement Forestry include planting by hand, no use of pesticide or fertilizer, no refuelling or storage of fuels onsite, a 10m water setback are, and the planting and management of the site in accordance with Best Practice. Magnitude is negligible.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- Neutral habitat deterioration impacts arising from the UWF Replacement Forestry, as there is no requirement for instream works and no sources of significant invasive species introduction as planting will be carried out by hand.
- There is no risk of operational alteration via the introduction of invasive species is avoided as commercial tree felling will not be required – UWF Replacement Forestry will be a permanent native woodland.

Element 4: Upperchurch Windfarm

Impact Magnitude:
There is the potential for introduction of non-native, invasive aquatic species at the 1 No. watercourse crossing associated with the Upperchurch Windfarm works.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- The Upperchurch Windfarm impacts were evaluated as being of high magnitude for aquatic species, in the absence of mitigation. However, it was identified that significant impacts were not probable/likely.

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<ul style="list-style-type: none"> ● Baseline conditions indicated that the aquatic species were present year-round and impacts were associated with construction phase works. ● All effects were evaluated as reversible and temporary in the short-term; however, in the case of potential spread of aquatic invasive species, there is the potential for long-term, irreversible impacts, ● Best practice biosecurity and invasive species control measures will be implemented during construction works to prevent the spread of invasive species, which will meet regulatory requirements.
<p>Element 5: UWF Other Activities</p>
<p>Impact Magnitude:</p> <p>The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. There is no potential habitat effects via the introduction of invasive species within or ex-situ to the River Suir SAC as there are no instream works or activities adjacent to watercourses required as a result of UWF Other Activities such as Haul Route Activities. The Upperchurch Hen harrier Scheme is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence upstream or ex-situ to the River Suir SAC. This project element will include riparian habitat enhancement through planting; however, this will not result in any negative quality effects on the aquatic environment through the introduction of invasive species.</p> <p>All activities will proceed in line with Best Practice measures for the prevention of the introduction or spread of invasive species. The proposed Activities include all environmental protection measures, including measures for invasive species management; as set out in Appendix 5.6 of the accompanying EIAR (volume C4). No potential for impacts to aquatic habitats due to tree felling, as no tree felling of conifer plantations is required.</p> <p>Overall magnitude is evaluated as negligible.</p>
<p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> ● Absence of pathways from activities to the River Suir SAC, and; ● Implementation of measures in respect of invasive species management and monitoring.
<p>Evaluation of Other Cumulative Impacts – Spread of Aquatic Invasive Species</p>
<p>Whole UWF Project Effect</p>
<p>Cumulative Impact Magnitude:</p> <p>There is the potential for introduction of non-native, invasive aquatic species at 37 No. watercourse crossing works locations, within the River Suir SAC regional catchment, associated with the Whole UWF Project. The impact magnitude is evaluated as Medium due to the presence of invasive species in the study area, established as the baseline condition and thus contributing to the risk of spread where infestations from one location to another.</p> <p>However all watercourse crossing locations are located outside and upstream of the SAC boundary and the management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plans for both UWF Grid Connection (which includes for Upperchurch Windfarm) and UWF Related Works which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided.</p>
<p>Significance of the Whole Project Impact: No adverse effects on the Integrity of the Lower River Suir SAC</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> ● The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication. ● In this respect, the spread of aquatic invasive species are evaluated as non-reversible, however ● The implementation of the Invasive Species Management Plan for UWF Grid Connection and UWF Related Works, including best practice Biosecurity Protocols (IFI, 2010), and the implementation of best practice measures for Upperchurch Windfarm will ensure that there is no likelihood of this effect occurring. <p><u>Qualifying Interests</u></p> <ul style="list-style-type: none"> ● No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.

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- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition *including increases in non-native species of >1%*, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat *Taxus baccata* woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition *including increases in negative indicator species* are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, increases in disease such as Crayfish Plague, increased negative indicator species (Alien Crayfish Species) & reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

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

Cumulative Impact Magnitude:

There is the potential for introduction of non-native, invasive aquatic species at 37 No. watercourse crossing works locations, associated with the Whole UWF Project. The impact magnitude is evaluated as Medium due to the presence of invasive species throughout the study area, established as the baseline condition and thus contributing to the risk of spread where infestations from one location to another.

With regard to Other projects, it is considered that Curraghduff Quarry is to be operated in line with statutory obligations around Best Practice in the eradication and treatment of invasive species. Similarly the effects from agriculture, turbary and forestry are evaluated as negligible in magnitude as no contrast is expected in the context of background trends.

However the management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plans for both UWF Grid Connection (which includes for Upperchurch Windfarm) and UWF Related Works which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided, and therefore it is considered that this impact is unlikely to occur.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Suir SAC

Rationale for Cumulative Impact Evaluation:

Whole UWF Project:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the Whole UWF Project, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, the spread of aquatic invasive species are evaluated as non-reversible, however
- The implementation of the Invasive Species Management Plan for UWF Grid Connection and UWF Related Works, including best practice biosecurity protocols (IFI, 2010), and the implementation of best practice measures for Upperchurch Windfarm, will ensure that there is no likelihood of this effect occurring.

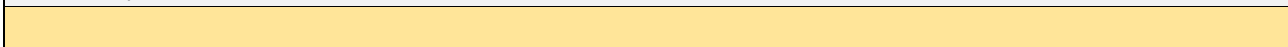
- In addition, the construction of the other projects under consideration, will be obliged to meet the requirements set out in any described EMP, in addition to its statutory requirements with regard to the introduction or spread of invasive species as set out in the European Communities (Birds and Natural Habitats) Regulations 2011, with specific reference to species listed in Annex III of those regulations.

Other Plans or Projects:

- The operation of the consented quarry and its associated elements, will be obliged to meet its statutory requirements with regard to the introduction or spread of invasive species as set out in the birds and habitats regulations- with specific reference to species listed in Annex III of those regulations.
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interests:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition *including increases in non-native species of >1%*, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition *including increases in negative indicator species* are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, increases in disease such as Crayfish Plague, increased negative indicator species (Alien Crayfish Species) & reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, accessibility to watercourses, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.



3.7.3.2 Evaluation of SAC Impacts 4, 5 & 7

3.7.3.2.1 Effects on QI species (Fisheries and Other Species) along Pathways 4 from Direct mortality, within or ex-situ the Lower River Suir SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> culvert replacement works; operating machinery; excavation works; reinstatement</p> <p><u>Cumulative Impact Source:</u> Instream works, operating machinery; excavation works; reinstatement</p> <p><u>Impact Pathway:</u> Direct contact;</p> <p><u>Impact Description:</u></p> <p>Although Fish are likely to mobilise outside of their territories due to human disturbance, and return once the disturbance effect diminishes some individuals may remain, and in the absence of intervention be subject to contact related pathways for mortality. Aquatic invertebrates are less sensitive to mortality arising from works/human activity and are scoped out from evaluation of mortality related effects. The extent of mortality of aquatic QI ecological receptors, i.e. fish, will be limited to the direct footprint of any instream works within watercourses which support anadromous Atlantic salmon and resident Brown trout populations – i.e. Class 1 or Class 2 watercourses. Any mortality is irreversible.</p> <p>Instream works and machinery operation within or in close proximity to any (i.e. <i>ex-situ</i>) upstream, hydrologically connected watercourse, has the potential to directly injure or kill salmonid fish and aquatic species within fish-bearing streams, which in turn interact with the natural functions of the downstream SAC.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as distribution and numbers of adults and/or juveniles and through secondary effects on prey item species, affect the supporting habitat quality or in some instances the availability of host or prey item species, for other QI Species.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>Impact Quality: Negative</p>	
Evaluation the Subject Development Impact – Direct Mortality	
Element 1: UWF Grid Connection – direct/indirect impact	
<p>Impact Magnitude:</p> <p>Direct mortality of aquatic ecological receptors, including fish, will be limited to the footprint of any instream works or culvert replacement works and construction works adjacent to watercourses and over existing crossing structures.</p> <p>No instream works (within watercourses with fisheries value) are proposed within the Lower River Suir SAC. In the Suir_SC_030 sub-catchment, upstream from the River Suir SAC, the UWF Grid Connection does not require any instream works, or culvert replacement works to existing culverts on watercourses with fisheries value. Magnitude is considered to be negligible.</p>	
Significance of the Impact: No adverse effects on the Integrity of the Lower River Suir SAC	
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No instream works will take place within the SAC; • No instream works (in watercourses with fisheries value) will take place, upstream of the SAC, but within the regional sub-catchment of the SAC. <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, host species are expected. 	

- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, supporting habitat quality (including fish biomass) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2) where instream works will occur. The potential for UWF Grid Connection to cause mortality effects in the Suir_SC_030 is limited to 1 No. watercourse (W65 -14km upstream from the SAC) with fisheries value, where works will only involve trenching works in the public road over an existing culvert, and no new instream or culvert replacement works will be required at this location. No instream works (in Class 1 or Class 2 watercourses with fisheries value) are proposed within the River Suir SAC regional catchment as part of UWF Grid Connection works. Nor will there be any temporal overlap between works at the UWF Grid Connection crossing locations and UWF Related Works instream works (Project Design). This minimises the potential for cumulative mortality effects caused by UWF Grid Connection. Therefore, the magnitude of any cumulative effects will be Negligible.

In relation to other projects, the magnitude of any potential cumulative effects is evaluated as negligible due to spatial separation from Curraghduff Quarry, with agriculture, forestry and turf-cutting on-going and form part of the baseline conditions, with no material changes in practices expected or planned in the area.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- The UWF Grid Connection will not require any culvert replacement works for watercourses of fisheries value in the Suir_SC_030 sub-catchment;
- Limited instream works associated with other elements

Other Projects

- Separation of quarry from watercourses affected by UWF Grid Connection,
- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interests:

- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, host species are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, supporting habitat quality (including fish biomass) are expected.

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

Element 2: UWF Related Works

Impact Magnitude:

Of the 31 No. watercourse crossings within the UWF Related Works construction works area boundary (in the River Suir catchment), **6 No.** have been evaluated to have fisheries value. Of these 6 No. watercourses, 5 No. will be subject to instream works (the remaining 1 no. crossing WW2 will use a clear span structure (part of Upperchurch Windfarm works) with no requirement for instream works). None of the 31 no. watercourse crossings referenced are within the SAC, and the closest is 4.3km hydrologically upstream. Any fish present are likely to be exposed to mortality pathways for between 1 – 2 days during instream works. The frequency of these disturbance effects is once for half of the locations (cables

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trenches with or without new permanent culverts) and twice for the remaining locations (temporary culverts; once for installation and once for removal). However, Project Design measures will be implemented to translocate fish prior to instream works.
<u>Significance of the Impact:</u> No adverse effect on European Site Integrity
Rationale for Impact Evaluation: <ul style="list-style-type: none"> ● In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure); ● The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure); ● All fish will be translocated to suitable habitat in immediate proximity downstream, within the same watercourse prior to works (Project Design Measure); ● The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure);
Element 3: UWF Replacement Forestry
Impact Magnitude: No instream works will take place as part of Replacement Forestry
<u>Significance of the Impact:</u> No adverse effect on European Site Integrity
Rationale for Impact Evaluation: <ul style="list-style-type: none"> ● Absence of Pathways
Element 4: Upperchurch Windfarm
Impact Magnitude: None: 1 No. watercourse with fisheries value occurs within the footprint of the Upperchurch Windfarm site. This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Mortality effects are limited to the construction works for the new bridge along with the subsequent use of the new bridge throughout the construction period.
<u>Significance of the Impact:</u> No adverse effect on European Site Integrity
Rationale for Impact Evaluation: <ul style="list-style-type: none"> ● The Upperchurch Windfarm impacts were evaluated as being of high magnitude for aquatic species; however, it was identified that significant impacts were not probable/likely post-mitigation. A clear-span bridge will be used at WW2 and therefore no in-stream works are required; no mortality is envisaged.
Element 5: UWF Other Activities
<u>Impact magnitude:</u> The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. There is no potential for aquatic receptor mortality effects within or ex-situ to the River Suir SAC as there are no instream works required as a result of UWF Other Activities including Haul Route Activities or the Upperchurch Hen Harrier Scheme (UHHS). No potential for mortality effects to aquatic receptors due to the small scale of activities and no activities within the riparian corridor of Class 1 or Class 2 watercourses. The Upperchurch Hen harrier Scheme is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence upstream or ex-situ to the River Suir SAC. No potential exists for mortality related impacts to aquatic receptors, as there are no instream works or activities adjacent to watercourses required as a result of UWF Other Activities. Overall magnitude is evaluated as negligible.
<u>Significance of the Impact:</u> No adverse effect on European Site Integrity
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> ● Absence of pathways for mortality.
Evaluation of Other Cumulative Impacts – Mortality
Whole UWF Project Effect
<u>Cumulative Impact Magnitude:</u> Direct mortality of aquatic ecological receptors, including fish, will be limited to the footprint of any instream works or culvert replacement works and directly upstream and downstream of all crossings, temporary and permanent instream works structures, bank-side works and construction works adjacent to watercourses and over existing crossing structures.

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The potential for the Whole UWF Project to cause effects relates to those watercourses with fisheries value which will be subject to instream works or works in close proximity for UWF Grid Connection, Upperchurch Windfarm and UWF Related Works. In total there are **5 No.** instream works locations (all UWF Related Works), where instream works in fish-bearing streams are required, all of which will be sensitive to disturbance. However, at the local level in the context of individual receptors, mortality will be limited to the affected stretch of watercourse, without cumulative population-level impacts at a watercourse or catchment level. Neither UWF Replacement Forestry nor UWF Other Activities will require any instream works, and works in close proximity will be small in scale; it is therefore evaluated that the magnitude of any cumulative mortality impacts will be negligible. In addition, Project Design Measures will avoid mortality of aquatic receptors.

Significance of the Whole Project Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure);
- The in-stream works will not be undertaken without isolation of flow within the watercourse, and the translocation of fish, prior to the in-stream works commencing (Project Design Measure);

The low number of watercourses (5 No. in total) with fisheries value and subject to instream/culvert replacement works. Qualifying Interests;

- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, host species are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, supporting habitat quality (including fish biomass) are expected.

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

Cumulative Impact Magnitude:

In total there are **5 No.** instream works locations where instream works in fish-bearing streams are required for elements of the Whole UWF Project (all UWF Related Works), all of which will be sensitive to Mortality. However, at the local level in the context of individual receptors, mortality will be limited to the affected stretch of watercourse, without cumulative population-level impacts at a watercourse or catchment level. Project Design Measures will avoid mortality of aquatic receptors.

In relation to other projects, the magnitude of any potential cumulative effects is evaluated as negligible due to spatial separation from Curraghduff Quarry, with agriculture, forestry and turf-cutting on-going and form part of the baseline conditions, with no material changes in practices expected or planned in the area.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

Whole UWF Project:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure);
- The in-stream works will not be undertaken without isolation of flow within the watercourse, and the translocation of fish, prior to the in-stream works commencing (Project Design Measure);
- The low number of watercourses (5 No. in total) with fisheries value and subject to instream works.

Other Plans or Projects:

- Separation of quarry from watercourses affected by UWF Grid Connection,
- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interests;

- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, host species are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, supporting habitat quality (including fish biomass) are expected.

3.7.3.2.2 Effects on QI species (Fisheries and Other Species) along Pathways 5 & 7 from Disturbance or Displacement within or ex-situ the Lower River Suir SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> culvert replacement works; operating machinery; excavation works; noise and human disturbance; reinstatement works</p> <p><u>Cumulative Impact Source:</u> Instream works, operating machinery; excavation works; noise and human disturbance; reinstatement</p> <p><u>Impact Pathway:</u> Surface water; Direct contact; Ground and air vibrations</p> <p><u>Impact Description:</u> Instream works and machinery operation within or in close proximity to any watercourse either comprising natural locations within the SAC or ex-situ supporting locations upstream, has the potential to directly disturb or displace salmonid fish and aquatic species within fish-bearing streams, or sensitive aquatic receptors. Fish are likely to mobilise outside of their territories due to human disturbance, but will return once the disturbance effect diminishes (i.e. brief temporary effect). Aquatic invertebrates are less sensitive to disturbance and displacement arising from human activity and are scoped out from evaluation of disturbance/displacement effects in the context of European Sites. The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the direct footprint of any instream works within watercourses which support anadromous Atlantic salmon and resident Brown trout populations – i.e. Class 1 or Class 2 watercourses either within or ex-situ the SAC. Disturbance or displacement effects will be brief to temporary in nature, lasting for the duration of works at or in close proximity to Class 1 or Class 2 watercourses.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as distribution and numbers of adults and/or juveniles and through secondary effects on prey item species, affect the supporting habitat quality and or availability of host species for other QI Species.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>Impact Quality: Negative</p>	
Evaluation the Subject Development Impact – Disturbance or Displacement	
Element 1: UWF Grid Connection – direct/indirect impact	
<p>Impact Magnitude:</p> <p>Of the 68 No. watercourse crossings required for the UWF Grid Connection, 5 No. are located within the catchment of the Lower River Suir SAC. Of the 5 No. watercourses, only one of these (W65) has been evaluated to have fisheries value.</p> <p>The installation of the 110kV UGC at W65 will not involve instream works or culvert replacement works as the cables will be installed either under or over the existing structure, therefore the magnitude of disturbance effects at this location only relates to works in the public road pavements and is evaluated as Negligible. There may be occasional, very short duration disturbance to fish populations utilising habitat beneath the bridge; however, this will not result in displacement, loss of territory, or holding habitat.</p> <p>Approximately 1.5km of the 110kV UGC exists within an upper headwater tributary of the Clodiagh River catchment. Proposed works including trench excavation, and resurfacing occurring within the Lower River Suir regional catchment (may give rise to disturbance to fish and aquatic biodiversity receptors present within Class 1 and Class 2 watercourses over a period of c.1 – 2 days at each crossing location. The frequency of these disturbance effects is once only for cables trenches with or without new permanent culverts.</p> <p>Overall magnitude is evaluated as negligible.</p>	
<p>Significance of the Impact: No adverse effects on the Integrity of the Lower River Suir SAC</p>	

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Rationale for Impact Evaluation:

- No instream works are required at W65;
- The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the works occurring in public road pavements;
- The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.

Qualifying Interests

- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, host species are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), are expected.

No effects on QI Species (Otter) via reductions in Abundance or distribution, supporting habitat quality (including fish biomass) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2). The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value which will be subject to instream works or works in close proximity for both UWF Grid Connection and for Other Elements and which also occur within the regional River Suir SAC catchment.

Neither UWF Replacement Forestry nor UWF Other Activities will require any instream works, and works in close proximity will be small in scale; it is therefore evaluated that the magnitude of any cumulative disturbance impacts will be negligible. The potential for cumulative disturbance effects is limited to the Suir SC 030 sub-catchment, where both Upperchurch Windfarm and UWF Related Works will occur and will require instream works or works in close proximity to watercourses with fisheries value.

UWF Related Works will involve instream works on five watercourses (with fisheries value) in the Suir SC 030 sub-catchment, and Upperchurch Windfarm will involve works in close proximity (but no instream works) to one of these five watercourses (WW2) (during the construction of a clear span structure over this watercourse). The potential for UWF Grid Connection to cause disturbance/displacement effects in the Suir_SC_030 is limited to 1 No. watercourse (W65) with fisheries value, where works will only involve trenching works in the public road over an existing culvert, and no instream or culvert replacement works will be required at this location, neither will there be any temporal overlap between works at the UWF Grid Connection crossing locations and UWF Related Works instream works (Project Design), and furthermore UWF Grid Connection is not located close to WW2. This minimises the potential for cumulative disturbance or displacement effects caused by UWF Grid Connection. Therefore, the magnitude of any cumulative effects will be Negligible.

In relation to other projects, the magnitude of any potential cumulative effects is evaluated as negligible due to spatial separation from Curraghduff Quarry, with agriculture, forestry and turf-cutting on-going and form part of the baseline conditions, with no material changes in practices expected or planned in the area.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- The UWF Grid Connection will not require any culvert replacement works for watercourses of fisheries value in the Suir_SC_030 sub-catchment, and therefore any disturbance/displacement effects to fish in the Suir catchment only relates to brief disturbance as a result of trenching works in the public road over 1 No. existing culvert;
- In-stream works for UWF Related Works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure);

<ul style="list-style-type: none"> •The in-stream works for UWF Related Works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure). All fish and Annex II listed species (White-clawed crayfish) will be translocated to suitable habitat in immediate proximity downstream, within the same watercourse. This will be completed under license and following standard protocols; •The frequency of disturbance effects will be once. <p>Other Projects</p> <ul style="list-style-type: none"> •Separation of quarry from watercourses affected by UWF Grid Connection, •Implementation of Mitigation as part of Curraghduff Quarry operation consent; <p>The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting</p> <p><u>Qualifying Interests</u></p> <ul style="list-style-type: none"> •No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, host species are expected. •No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, are expected. •No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, are expected. •No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), are expected. •No effects on QI Species (Otter) via reductions in Abundance or distribution, supporting habitat quality (including fish biomass) are expected.
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Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 2: UWF Related Works

<p>Impact Magnitude:</p> <p>Of the 32 No. watercourse crossings within the UWF Related Works construction works area boundary, 6 No. have been evaluated to have fisheries value. Of these 6 No. watercourses, 5 No. will be subject to instream works (the remaining 1 no. crossing WW2 will use a clear span structure (part of Upperchurch Windfarm works) with no requirement for instream works).</p> <p>Any fish present are likely to be affected for between 1 – 2 days during instream works. The frequency of these disturbance effects is once for half of the locations (cables trenches with or without new permanent culverts) and twice for the remaining locations (temporary culverts; once for installation and once for removal).</p>

Significance of the Impact: No adverse effect on European Site Integrity

<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure); • The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure); • All fish will be translocated to suitable habitat in immediate proximity downstream, within the same watercourse prior to works (Project Design Measure); • The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure); • The singular frequency of any disturbance events at half of the locations, and; • The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.
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Element 3: UWF Replacement Forestry

Impact Magnitude: None: No instream works will take place as part of Replacement Forestry

Significance of the Impact: No adverse effect on European Site Integrity

<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Absence of Pathways

Element 4: Upperchurch Windfarm

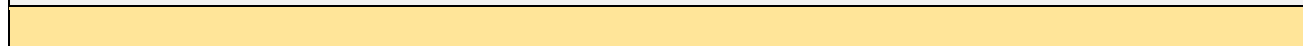
Impact Magnitude: None:

<p>1 No. watercourse with fisheries value occurs within the footprint of the Upperchurch Windfarm site. This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Disturbance effects are limited to the construction works for the new bridge along with the subsequent use of the new bridge throughout the construction period.</p>
<p>Significance of the Impact: Imperceptible</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The Upperchurch Windfarm impacts were evaluated as being of high magnitude for aquatic species; however, it was identified that significant impacts were not probable/likely post-mitigation. A clear-span bridge will be used at WW2 and therefore no in-stream works are required; disturbance will be limited to the immediate works area.
<p>Element 5: UWF Other Activities</p>
<p><u>Impact magnitude:</u> The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. There is no potential for aquatic receptor disturbance effects within or ex-situ to the River Suir SAC as there are no instream works required as a result of UWF Other Activities including Haul Route Activities or the Upperchurch Hen Harrier Scheme (UHHS). No potential for disturbance effects to aquatic receptors due to the small scale of activities and no activities within the riparian corridor of Class 1 or Class 2 watercourses. The Upperchurch Hen harrier Scheme is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment, hence upstream or ex-situ to the River Suir SAC. No potential exists for disturbance related impacts to aquatic receptors, as there are no instream works or activities adjacent to watercourses required as a result of UWF Other Activities. Overall magnitude is evaluated as negligible.</p>
<p>Significance of the Impact: No adverse effect on European Site Integrity</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Absence of pathways for disturbance
<p>Evaluation of Other Cumulative Impacts – Disturbance or Displacement</p>
<p>Whole UWF Project Effect</p>
<p><u>Cumulative Impact Magnitude:</u> Direct disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the footprint of any instream works or culvert replacement works and directly upstream and downstream of all crossings, temporary and permanent instream works structures, bank-side works and construction works adjacent to watercourses and over existing crossing structures. In total there are 5 No. instream works locations (all UWF Related Works) where instream works/culvert replacement works in fish-bearing streams are required, all of which will be sensitive to disturbance. However, at the local level in the context of individual receptors, temporary displacement will be limited to the affected stretch of watercourse, without cumulative population-level impacts at a watercourse or catchment level. Disturbance may also occur at other watercourse crossing points due to works in close proximity however this is brief. Overall impact magnitude is negligible.</p>
<p>Significance of the Whole Project Impact: No adverse effects on the Integrity of the Lower River Suir SAC</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure); • The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure); • The in-stream works will not be undertaken without isolation of flow within the watercourse, and the translocation of fish, prior to the in-stream works commencing (Project Design Measure); • The linear nature of the UWF Grid Connection 110kV UGC works over a large c.23km latitudinal distance; • The low number of watercourses (8 No. in total) with fisheries value and subject to instream/culvert replacement works. • The frequency of disturbance effects will be once for all 110kV UGC cables trenches at crossing locations with or without potential culvert replacement; • The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.

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<p><u>Qualifying Interests</u></p> <ul style="list-style-type: none"> ● No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, host species are expected. ● No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, are expected. ● No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, are expected. ● No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), are expected. ● No effects on QI Species (Otter) via reductions in Abundance or distribution, supporting habitat quality (including fish biomass) are expected.



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

Impact Magnitude: In respect of the Whole UWF project, in total there are **5 No.** instream works locations associated with Related Works, all *outside* the SAC, where instream works/culvert replacement works in fish-bearing streams are required, all of which will be sensitive to disturbance. However, at the local level in the context of individual receptors, temporary displacement will be limited to the affected stretch of watercourse, without cumulative population-level impacts at a watercourse or catchment level. Disturbance may also occur at other watercourse crossing points due to works in close proximity however this is brief. Magnitude is negligible.

For other plans or projects such as the considered Curraghduff Quarry, no instream works are required, and with regard to background trends in Agriculture, Forestry and Turbary, no contrast or material change is expected.

Overall cumulative magnitude is also negligible.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

Whole UWF Project

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure);
- The in-stream works will not be undertaken without isolation of flow within the watercourse, and the translocation of fish, prior to the in-stream works commencing (Project Design Measure);
- The linear nature of the UWF Grid Connection 110kV UGC works over a large c.23km latitudinal distance;
- The low number of watercourses (8 No. in total) with fisheries value and subject to instream/culvert replacement works.
- The frequency of disturbance effects will be once for all 110kV UGC cables trenches at crossing locations with or without potential culvert replacement;
- The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.

Other Plans or Projects

- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interests

- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, host species are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), are expected.

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- No effects on QI Species (Otter) via reductions in Abundance or distribution, supporting habitat quality (including fish biomass) are expected.

3.7.3.2.3 Effects on QI species (Otter) along Pathways 4 from Direct mortality ex-situ the Lower River Suir SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> culvert replacement works; operating machinery; excavation works; reinstatement works</p> <p><u>Cumulative Impact Source:</u> Instream works, operating machinery; excavation works; reinstatement</p> <p><u>Impact Pathway:</u> Direct Contact</p> <p><u>Impact Description:</u> Otter are rated as a very high sensitivity receptor (based on International importance ratings) and may be sensitive to mortality through inadvertent collision with moving vehicles or machinery, in particular during hours of darkness. As no active holts were located within 300m (upstream or downstream) of works locations in proximity to suitable Otter habitat (i.e. at watercourse crossing locations) then effects are reduced to potential mortality of foraging or resting animals, primarily within aquatic habitats but also within adjacent riparian corridors and /or whilst crossing roads in close proximity to proposed works. Many of the watercourses present whilst not within the SAC boundary, form the upper reaches of or are hydrologically connected to the River Suir SAC which includes Otter as a Qualifying Interest.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as a decline in range and/or distribution and numbers of individuals within the River Suir SAC.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on connected or supporting populations for downstream but ecologically connected Qualifying Interest (QI) species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>These effects are substantially reduced by an adherence to completing works during daylight hours only as part of Project Design (PD04). All works will be completed in line with the traffic management plan which forms part of the accompanying EMP (PD10) and traffic movements will be limited in respect of refuelling near watercourses (PD39 and PD42), in addition to specific measures around the protection of Otter, such as confirmatory surveys (PD52), the limiting of works within 150m of any confirmed active Otter holts (PD53, PD54, PD55) and the establishment of a prohibited area associated with confirmed active Otter holts (PD56). Traffic Management measures (vehicular speeds – project design PD05) will also reduce potential collision mortality.</p> <p>Impact Quality: Negative</p>	
Evaluation of the Subject Development Impact – Otter: Mortality	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>No evidence of Otter was found within the regional River Suir SAC catchment. 5 no. watercourse crossings (W64-W68 inclusive) are pertinent for consideration however none of these include instream works in a watercourse with fisheries value – all are outside the SAC boundary at significant distances upstream (ca.14km). Considering the absence of Otter records, and absence of instream works requirements, the temporary duration of works at watercourse crossings, the scale of the proposed works, along with the project design measures in place during works, the magnitude of impact in relation to mortality of Otter is expected to be negligible.</p>	
Significance of the Impact: No adverse effects on the Integrity of the Lower River Suir SAC	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> ● The very high sensitivity rating of the species, and Negligible magnitude of impact; ● No Recorded Otter evidence; ● No Holts or resting places occur in close proximity, and; ● Works will take place during daylight hours, with; ● Very slight contrast to existing baseline conditions is expected, given the majority of works take place in an existing road or paved surface subject to passage of traffic, to which Otter will be habituated; 	

- The brief-temporary duration of disturbance events and any corresponding effect, with
 - Effects expected to be reversible, and;
 - Project design measures to avoid/reduce effects also in place, including at all watercourse crossing locations.
- Qualifying Interest:
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: There is potential for cumulative effect where the UWF Grid Connection comes in close proximity to the UWF Related Works and Upperchurch Windfarm construction works areas. Six of the seven watercourse crossings (W64-W68) within the zone of overlap with UWF Related Works and Upperchurch Windfarm within the River Suir regional catchment and which are associated with the UWF Grid Connection are Class 4 drains which have marginal habitat value to Otter, with limited prey availability (no fisheries potential). No evidence of Otter at the remaining watercourse crossing (W65-Class 2 indicating high fisheries potential but outside the SAC by ca.14km) was recorded in studies to date. Therefore, the magnitude of cumulative impacts in relation to disturbance of Otter is expected to be negligible.

In relation to other plans and projects, the Curraghduff Quarry will not require any instream works so therefore there will be no substantial pathways for direct mortality, while agriculture, forestry and turf-cutting are not expected to be materially different from the existing baseline.

Overall cumulative magnitude is negligible.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- 6 of the 7 watercourses within the zone of cumulative impacts are drains, with the remaining 1 watercourse with potential to provide habitat, but no evidence of Otter recorded;
- Works will take place during daylight hours only, and;
- Be of brief-temporary duration, with;
- Very Low probability of any impact on Otter or European Sites designated for same, and;
- Application of project design measures for the protection of Otter

Other Projects

- Separation of quarry from watercourses affected by UWF Grid Connection,
- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting

Qualifying Interest:

- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

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

Element 2: UWF Related Works

Impact Magnitude: 32 No. watercourse crossings in total are required for UWF Related Works with instream works required at 25 No. of these crossings – all outside the SAC boundary with the closest watercourse crossing location ca.4.3km upstream from the SAC. Due to 75% of these watercourses being drains or marginal watercourses, the absence of otter holts within 150m of the crossing points, and separation distance the impact magnitude is expected to be Negligible

Significance of the Impact: No adverse effects on European Site Integrity.

Rationale for Impact Evaluation:

- Application of project design measures for the protection of Otter,
- No active holts were identified overlapping the construction area boundaries or within 150m, and;
- Works will take place during daylight hours only, and;

<ul style="list-style-type: none"> ● Be of brief-temporary duration.
<p>Element 3: UWF Replacement Forestry</p>
<p><u>Impact Magnitude:</u> No active holts or resting places were recorded in baseline studies and all planting will be done by hand. The replacement Forestry is all located outside the SAC at a substantial distance upstream. Therefore impact magnitude is expected to be Negligible.</p>
<p><u>Significance of the Impact:</u> No adverse effects on European Site Integrity.</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> ● No active holts or resting places were recorded in baseline studies, and; ● All planting will be done by hand, and; ● Undertaken during daylight hours, and ● Of temporary duration; ● No significant contrast to baseline conditions is expected.
<p>Element 4: Upperchurch Windfarm</p>
<p><u>Impact Magnitude:</u> No Otter were recorded during windfarm surveys; All work locations are outside the SAC boundary therefore, the impact magnitude of any disturbance is expected to be Negligible.</p>
<p><u>Significance of the Impact:</u> No adverse effects on European Site Integrity.</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> ● No active holts or resting places were recorded in baseline studies for the windfarm; ● watercourses in the windfarm area generally comprise drains which have marginal habitat value to otter and; ● works will be of temporary duration.
<p>Element 5: UWF Other Activities</p>
<p><u>Impact Magnitude:</u> No otter holts or resting places were recorded at Haul Route Activity locations, and the locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, are all outside the SAC, no upgrades to watercourse crossings or instream works will be required, and activities will all be of brief duration (including riparian enhancement as part of UHHS) and only during daylight hours. Therefore, the impact magnitude is evaluated to be Negligible</p>
<p><u>Significance of the Impact:</u> No adverse effects on European Site Integrity.</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> ● No otter holts or resting places were recorded at Haul Route Activity locations, and; ● Absence of instream works; ● Locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours; ● The offsetting effects of long-term management activities for the Upperchurch Hen Harrier Scheme which will promote and enhance existing Otter habitat – including the enhancement of riparian corridors. ● The low reversibility of the above described management.
<p>Evaluation of Other Cumulative Impacts – Otter: Disturbance/Displacement</p>
<p>Whole UWF Project Effect</p>
<p><u>Impact Magnitude:</u> Construction works involving the use of machinery and excavation work at watercourse crossing points (both existing and new crossing points) will occur within the River Suir catchment. There is potential to cause mortality of otter at larger watercourse crossing points. However most of these larger watercourses occur along the UWF Grid Connection within the regional Shannon catchment, whereas the watercourses on the UWF Grid Connection where it is located within the regional River Suir Catchment, on the UWF Related Works and Upperchurch Windfarm sites are mainly drains and larger drains/watercourses with marginal habitat value to otter – reflected in baseline records. Sequential effects could occur where Otters foraging or transiting along watercourses experience multiple sources of mortality in quick succession such as encountering work crews/vehicles undertaking construction activities.</p> <p>In relation to in-combination effects of the whole project on the River Suir SAC, there is no potential for cumulative additive effects to Otters from both the UWF Related Works and the Upperchurch Windfarm due to the absence</p>

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of Otter recorded at the watercourses within these sites. There is no potential for cumulative effects of the UWF Replacement Forestry with the Other Elements due to the Neutral effect of UWF Replacement Forestry. The magnitude of the in-combination effect of the whole project, where considered in its entirety is in the order of UWF Grid Connection – i.e. Negligible.

Significance of the Whole Project Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- The absence of Otter records at the grid Connection locations within the regional River Suir catchment (all outside the SAC);
- The absence of Otter records from UWF Related Works, UWF Replacement Forestry and UWF study areas;
- Works will take place during daylight hours, and will be brief-temporary in duration;
- The very high sensitivity of the species, and Negligible cumulative magnitude;
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

Qualifying Interest:

- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

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

Impact Magnitude:

Impact magnitude from the Whole UWF Project is negligible and essentially in the order of effects from the UWF Related Works element. Pathways for effects to the River Suir SAC appear limited due to the absence of Otter records within these watercourses forming upper reaches of the River Suir outside the SAC.

In relation to other plans and projects, the Curraghduff Quarry will not require any instream works so therefore there will be no substantial pathways for direct mortality, while agriculture, forestry and turf-cutting are not expected to be materially different from the existing baseline.

Overall cumulative magnitude is negligible.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

Whole UWF project:

- The absence of Otter records at the grid Connection locations within the regional River Suir catchment (all outside the SAC);
- The absence of Otter records from UWF Related Works, UWF Replacement Forestry and UWF study areas;
- Works will take place during daylight hours, and will be brief-temporary in duration;
- The very high sensitivity of the species, and Negligible cumulative magnitude;

Other Plans or Projects:

- Findings of the submitted NIS for Curraghduff Quarry;
- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interest:

- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

3.7.3.2.4 Effects on QI species (Otter) along Pathways 5 & 7 from Disturbance / Displacement, within or ex-situ the Lower River Suir SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
Impact Source: noise and human disturbance; visual intrusion	
Cumulative Impact Source: Noise and Visual Intrusion	
Impact Pathway: Air and visibility	
<p><u>Impact Description:</u> Otter are rated as a very high sensitivity receptor (based on International importance ratings) and do not tolerate disturbance at or near holts (breeding dens) that are in active use (breeding may occur at any time of the year, but most likely during the Summer/early Autumn period). When Otters are not breeding, records suggest that Otters are less sensitive to human disturbance (Chanin, 2013). As no active holts were located within 300m (upstream or downstream) of works locations in proximity to suitable Otter habitat (i.e. at watercourse crossing locations) then effects are reduced to disturbance/displacement of foraging or resting animals, primarily within aquatic habitats but also within adjacent riparian corridors. This could include the disturbance of animals at resting places (couches). It is also noted that Watercourses are present which form part of or are hydrologically connected to European Sites (SAC's) suggesting the potential for secondary effects on this QI species both within and ex-situ the European Site under consideration.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI Species and Conservation objectives such as a decline in range and/or distribution and numbers of individuals within the Lower River Suir SAC catchment.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude ,degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on connected or supporting populations for downstream but ecologically connected Otter.</p> <p>These effects are reduced by an adherence to completing works during daylight hours only as part of Project Design (PD04). All works will be completed in line with the traffic management plan which forms part of the accompanying EMP (PD10) and traffic movements will be limited in respect of refuelling near watercourses (PD39 and PD42), in addition to specific measures around the protection of Otter, such as confirmatory surveys (PD52), the limiting of works within 150m of any confirmed active Otter holts (PD53, PD54, PD55) and the establishment of a prohibited area associated with confirmed active Otter holts (PD56).</p> <p>Impact Quality: Negative</p>	
Evaluation of the Subject Development Impact – Otter: Disturbance/Displacement	
Element 1: UWF Grid Connection – direct/indirect impact	
<p>Impact Magnitude: No evidence of Otter was found within the regional River Suir SAC catchment. 5 no. watercourse crossings (W64-W68 inclusive) are pertinent for consideration however none of these include instream works in a watercourse with fisheries (Otter prey items) value – all are outside the SAC boundary at significant distances upstream (ca.14km).</p> <p>Considering the absence of Otter records, and absence of instream works requirements, the temporary duration of works at watercourse crossings, the scale of the proposed works, along with the project design measures in place during works, the magnitude of impact in relation to disturbance or displacement of Otter is expected to be negligible.</p>	
Significance of the Impact: No adverse effects on the Integrity of the Lower River Suir SAC	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> •The very high sensitivity rating of the species, and Negligible magnitude of impact; •No Recorded Otter evidence in close proximity to 5 identified crossings, none of which include new instream works or culvert replacement works in a watercourse with fisheries value; 	

- No Holts or resting places occur in close proximity, and;
- Works will take place during daylight hours only , with;
- Very slight contrast to existing baseline conditions is expected, given the majority of works take place in an existing road or paved surface subject to heavy passage of traffic, to which Otter will be habituated;
- The brief-temporary duration of disturbance events and any corresponding effect, with
- Effects expected to be reversible, and;
- Mitigation Measures to avoid/reduce effects also in place, including at all watercourse crossing locations.

Qualifying Interest:

No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: There is potential for cumulative effect where the UWF Grid Connection comes in close proximity to the UWF Related Works and Upperchurch Windfarm construction works areas. Six of the seven watercourse crossings (W64-W68) within the zone of overlap with UWF Related Works and Upperchurch Windfarm within the River Suir regional catchment and which are associated with the UWF Grid Connection are Class 4 drains which have marginal habitat value to Otter, with limited prey availability (no fisheries potential). No evidence of Otter at the remaining watercourse crossing (W65-Class 2 indicating high fisheries potential but outside the SAC by ca.14km) was recorded in studies to date. Therefore, the magnitude of cumulative impacts in relation to disturbance of Otter is expected to be negligible.

In relation to other plans and projects, the Curraghduff Quarry will not require any instream works so therefore there will be no substantial pathways for disturbance, while agriculture, forestry and turf-cutting are not expected to be materially different from the existing baseline.

Overall cumulative magnitude is negligible.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

- no evidence of Otter recorded within the zone of cumulative influence, with;
- No instream works required;
- Works will take place during daylight hours only, and;
- Be of brief-temporary duration, with;
- Application of Mitigation Measures for the protection of Otter.

Other Projects

- Separation of quarry from watercourses affected by UWF Grid Connection,
- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting

Qualifying Interest:

No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

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

Element 2: UWF Related Works

Impact Magnitude: 32 No. watercourse crossings in total are required for UWF Related Works with instream works required at 25 No. of these crossings – all outside the SAC boundary with the closest watercourse crossing location ca.4.3km upstream from the SAC. Due to 75% of these watercourses being drains or marginal watercourses, the absence of otter holts within 150m of the crossing points, and separation distance the impact magnitude is expected to be Negligible

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- Absence of Otter records;

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<ul style="list-style-type: none"> ● Application of project design measures for the protection of Otter, ● No active holts were identified overlapping the construction area boundaries or within 150m, and; ● Works will take place during daylight hours only, and; ● Be of brief-temporary duration.
<p>Element 3: UWF Replacement Forestry</p>
<p><u>Impact Magnitude:</u> No active holts or resting places were recorded in baseline studies and all planting will be done by hand. The replacement Forestry is all located outside the SAC at a substantial distance upstream. Therefore impact magnitude is expected to be Negligible.</p>
<p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> ● No active holts or resting places were recorded in baseline studies, and; ● All planting will be done by hand, and; ● Undertaken during daylight hours, and ● Of temporary duration; ● No significant contrast to baseline conditions is expected. ● Any effect will be reversible, given the low magnitude of source disturbance.
<p>Element 4: Upperchurch Windfarm</p>
<p><u>Impact Magnitude:</u> No Otter were recorded during windfarm surveys; All work locations are outside the SAC boundary therefore, the impact magnitude of any disturbance is expected to be Negligible.</p>
<p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> ● No active holts or resting places were recorded in baseline studies for the windfarm; ● watercourses in the windfarm area generally comprise drains which have marginal habitat value to otter and; ● works will be of temporary duration.
<p>Element 5: UWF Other Activities</p>
<p><u>Impact Magnitude:</u> No otter holts or resting places were recorded at Haul Route Activity locations, and the locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, are all outside the SAC, no upgrades to watercourse crossings or instream works will be required, and activities will all be of brief duration (including riparian enhancement as part of UHHS) and only during daylight hours. Therefore, the impact magnitude is evaluated to be Negligible</p>
<p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> ● No otter holts or resting places were recorded at Haul Route Activity locations, and; ● Locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours; ● The offsetting effects of long-term management activities for the Upperchurch Hen Harrier Scheme which will promote and enhance existing Otter habitat – including the enhancement of riparian corridors. ● The low reversibility of the above described management.
<p>Other Projects: Curraghduff Quarry, Agriculture, Forestry, Turf-cutting.</p>
<p><u>Impact Magnitude:</u> <u>Curraghduff Quarry:</u> The separation distance from proposed works to the downstream SAC is ca.600m at its closest. A NIS accompanies the current application and has concluded that ‘as a result of the proposed mitigation measures, this Natura Impact Statement is able to conclude that the proposed development will not result in impacts on the integrity of the Lower River Suir SAC or any other Natura 2000 sites’. It is assumed that rationale around pathways to otter and mitigation measures to avoid adverse effects on European Site Integrity as set out in the NIS is correct and will be implemented. Cumulative magnitude evaluated as negligible.</p>
<p><u>Agriculture, Forestry and Turf-cutting:</u></p>

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<p>These activities are on-going and form part of the baseline conditions. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.</p>
<p>Significance of the Impact: No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Findings of the submitted NIS for Curraghduff Quarry; • Implementation of Mitigation as part of Curraghduff Quarry operation consent; • The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.
<p>Evaluation of Other Cumulative Impacts – Otter: Disturbance/Displacement</p>
<p>Whole UWF Project Effect</p>
<p>Impact Magnitude: Construction works involving the use of machinery and excavation work at watercourse crossing points (both existing and new crossing points) will occur within the River Suir catchment. There is potential to cause disturbance or displacement of otter at larger watercourse crossing points. However all of these larger watercourses occur along the UWF Grid Connection within the regional Shannon catchment, whereas the watercourses on the UWF Grid Connection where it is located within the regional River Suir Catchment, and on the UWF Related Works and Upperchurch Windfarm sites are mainly drains and larger drains/watercourses with marginal habitat value to otter – reflected in baseline records. Sequential effects could occur where Otters foraging or transiting along watercourses experience multiple sources of instruction/disturbance in quick succession such as encountering work crews undertaking construction activities.</p> <p>In relation to in-combination effects of the whole project on the River Suir SAC, there is no potential for cumulative additive effects to Otters from both the UWF Related Works and the Upperchurch Windfarm due to the absence of Otter recorded at the watercourses within these sites. There is no potential for cumulative effects of the UWF Replacement Forestry with the Other Elements due to the Neutral effect of UWF Replacement Forestry. The magnitude of the in-combination effect of the whole project, where considered in its entirety is in the order of UWF Grid Connection – i.e. Negligible.</p>
<p>Significance of the Whole Project Impact: No adverse effects on the Integrity of the Lower River Suir SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The absence of Otter records at the grid Connection locations within the regional River Suir catchment (all outside the SAC); • The absence of Otter records from UWF Related Works, UWF Replacement Forestry and UWF study areas; • Works will take place during daylight hours, and will be brief-temporary in duration; • The very high sensitivity of the species, and Negligible cumulative magnitude; • No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected. <p>Qualifying Interest:</p> <ul style="list-style-type: none"> • No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p>Impact Magnitude: Whole UWF Project magnitude is negligible and essentially in the order of effects from the UWF Related Works element. Pathways for effects to the River Suir SAC are limited due to the absence of Otter records within these watercourses forming upper reaches of the River Suir outside the SAC.</p> <p>In relation to other projects, the Curraghduff Quarry are not expected to require instream works so no substantial pathways for disturbance or displacement exists or are not expected, while agriculture, forestry and turf-cutting activities are not expected to be materially different from the existing baseline.</p> <p>Overall cumulative magnitude is negligible.</p>

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Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Lower River Suir SAC

Rationale for Impact Evaluation:

Whole UWF project:

- The absence of Otter records at the Grid Connection locations within the regional River Suir catchment (all outside the SAC);
- The absence of Otter records from UWF Related Works, UWF Replacement Forestry and UWF study areas;
- Works will take place during daylight hours, and will be brief-temporary in duration;
- The very high sensitivity of the species, and Negligible cumulative magnitude;

Other Plans or Projects:

- Findings of the submitted NIS for Curraghduff Quarry;
- Implementation of Mitigation as part of Curraghduff Quarry operation consent;
- The limited contrast to existing baseline conditions in the context of background agriculture, forestry and turf cutting.

Qualifying Interest:

- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.



3.7.4 Summary of the Impact of UWF Grid Connection on Qualifying Interests of the Lower River Suir SAC

This section of the NIS has provided further evaluation of the source-impact pathways identified at Stage 1 Screening as having the potential to result in likely significant effects on the River Suir SAC and its respective Qualifying Interests screened in for further appraisal.

This has included potential effects on QI habitats and species from decreases in instream aquatic habitat quality, changes to flow regime, riparian habitat degradation, and the spread of invasive species. Potential effects on QI Species examined have included direct mortality of fisheries and other aquatic species, disturbance to or displacement of fisheries and other aquatic species, along with mortality of and disturbance to or displacement of Otter. The Qualifying Interests screened in for evaluation at Stage 2 were:

- Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation [3260]
- Alluvial Forests (91E0)* (priority habitat)
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]
- Yew Woodlands* *Taxus baccata* woods of the British Isles [91J0] (priority habitat)
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- Freshwater Pearl Mussel [1029]
- White-clawed Crayfish [1092]
- Sea Lamprey [1095]
- Brook Lamprey [1096]
- River Lamprey [1099]
- Atlantic Salmon [1106]
- Otter [1355]

The above Qualifying Interests both habitats and species have been subject to further examination in respect of their specific sensitivities & Conservation Objectives as to whether the identified pathways/effects can be considered likely to result in adverse effects on European Site Integrity via effects on Conservation Objectives; this has concluded that:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition including increases in non-native species of >1%, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat *Taxus baccata* woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition including increases in negative indicator species are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.
- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, increases in disease such as Crayfish Plague, increased negative indicator species (Alien Crayfish Species) & reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.

- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

Cognisance has been given at this stage to the various Mitigation Measures designed to specifically avoid adverse effects on European Site Integrity, and to in-combination effects with both other project elements of the Whole Upperchurch Windfarm Project in addition to other plans or activities, or consented projects within the defined temporal and spatial overlap for cumulative or in combination effects. Effects both within and without (i.e. ex-situ) the European Site under consideration have been considered.

The evaluation herein has found, that following the examination and analysis presented, it can be concluded on a reasoned basis, that the proposed development will not result in adverse effects on the Integrity of the Lower River Suir SAC, in circumstances where no reasonable scientific doubt remains.

Table 16, overleaf in Section 3.7.5 summarises the evaluation of the impact of the UWF Grid Connection on the Integrity of the Lower River Suir SAC.

3.7.5 Evaluation of the impact of UWF Grid Connection on the Integrity of the Lower River Suir SAC

Using the checklist in the Table below, the UWF Grid Connection is examined, both alone and in-combination with other projects, for adverse impacts on the integrity of the Lower River Suir SAC is examined.

Table 16: Integrity of Site checklist

<i>Does the project or plan have the potential to: Yes/No</i>	
- cause delays in progress towards achieving the conservation objectives of the site?	No
- interrupt progress towards achieving the conservation objectives of the site?	No
- disrupt those factors that help to maintain the favourable conditions of the site?	No
- interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No
- change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No
- interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No
- reduce the area of key habitats?	No
- reduce the population of key species?	No
- change the balance between key species?	No
- reduce diversity of the site?	No
- result in disturbance that could affect population size or density or the balance between key species?	No

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3.8 Evaluation of Adverse Impacts to the Clare Glen SAC

The Screening stage evaluated the potential for UWF Grid Connection to impact the Clare Glen SAC via identified impact pathways (Sections 2.9). The potential for impacts was identified with regard to individual Qualifying Interests of the SAC. These impacts are evaluated further within this Section 3.7 of the Appropriate Assessment report, to determine whether the UWF Grid Connection project (either alone or in-combination) will affect the conservation status of these conservation interests, and thus the overall integrity of the Clare Glen SAC.

The evaluation of the impacts of UWF Grid Connection on the integrity of the Clare Glen SAC takes account of the following information:

- conservation objectives, outlined at Section 3.8.1 below, for the Qualifying Interests which were screened in for evaluation at Stage 2;
- the potential impact pathways to Qualifying Interests which were screened in for evaluation, these impact pathways are identified in Section 3.4;
- The description of the UWF Grid Connection project as described in Section 3.2 of this report, and its Mitigation Measures as described in see Section 3.5 of this report;
- the descriptions of the other projects as outlined in Section 3.2.7.

3.8.1 Conservation Objectives of Clare Glen SAC (000930)

The site-specific conservation objectives of the Clare Glen SAC aims to define favourable conservation condition for the particular habitat or species at that site. These objectives and conditions are summarised in Table 17 below in respect of the Qualifying Interests of the Clare Glen SAC which were screened in for further evaluation.

The conservation objectives of the Clare Glen SAC are available in full on the National Parks & Wildlife Service website at <https://www.npws.ie/protected-sites>. The conservation objectives outlined in the table below were sourced from NPWS (2018) *Conservation Objectives: Clare Glen SAC 000930. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht. [Version dated 16/05/2018]* and should be read in conjunction with any other supporting documentation on the referenced website as referenced above.

Table 17: Conservation Objectives of Clare Glen SAC (000930)

Clare Glen SAC (000930)			
Old Oak Woodlands [91A0]	T restore the favourable conservation condition of Old sessile oak woods with Ilex and Blechnum in the British Isles in Clare Glen SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The woodland in Clare Glen SAC occurs along the Clare River valley and is of mixed composition with native broadleaves and non-native conifers and beech (<i>Fagus sylvatica</i>). As part of the National Survey of Native Woodlands (NSNW), the sub-site Clare Glen (NSNW site code 1286) was surveyed by Perrin et al. (2008). The minimum area of old oak woodland in the SAC is estimated to be 17.93ha. Map 3 shows the surveyed woodland classified as 91A0 (17.93ha) by Perrin et al. (2008) in the SAC
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution based on Perrin et al. (2008)
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, topographical constraints may restrict expansion

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Clare Glen SAC (000930)			
		least 25ha in size and “small” woods at least 3ha in size	
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semimature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008) and NPWS internal files
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008) and NPWS internal files
Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Sessile oak (<i>Quercus petraea</i>) generally regenerates poorly. In suitable sites, ash (<i>Fraxinus excelsior</i>) can regenerate in large numbers although few seedlings reach pole size
Woodland structure: dead wood	m ³ per hectare; number per hectare	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands (Perrin and Daly, 2010), archaeological and geological features as well as red-data and other rare or localised species. Clare Glen (NSNW site code 1286) has been classified as possible ancient woodland by Perrin and Daly (2010). The Near Threatened liverworts <i>Dumortiera hirsuta</i> and <i>Lejeunea eckloniana</i> (Lockhart et al., 2012) are associated with wet rocks in the river, shaded by the woodland in the SAC (NPWS internal files). The rare Myxomycete fungi <i>Fuligo muscorum</i> , <i>Stemonitopsis hyperopta</i> and <i>Licea testudinacea</i> are present in the woodland and the Annex II listed Killarney fern (<i>Trichomanes speciosum</i>) has also been recorded (NPWS internal files). See also the conservation objective for Killarney fern (1421) in this volume
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including sessile oak (<i>Quercus petraea</i>) and birch (<i>Betula pubescens</i>)	Species reported in Perrin et al. (2008) and NPWS internal files. See also Young (1971) and Fahy (undated)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common non-native invasive species in this woodland type: beech (<i>Fagus sylvatica</i>), sycamore (<i>Acer pseudoplatanus</i>) and rhododendron (<i>Rhododendron ponticum</i>). Parts of Clare Glen have been planted with conifers (<i>Abies</i> , <i>Picea</i> and <i>Pinus</i> spp.). Beech, rhododendron and cherry laurel (<i>Prunus laurocerasus</i>) also occur in the woodland in the SAC (Perrin et al., 2008; NPWS internal files)

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Clare Glen SAC (000930)			
Killarney Fern Trichomanes speciosum (1421)	To maintain the favourable conservation condition of Killarney Fern in Clare Glen SAC, which is defined by the following list of attributes and targets:		
Attribute	Measure	Target	Notes
Distribution	Occurrence	No loss in geographical spread of populations, subject to natural processes	The population of Killarney fern (Trichomanes speciosum) is currently known from several locations in Clare Glen SAC, all within hectad R75. Exact locations are not mapped here on account of the threat posed by illegal collecting. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Number of populations	Number	No decline, subject to natural processes	One population of the species has been recorded in the SAC since 1960. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Number of colonies	Number	No decline, subject to natural processes	Eleven colonies of the species have been recorded from the population in the SAC since 1960. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Population: lifecycle stage	Type (sporophyte or gametophyte)	Maintain life-cycle stage composition of populations, subject to natural processes	Three of the eleven colonies recorded since 1960 are composed of sporophytes (frond stage), all of which have co-existing gametophytes (filamentous stage), and eight are composed of gametophytes only. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Population size: area of occupancy	Square metres	No decline, subject to natural processes	Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Population size: living sporophyte fronds	Number	No decline, subject to natural processes	Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Population structure: young and unfurling fronds	Occurrence	Young (not fully expanded) and/or unfurling (crozier) fronds present in populations previously observed to have these, subject to natural processes	Young and/or unfurling fronds have been recorded from Clare Glen SAC. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Population structure: fertile fronds	Occurrence	Fertile fronds present in populations previously observed to have these, subject to natural processes	Fertile fronds have been recorded from the SAC. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Population structure: juvenile sporophyte fronds emerging from gametophytes	Number	No decline, subject to natural processes	Juvenile sporophyte fronds emerging from gametophytes have been recorded from the SAC. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Habitat extent	Hectares	No loss of suitable habitat, subject to natural processes	The species grows in deeply shaded, humid situations - dripping caves, overhangs and crevices on cliffs, rocky slopes, by waterfalls, in stream ravines and gullies, on rock or soil banks in woodlands and, occasionally, under fallen trees and on the floor of damp woodlands. Whilst also occurring in these habitats, the gametophyte stage can grow in drier areas that do not suit the sporophyte. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Hydrological conditions: wet/damp microhabitats	Occurrence	Maintain hydrological conditions at the locations of known populations - visible water source, with dripping or seeping water present	Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal file

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		and/or substrate wet/damp to touch, subject to natural processes	
Hydrological conditions: relative humidity	Percentage	Maintain relative humidity levels at known colonies at not less than 80%, subject to natural processes	Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Hydrological conditions: desiccated fronds	Number	No increase, subject to natural processes	Presence of desiccated sporophyte fronds and gametophyte mats is indicative of unsuitable conditions. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Light levels: shading	Shade index score	At least 4 for woodland sporophyte-only and mixed colonies; at least 5 for open upland sporophyteonly and mixed colonies; at least 6 for gametophyteonly colonies, subject to natural processes	Shade Index: 4. Moderate shade, e.g. light-medium deciduous canopy with sun flecks. 5. Permanently shaded from direct sunlight but otherwise open to sky. 6. Deep woodland (e.g. coniferous or in ravine) shade, no sun flecks. 7. Perpetual deep shade, e.g. cave entrance, beneath boulder. The species occurs in moderate to deep shade in woodland in Clare Glen SAC. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Woodland canopy cover	Percentage	No loss of woodland canopy at, or in the vicinity of, the locations of known populations and canopy cover here maintained at more than 33%, subject to natural processes	Woodland management at or near to locations of known populations of the species must take account of its habitat requirements, particularly with regard to maintenance of sufficient canopy cover. The species occurs in woodland in Clare Glen SAC. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files
Invasive species	Occurrence	Maintain absence of invasive non-native and vigorous native plant species at the locations of known populations or, if present, maintain vegetation cover of these at less than 10%, taking into account the habitat requirements of <i>T. speciosum</i>	In order to avoid negative impacts on the Killarney fern (<i>Trichomanes speciosum</i>), its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) must be taken into account in locations that are subject to or proposed for management actions to control invasive non-native and/or vigorous native plant species. Based on Ní Dhúill et al. (2015), NPWS (2013) and NPWS internal files

3.8.2 Qualifying Interests and potential impact pathways which were screened in for evaluation

The Qualifying Interests of Clare Glen SAC and potential impact pathways which were screened in for evaluation are:

Table 18: Qualifying Interest Screened In due to potential for UWF Grid Connection to cause effects

Qualifying Interest of Clare Glen SAC Screened In due to potential or likelihood of UWF Grid Connection causing effects	Impact Screened in for further consideration at Stage 2
Old Oak Woodlands [91A0] Killarney Fern (<i>Trichomanes speciosum</i>) [1421]	SAC Pathway 2, 3

The SAC Impacts 2 and 3 are described below:

SAC Impact 2: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC
SAC Impact 3: Indirect Effects to Qualifying Interest habitats , of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC

3.8.3 Evaluation of the Impact of UWF Grid Connection on Qualifying Interests of the Clare Glen SAC

In order to evaluate the effect of UWF Grid Connection on the integrity of the Clare Glen SAC, the impact pathways identified above are examined in detail, through a number of focused impact evaluations, as per:

SAC Impact 2 SAC Impact 3	<i>Will be examined through these impact evaluations:</i>	<ul style="list-style-type: none"> • Decrease in instream aquatic habitat quality • Changes to flow regime • Riparian habitat degradation • Spread of invasive aquatic species
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For the purposes of the appraisal herein, effects on aquatic QI Habitats/Species (and their respective conservation objectives) within the Clare Glen SAC (direct, secondary, within or Ex-Situ) as defined via possible pathways SPA Pathway 2 & 3, can be characterised under a number of specific impact types. This includes general decreases in instream aquatic habitat quality, changes to flow regime, degradation of riparian habitat and potential cross-factor effects on QI Habitats/Species via the spread of Aquatic invasive species.

Evaluation of In-Combination Effects:

The evaluations of the impact of UWF Grid Connection on the Qualifying Interests of the Clare Glen SAC takes into account the in-combination effect with the Other Elements of the Whole UWF Project, and with the following other unrelated projects and activities:

- Rearcross Quarry
- Castlewaller Windfarm
- Bunkimalta Windfarm
- Agriculture, Forestry and Turf-cutting in the surrounding area.

A description of the other projects is included in Section 3.2.7.

The location of the UWF Grid Connection, and the other projects, in relation to the Clare Glen SAC is illustrated on the following mapping, which are contained in **Appendix A9: Accompanying Figures** of this Appropriate Assessment Report:

AA Figure 6: Location of UWF Grid Connection in relation to Clare Glen SAC

AA Figure 14: Location of UWF Grid Connection and other projects in relation to Clare Glen SAC.

3.8.3.1 Evaluation of SAC Impacts 2 & 3

3.8.3.1.1 Effects on QI habitats and/or species along Pathways 2 & 3 from decreases in instream aquatic habitat quality, within or ex-situ the Clare Glen SAC

Impact Description:	
Project Life Cycle Stage:	Construction stage
<u>Impact Source:</u> culvert replacement works; parapet works; movement of soils and machinery; excavation works; use of hydrocarbons & cement-based compounds; reinstatement works.	
<u>Cumulative Impact Source:</u> Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Hydrocarbons; Reinstatement; Earthworks and Groundwork	
<u>Impact Pathway:</u> Runoff and surface water, Flowpaths	
<p><u>Impact Description:</u> Aquatic habitat relates to the instream features supporting aquatic biodiversity (bed substrate, morphology, water quality, etc.). Watercourses are highly sensitive to change, containing sensitive aquatic ecological receptors.</p> <p>Instream works at some watercourses will require direct excavation of the banks and bed of the watercourse, which can change the physical character of the watercourse and has the potential to degrade the quality of the baseline habitat which supports the structure, function and diversity of aquatic or aquatic dependant species.</p> <p>Water quality effects due to sedimentation: Erosion and deposition are natural process in watercourses¹⁸, varying naturally throughout the year. However, additional sediment contributions entering the watercourse, such as from construction works in, adjacent to or upstream of individual watercourses, can have negative implications. These impacts may be mobilised downstream and affect river reaches at a distance from the physical works.</p> <p>In addition, water quality effects due to contamination by fuels, oils or cementitious material has the potential to lead to direct toxicity events, or sub-lethal degradation of aquatic habitat quality.</p> <p>Were the impacts described above to occur within an SAC it may result in direct adverse effects on QI habitats/species and Conservation objectives such as distribution and extent of QI habitat/species (including a reduction in individuals, colony size or population size – e.g. direct contact with Hydrocarbons may damage Killarney Fern), effects to structure and composition of QI habitat through an altered hydrological regime and through secondary effects such as increased erosion, flooding or altered relative humidity, affect the supporting habitat quality for QI Species or affect the distinctiveness of habitats within the SAC.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source pollution type, magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p>	
<u>Impact Quality:</u> Negative	
Evaluation the Subject Development Impact – Decrease in instream aquatic habitat quality	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u> Of the 68 No. watercourse crossings required for the UWF Grid Connection, 29 no. (W11-W39 inclusive) are located upstream or are hydrologically connected to the downstream Clare Glen SAC. No watercourse crossing locations are within the SAC boundary, therefore there is no potential for direct effects.</p>	

¹⁸ EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems,

Apart from a larger crossing of the River Clare itself at Watercourse W36, the 29 no. watercourse crossing locations are all minor streams, drains or first order tributaries of the Clare (Annagh) River, along the regional R503 road. At watercourse W36, which is a bridge structure on the Clare River, works will be limited to the road surface with the cable installed in the structure, road level increased, and the parapet walls at this location will be raised (with all works taking place from the road surface over the bridge structure).

The remaining crossing points are all over or under existing culverts or bridges on the R503 Regional Road. Due to the nature of some of the culverts (being old masonry box culverts), there is potential that The existing culverts may need to be replaced at 8 no. Watercourses Crossings (W13, W14, W15, W17, W19, W20, W32, & W34).

The potential for decreases in aquatic habitat quality likely to affect the downstream Clare Glen SAC relates to sources (excavation works for cable trenches and joint bays, culvert replacement works, parapet works) of additional sedimentation or contamination by fuels, oils or cement at works locations in close proximity to the 29 No. watercourses, with risk increased at 9 no. watercourse subject to parapet wall works (W36) or potential culvert replacement. Sequential or cumulative effects may occur dependant on how many watercourse crossings are being worked on simultaneously. Effects to surface water quality, can then indirectly affect aquatic habitat quality. Only between 100 – 300m of the trench will be excavated in any day with a maximum of 3 watercourse crossings being completed in any one day (assumed 3 work crews on the R503).

As part of Project Design, Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering (PD29, see Section 3.5.1); all culvert works will be subject to the implementation of water quality protection measures PD11-PD45 and will be supervised by a member of CIEEM and the Institute of Fisheries Management (PD41). A Surface Water Management Plan will be implemented during works. In addition all works will be carried out in line with Best Practice (IFI, 2016 as per PD49) and culvert replacement works will not take place without the isolation of flow within the respective watercourse (PD50). Finally, all works to bridge parapet walls will only be undertaken with the use of debris netting, affixed to the outside of walls to prevent debris falling into the river (PD31).

Given this the magnitude of any effect is evaluated as negligible.

Significance of the Impact: No adverse effects on the Integrity of the Clare Glen SAC

Rationale for Impact Evaluation:

- Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year (Project Design Measure), which puts works outside of key sensitivity periods for the aquatic receptors. Flow conditions during this period are also likely to be lower, with lower relative contributions from surface water run-off;
- The in-stream works will not be undertaken without isolation of flow within the watercourse, prior to the in-stream works commencing (Project Design Measure);
- Implementation of the Project Design Measures for Water Quality protection (PD11 to PD45) through the Surface Water Management Plan for UWF Grid Connection
- There will be no direct discharge of pumped water into the watercourse during the works (Project Design);
- The spatial extent of effects to the watercourse channel will occur within the footprint of any works at potential culvert replacement locations;
- The frequency of such an event is once for any culvert replacement works;
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat.
- all works to bridge parapet walls will only be undertaken with the use of debris netting, affixed to the outside of walls to prevent debris falling into the river;
- The dilution factor of the main channel of the Clare River will avoid any alteration to hydrology;
- Impacts to the watercourse channel are temporary and reversible. The duration of any reductions in the quality of downstream habitats due to siltation or the introduction of pollutants are considered with regard to Clare Glen Qualifying Interests; such effects are evaluated to be temporary to short-term and reversible; and
- It's likely only between 100 – 300m of the trench will be excavated in any day with only 1 – 3 watercourse crossings being completed in any one day (assumed 3 work crews). Therefore, taking account of the temporary nature of the works within the catchment, all effects will be brief to temporary in nature and reversible.

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Qualifying Interests:

- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
- No effects on QI Killarney Fern (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourse crossings or locations of works which are also located upstream of Clare Glen SAC which will be subject to instream works for both UWF Grid Connection and for Other Elements, with cognisance of works proposed within adjacent tributaries of the affected catchments, but which may not be occurring on the same individual watercourses.

Neither Upperchurch Windfarm, nor UWF Replacement Forestry, nor UWF Other Activities will require any instream works, within or upstream of Clare Glen SAC and it is therefore evaluated that any cumulative impacts directly or indirectly affecting instream aquatic habitat quality (water quality contamination or sedimentation) will be negligible, with reference to interactions between these elements and the UWF Grid Connection. UWF Related Works within the Shannon regional catchment are located in the Bilboa_SC_010 sub-catchment, and cumulative impacts to instream aquatic habitat quality to Clare Glen SAC will be impossible as the Bilboa river is isolated from the Clare River. Overall, the Other Elements of the Whole UWF Project will not contribute to in-combination effects to the Clare Glen SAC.

In respect of a potential Bunkimalta Windfarm and its associated Grid Connection, the majority of this potential project is located in a separate subcatchment (Newport[Tipperary]_SC_010) and therefore has no potential to cause in-combination effects to the Clare Glen SAC. Based on the previous 2013 layout for Bunkimalta, a number of turbines and associated access roads could be located in the Kileengarrif subcatchment upstream of the Clare Glens. However, due to the large upstream distance (ca.16km) between the potential Bunkimalta Windfarm and the SAC, and the large size and assimilative capacity of this catchment, it is evaluated that any impacts will be of negligible magnitude.

There is limited potential for cumulative effects with Castlewaller Windfarm (should it be constructed during the same period as UWF Grid Connection), this only relates to the potential use (and widening) of an existing forestry entrance off the R503 and a c.1km length of access road using existing forestry road to the Castlewaller Windfarm site, due to the location on existing forestry roads with drainage already in place and small scale of the works, any contribution to in-combination effects to the downstream SAC will be negligible.

Also in relation to Castlewaller Windfarm, while a short length of the potential grid connection (c.400m) occurs within the Killeengarrif subcatchment, it drains into the Clare River at a point downstream of the SAC, and therefore this part of a potential grid connection cannot contribute to in-combination effects. The windfarm is entirely located in a separate subcatchment (Newport [Tipperary]_SC_010) and therefore has no potential to cause in-combination effects to the Clare Glen SAC.

Agriculture, forestry and turf cutting are on-going and form part of the baseline conditions. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.

Rearcross Quarry partially occurs within the Kileengarriff subcatchment, ca.12km upstream of the SAC. Indirect cumulative effects on the Clare Glen SAC will therefore be negated due to physical and spatial isolation, i.e. separation distance.

Overall the magnitude of cumulative effects is evaluated as negligible.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Clare Glen SAC

Rationale for Impact Evaluation:

- In-stream works or culvert replacement works in watercourses upstream of Clare Glen SAC for UWF Grid Connection only relate to the construction works on the Regional Road R503 in the Killeengarrif SC 010 sub-catchment and cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year (Project Design Measure);
- Application of comprehensive water quality protection measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all instream works and culvert replacement works (i.e. whether fisheries value or not);
- The duration of any reductions in the quality of downstream habitats due to siltation or the introduction of pollutants are considered with regard to Clare Glen Qualifying Interests; such effects are evaluated to be temporary to short-term and reversible.

Other Projects

- the location of Castlewaller Windfarm and the potential Bunkimalta Windfarm predominately in other subcatchments with no pathways to the SAC,
- the small scale of potential works for Castlewaller Windfarm upstream of the SAC, and the large separation distance to any potential Bunkimalta Windfarm works; and the large upstream distance to Rearcross quarry.
- No contrast to existing baseline conditions or material changes is expected in respect of Forestry, Agriculture and Turfcutting;
- A Sediment Control Plan is expected to form part of any future proposed Bunkimalta Windfarm project

Qualifying Interests:

- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
- No effects on QI Killarney Fern (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected.

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

Element 2: UWF Related Works

Impact Magnitude:

No works are proposed upstream of Clare Glen SAC. Magnitude is zero.

Significance of the Impact: No adverse effect on European Site Integrity.

Rationale for Impact Evaluation:

- Absence of pathways for adverse effects.

Element 3: UWF Replacement Forestry

Impact Magnitude:

No works are proposed upstream of Clare Glen SAC. Magnitude is zero.

Significance of the Impact: No adverse effect on European Site Integrity.

Rationale for Impact Evaluation:

- Absence of pathways for adverse effects.

Element 4: Upperchurch Windfarm

Impact Magnitude:

No works are proposed upstream of Clare Glen SAC. Magnitude is zero.

Significance of the Impact: No adverse effect on European Site Integrity.

Rationale for Impact Evaluation:

- Absence of pathways for adverse effects.

Element 5: UWF Other Activities

The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. No works occur in close proximity to Clare Glen SAC. Overall magnitude is evaluated as negligible.

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<p>Significance of the Impact: No adverse effect on European Site Integrity.</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Absence of pathways for adverse effects.
<p>Evaluation of Other Cumulative Impacts – Decrease in instream aquatic habitat quality</p>
<p>Whole UWF Project Effect</p>
<p>Magnitude: Whole UWF Project effects are in the order of the UWF Grid connection impact described above. Negligible magnitude in line with the evaluation for the Grid Connection element alone.</p>
<p>Significance of the Whole Project Impact: No adverse effects on the Integrity of the Clare Glen SAC</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year (Project Design Measure), which puts works outside of key sensitivity periods for the aquatic receptors. Flow conditions during this period are also likely to be lower, with lower relative contributions from surface water run-off; • The in-stream works will not be undertaken without isolation of flow within the watercourse, prior to the in-stream works commencing (Project Design Measure); • Implementation of the Project Design Measures for Water Quality protection (PD11 to PD45) through the Surface Water Management Plan for UWF Grid Connection • There will be no direct discharge of pumped water into the watercourse during the works (Project Design); • The spatial extent of effects to the watercourse channel will occur within the footprint of any works at potential culvert replacement locations; • The frequency of such an event is once for any culvert replacement works; • The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat. • all works to bridge parapet walls will only be undertaken with the use of debris netting, affixed to the outside of walls to prevent debris falling into the river; • The dilution factor of the main channel of the Clare River will avoid any alteration to hydrology; • Impacts to the watercourse channel are temporary and reversible. The duration of any reductions in the quality of downstream habitats due to siltation or the introduction of pollutants are considered with regard to Clare Glen Qualifying Interests; such effects are evaluated to be temporary to short-term and reversible; and • It's likely only between 100 – 300m of the trench will be excavated in any day with only 1 – 3 watercourse crossings being completed in any one day (assumed 3 work crews). Therefore, taking account of the temporary nature of the works within the catchment, all effects will be brief to temporary in nature and reversible. <p>Qualifying Interests:</p> <ul style="list-style-type: none"> • No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected. • No effects on QI Killarney Fern (<i>Trichomanes speciosum</i>) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p>Cumulative Impact Magnitude: Whole UWF Project effects in combination with other projects and activities are in the order of the UWF Grid connection in-combination effects, described above. Overall cumulative magnitude is negligible.</p>
<p>Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Clare Glen SAC</p>
<p>Rationale for Cumulative Impact Evaluation:</p> <ul style="list-style-type: none"> • In-stream works or culvert replacement works in watercourses upstream of Clare Glen SAC for UWF Grid Connection only relate to the construction works on the Regional Road R503 in the <u>Killeengarrif SC 010 sub-catchment</u> and cable trenching works, joint bay chamber installation and culvert replacement works on the

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<p>section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year (Project Design Measure);</p> <ul style="list-style-type: none"> • Application of comprehensive water quality protection measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all instream works and culvert replacement works (i.e. whether fisheries value or not); • The duration of any reductions in the quality of downstream habitats due to siltation or the introduction of pollutants are considered with regard to Clare Glen Qualifying Interests; such effects are evaluated to be temporary to short-term and reversible. <p>Other Projects</p> <ul style="list-style-type: none"> • the location of Castlewaller Windfarm and the potential Bunkimalta Windfarm predominately in other subcatchments with no pathways to the SAC, • the small scale of potential works for Castlewaller Windfarm upstream of the SAC, and the large separation distance to any potential Bunkimalta Windfarm works; and the large upstream distance to Rearcross quarry. • No contrast to existing baseline conditions or material changes is expected in respect of Forestry, Agriculture and Turfcutting; • A Sediment Control Plan is expected to form part of any future proposed Bunkimalta Windfarm project. <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected. • No effects on QI Killarney Fern (<i>Trichomanes speciosum</i>) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected.

3.8.3.1.2 Effects on QI habitats and/or species along Pathways 2 & 3 from changes to flow regime within or ex-situ the Clare Glen SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> culvert replacement works; movement of soils and machinery; excavation works; new crossing structures</p> <p><u>Cumulative Impact Source:</u> Instream works; new crossing structures;</p> <p><u>Impact Pathway:</u> surface water flowpaths;</p> <p><u>Impact Description:</u> Watercourse morphology relates to the shape of a watercourse channel, its bed and banks and how erosion, transportation of water, sedimentation and the composition of riparian vegetation changes this shape over time. Any change in watercourse morphology which affects channel flow regimes can result in cross factor effects on aquatic ecological communities. Aquatic species are reliant on instream habitat heterogeneity (riffle/glide/pool structure); along with the availability of peak flow flushes (flood/spate); the provision of flows for upstream/downstream migration and the avoidance of barriers to passage; and avoidance of channel constriction during low flow.</p> <p>The creation of adverse flow conditions or habitat limitations due to changes to flow or morphology will be limited to the specific works period within or adjacent to the aquatic habitat.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and /or species and Conservation objectives such as distribution or extent of QI habitat (including a reduction in size), effects to structure and vegetation composition of QI habitat, or an altered hydrological regime, which may alter the supporting habitat quality for QI Species (e.g. Killarney Fern), or affect the distinctiveness of habitats within the SAC.</p> <p>In instances where this impact occurs outside or ex-situ the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>Instream works are limited to the individual crossing points and include trenching works for underground cables, which occur over or under existing watercourse crossing structures where the UWF Grid Connection occurs upstream of the Clare Glen SAC. Works for the UWF Grid Connection also involve the replacement of some existing culverts under public road pavements which have potential to alter flow regimes downstream. As per project design new permanent watercourse crossing structures (replacement culverts) will be a minimum of 900mm in diameter and will be bottomless or clear spanning at W14 (fisheries value).</p> <p>Following works, as per project design, culvert replacement works at W14 and the 7 no. other watercourse crossings (no fisheries value) will be subject to reinstatement works which will include site-specific bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles. These measures will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. Deflector plates will be used if required, to reduce the hydraulic power of the water.</p> <p>As part of Project Design, Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff (PD29, see Section 3.5.1); all culvert replacement works will be subject to the implementation of water quality protection measures PD11-PD45 and will be supervised by a member of CIEEM and the Institute of Fisheries Management (PD41). A Surface Water Management Plan will be implemented</p>	

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during works. In addition all works will be carried out in line with Best Practice (IFI, 2016 as per PD49) and culvert replacement works will not take place without the isolation of flow within the respective watercourse (PD50).

Impact Quality: Negative

Evaluation the Subject Development Impact – Changes to Flow Regime

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Of the 68 No. watercourse crossings required for the UWF Grid Connection, 29 no. (W11-W39 inclusive) are located upstream or are hydrologically connected to the downstream Clare Glen SAC. No watercourse crossing locations are within the SAC boundary, therefore there is no potential for direct effects.

Apart from a larger crossing of the River Clare itself at Watercourse W36, the 29 no. watercourse crossing locations are all minor streams, drains or first order tributaries of the Clare (Annagh) River, along the regional R503 road. At watercourse W36, which is a bridge structure on the Clare River, works will be limited to the road surface with the cable installed in the structure, road level increased, and the parapet walls at this location will be raised (with works taking place from the road surface over the bridge structure).

The remaining crossing points are all over or under existing culverts or bridges on the R503 Regional Road. Due to the nature of some of the culverts (being old masonry box culverts), there is potential that the existing culverts may need to be replaced at 8 no. Watercourses Crossings (W13, W14, W15, W17, W19, W20, W32, & W34).

The potential for altered flow regime likely to affect the downstream Clare Glen SAC relates to sources (excavation works for cable trenches and joint bays, culvert replacement works, parapet works) of additional sedimentation at works locations in close proximity to the 29 No. watercourses, with increased risk at 9 no. watercourse subject to parapet wall works (W36) or potential culvert replacement. Sequential or cumulative effects may occur dependant on how many watercourse crossings are being worked on simultaneously. It's likely only between 100 – 300m of the trench will be excavated in any day with only 1 – 3 watercourse crossings being completed in any one day (assumed 3 work crews).

At the 8 no. locations of potential culvert replacement works, changes to the flow regime will be brief (1 day) and for the duration of the immediate works, restricted to the location of the works area within the footprint of, or directly adjacent to the existing crossing point in the public road. Changes to the flow regime at these crossing locations will be avoided through the carrying out of works during dry weather in dryer months of the year, the isolation of flow and equilibrated restoration, over pumping of the water from upstream to downstream of works, the use of deflector plates, the equilibrated restoration of flow and the sensitive restoration of the bed and banks of these watercourse following works (Project Design). The magnitude of impact is negligible to low, and the duration is long-term and permanent, taking account of Project Design.

At the remaining watercourses upstream of Clare Glen SAC, cables will be installed either under or over the structure. Any changes to flow regime due to sedimentation will be negligible with the implementation of Project Design Measures, such as the use of sandbags to avoid the runoff of sediment laden water from construction works areas, the treatment of any water pumped from excavations prior to discharge, and the carrying out of construction works at and in close proximity to Class 1 or Class 2 watercourses during dry periods. All works to bridge parapet walls will only be undertaken with the use of debris netting, affixed to the outside of walls to prevent debris falling into the river (PD31).

Magnitude evaluated as Negligible.

Significance of the Impact: No adverse effects on the Integrity of the Clare Glen SAC

Rationale for Impact Evaluation:

- Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff.

- Most watercourses are characterized as small, first order streams, which have all been in some way altered by the existing landuse (i.e. agriculture or public road infrastructure);
- The limited extent of direct instream works potentially affecting flow, and the sensitive design of replaced crossing structures following from pre-planning consultation with IFI.
- The brief to temporary duration and reversibility of any effects.
- the implementation of comprehensive water quality Project Design protection measures which will minimize/avoid sediment laden runoff from entering watercourses;

Qualifying Interests:

- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
- No effects on QI Killarney Fern (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected

Element 1: UWF Grid Connection – cumulative impact

There is no potential for cumulative effects with the Other Elements of the Whole UWF Project because none of the Other Elements occur or involve instream works or earthworks, within or upstream of Clare Glen SAC and therefore it is evaluated that the Other Elements of the Whole UWF Project will not contribute to in-combination flow regimes effects to Clare Glen SAC.

In respect of a potential Bunkimalta Windfarm and its associated Grid Connection, the majority of this potential project is located in a separate subcatchment (Newport[Tipperary]_SC_010) and therefore has no potential to cause in-combination effects to the Clare Glen SAC. Based on the previous 2013 layout for Bunkimalta, a number of turbines an associated access roads could be located in the Killeengarriff subcatchment upstream of the Clare Glens and therefore instream works and earthworks could occur. However, due to the upstream distance between the potential Bunkimalta Windfarm and the SAC, that any impacts on downstream flow regimes will be of negligible magnitude.

There is limited potential for cumulative effects with Castlewaller Windfarm (should it be constructed during the same period as UWF Grid Connection), this only relates to the potential use (and widening) of an existing forestry entrance off the R503 and a c.1km length of access road using existing forestry road to the Castlewaller Windfarm site, however instream works are not expected as watercrossing structures are expected to be already in place, works at the entrance will be small scale, and therefore any contribution to in-combination effects to the downstream SAC will be negligible.

Also in relation to Castlewaller Windfarm, while a short length of the potential grid connection (c.400m) occurs within the Killeengarriff subcatchment, it drains into the Clare River at a point downstream of the SAC, and therefore this part of a potential grid connection cannot contribute to in-combination effects. The windfarm is entirely located in a separate subcatchment (Newport [Tipperary]_SC_010) and therefore has no potential to cause in-combination effects to the Clare Glen SAC.

Agriculture, forestry and turf cutting are on-going and form part of the baseline conditions. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.

Rearcross Quarry partially occurs within the Killeengarriff subcatchment, 12km upstream of the SAC. The upstream distance and the management of water onsite negates any cumulative effects on the Clare Glen SAC. Overall, any cumulative flow regime effects are negligible.

The spatial extent of any cumulative flow regime effects will occur within the footprint of the instream works or culvert replacement works, extending to immediately downstream where hydrological flow character may be altered locally due to bank or river bed modification or hydrological modification works; however, this is not expected to occur downstream as far as Clare Glen SAC and therefore cumulative changes to flow regime due to instream works on the SAC are not expected.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Clare Glen SAC

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Rationale for Impact Evaluation:	
<ul style="list-style-type: none"> • The other project elements are not located upstream of Clare Glen SAC; • The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture); • The limited extent of direct instream works (culvert replacement works) potentially affecting flow; • The sensitive crossing designs to be implemented (Project Design); • The brief to temporary duration and reversibility of any effects; 	
Other Projects	
<ul style="list-style-type: none"> • the location of Castlewaller Windfarm and the potential Bunkimalta Windfarm predominately in other subcatchments with no pathways to the SAC, • the small scale of potential works for Castlewaller Windfarm upstream of the SAC, and the large separation distance to any potential Bunkimalta Windfarm works; and the large upstream distance to Rearcross quarry. • No contrast to existing baseline conditions or material changes is expected in respect of Forestry, Agriculture and Turfcutting. 	
Qualifying Interests:	
<ul style="list-style-type: none"> • No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected. • No effects on QI Killarney Fern (<i>Trichomanes speciosum</i>) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 2: UWF Related Works	
Impact Magnitude:	
No works are proposed upstream of Clare Glen SAC. Magnitude is zero.	
Significance of the Impact: No adverse effect on European Site Integrity.	
Rationale for Impact Evaluation:	
<ul style="list-style-type: none"> • Absence of pathways for adverse effects. 	
Element 3: UWF Replacement Forestry	
Impact Magnitude:	
No works are proposed upstream of Clare Glen SAC. Magnitude is zero.	
Significance of the Impact: No adverse effect on European Site Integrity.	
Rationale for Impact Evaluation:	
<ul style="list-style-type: none"> • Absence of pathways for adverse effects. 	
Element 4: Upperchurch Windfarm	
Impact Magnitude:	
No works are proposed upstream of Clare Glen SAC. Magnitude is zero.	
Significance of the Impact: No adverse effect on European Site Integrity.	
Rationale for Impact Evaluation:	
<ul style="list-style-type: none"> • Absence of pathways for adverse effects. 	
Element 5: UWF Other Activities	
The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. No works occur in close proximity to Clare Glen SAC. Overall magnitude is evaluated as negligible.	
Significance of the Impact: No adverse effect on European Site Integrity.	
Rationale for Impact Evaluation:	
<ul style="list-style-type: none"> • Absence of pathways for adverse effects. 	
Evaluation of Other Cumulative Impacts – Changes to Flow Regime	
Whole UWF Project Effect	

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<p>Whole UWF Project effects are in the order of the UWF Grid connection impact described above. Negligible magnitude in line with the evaluation for the Grid Connection element alone.</p>
<p>Significance of the Whole Project Impact: No adverse effects on the Integrity of the Clare Glen SAC</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. Most watercourses are characterized as small, first order streams, which have all been in some way altered by the existing landuse (i.e. agriculture or public road infrastructure); The limited extent of direct instream works potentially affecting flow, and the sensitive design of replaced crossing structures following from pre-planning consultation with IFI. The brief to temporary duration and reversibility of any effects. the implementation of comprehensive water quality Project Design protection measures which will minimize/avoid sediment laden runoff from entering watercourses; <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected. No effects on QI Killarney Fern (<i>Trichomanes speciosum</i>) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p>Impact Magnitude: Whole UWF Project effects in combination with other projects and activities are in the order of the UWF Grid connection in-combination effects, described above. Overall cumulative magnitude is negligible.</p>
<p>Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Clare Glen SAC</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> The other project elements are not located upstream of Clare Glen SAC; The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture); The limited extent of direct instream works (culvert replacement works) potentially affecting flow; The sensitive crossing designs to be implemented (Project Design); The brief to temporary duration and reversibility of any effects; <p><u>Other Projects</u></p> <ul style="list-style-type: none"> the location of Castlewaller Windfarm and the potential Bunkimalta Windfarm predominately in other subcatchments with no pathways to the SAC, the small scale of potential works for Castlewaller Windfarm upstream of the SAC, and the large separation distance to any potential Bunkimalta Windfarm works; and the large upstream distance to Rearcross quarry. No contrast to existing baseline conditions or material changes is expected in respect of Forestry, Agriculture and Turfcutting. <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected. No effects on QI Killarney Fern (<i>Trichomanes speciosum</i>) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected

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3.8.3.1.3 Effects on QI habitats and/or species along Pathways 2 & 3 from Riparian habitat degradation within or ex-situ the Clare Glen SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> culvert replacement works; movement of soils and machinery; excavation works; reinstatement works</p> <p><u>Cumulative Impact Source:</u> Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Reinstatement</p> <p><u>Impact Pathway:</u> Soils; Direct contact</p> <p><u>Impact Description:</u> The riparian corridor along a watercourse relates to the interface between the aquatic habitat, the bankside vegetation and terrestrial environment. An intact, semi-natural riparian zone has significant beneficial services in the protection of instream aquatic habitat quality, food/nutrient contributions, and temperature regulation. Existing riparian habitat quality within the study area is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works.</p> <p>The removal of, or damage to, riparian vegetation during instream works or excavation/ground clearance works in close proximity to any watercourse has the potential to impact on the quality of riparian habitats which in turn can affect watercourse morphology, shading, bank stability, and nutrient and sediment loading and result in indirect effects on aquatic species.</p> <p>The magnitude of resultant effects is expected to be higher when this occurs within an SAC as to without, given that effects are naturally localised. However downstream effects may occur to European Sites where suitable connectivity exists especially if riparian habitat degradation ex-situ leads to increased downstream sediment loads, resulting in downstream changes to the hydrological regime of European Sites, potential changes in water levels, erosion levels or other habitat requirements.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, an altered hydrological regime and through secondary effects on QI species, or affect the distinctiveness of habitats within the SAC.</p> <p>In instances where this impact occurs outside or ex-situ the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>As part of Project Design, all instream works will be subject to the implementation of water quality protection measures PD11-PD45 and will be supervised by a member of CIEEM and the Institute of Fisheries Management (PD41) - in addition all works will be carried out in line with Best Practice (IFI, 2016 as per PD49).</p> <p>Impact Quality: Negative</p>	
Evaluation the Subject Development Impact – Riparian habitat degradation	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>Of the 68 No. watercourse crossings required for the UWF Grid Connection, 29 no. (W11-W39 inclusive) are located upstream or are hydrologically connected to the downstream Clare Glen SAC. No watercourse crossing locations are within the SAC boundary, therefore there is no potential for direct effects.</p> <p>Apart from a larger crossing of the River Clare itself at Watercourse W36, the 29 no. watercourse crossing locations are all minor streams, drains or first order tributaries of the Clare (Annagh) River, along the regional R503 road. At watercourse W36, which is a bridge structure on the Clare River, works will be limited to the road</p>	

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surface with the cable installed in the structure, road level increased, and the parapet walls at this location will be raised (with works taking place from the road surface over the bridge structure).

The remaining crossing points are all over or under existing culverts or bridges on the R503 Regional Road. Due to the nature of some of the culverts (being old masonry box culverts), there is potential that The existing culverts may need to be replaced at 8 no. Watercourses Crossings (W13, W14, W15, W17, W19, W20, W32, & W34).

The potential for riparian habitat degradation likely to affect the downstream Clare Glen SAC relates to culvert replacement works along the R503 at 8 No. watercourse crossing locations; W13, W14, W15, W17, W19, W20, W32, & W34.

Riparian habitat impacts will be reversible with reinstatement and will be temporary to short-term, limited to the construction phase and early operational stage until vegetation has re-established. The impact magnitude is Low.

Significance of the Impact: No adverse effects on the Integrity of the Clare Glen SAC

Rationale for Impact Evaluation:

- Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited due to the 110kV UGC located within an existing public road and involving already in situ culverts;
- The general context of the locations of potential culvert replacements comprising mainly minor drains and watercourses;
- Minor clearance of riparian vegetation within the footprint of the potential culvert replacements will be required;
- Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions and reversible with reinstatement.
- supervision of all culvert replacement works (W14 and 7 no. other locations at watercourses with sub-optimal or no fisheries value) by a member of CIEEM and the Institute of Fisheries Management

Qualifying Interests:

- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
- No effects on QI Killarney Fern (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

There is no potential for cumulative effects with the Other Elements of the Whole UWF Project because none of the Other Elements occur or involve instream works or earthworks, within or upstream of Clare Glen SAC and therefore it is evaluated that the Other Elements of the Whole UWF Project will not contribute to in-combination effects to Clare Glen SAC.

In respect of a potential Bunkimalta Windfarm and its associated Grid Connection, the majority of this potential project is located in a separate subcatchment (Newport[Tipperary]_SC_010) and therefore has no potential to cause in-combination effects to the Clare Glen SAC. Based on the previous 2013 layout for Bunkimalta, a number of turbines and associated access roads could be located in the Kileengarrif subcatchment upstream of the Clare Glens. However, due to the large upstream distance between the potential Bunkimalta Windfarm and the SAC that any impacts will be of negligible magnitude.

There is limited potential for cumulative effects with Castlewaller Windfarm (should it be constructed during the same period as UWF Grid Connection), this only relates to the potential use (and widening) of an existing forestry entrance off the R503 and a c.1km length of access road using existing forestry road to the Castlewaller Windfarm site, however instream works or works in riparian zones are not expected as watercrossing structures are expected to be already in place, works at the entrance will be small scale, and therefore any contribution to in-combination effects to the downstream SAC will be negligible.

Also in relation to Castlewaller Windfarm, while a short length of the potential grid connection (c.400m) occurs within the Killeengarrif subcatchment, it drains into the Clare River at a point downstream of the SAC, and therefore this part of a potential grid connection cannot contribute to in-combination effects. The windfarm is

entirely located in a separate subcatchment (Newport [Tipperary]_SC_010) and therefore has no potential to cause in-combination effects to the Clare Glen SAC.

Agriculture, forestry and turf cutting are on-going and form part of the baseline conditions. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.

Rearcross Quarry partially occurs within the Kileengarriff subcatchment, 12km upstream of the SAC. The upstream distance and the management of water onsite negates any cumulative effects on the Clare Glen SAC.

Due to the limited extent of culvert replacement works associated with UWF Grid Connection upstream of the Clare Glen SAC, the temporary duration of these works, and the implementation of Project Design, reinstatement and surface water management plans for both the windfarms and grid connections, any cumulative riparian habitat effects are negligible.

The spatial extent of any cumulative riparian habitat effects will occur within the footprint of the instream works or culvert replacement works, extending to immediately downstream where hydrological flow character may be altered locally due to bank or river bed modification or hydrological modification works; however, this is not expected to occur downstream as far as Clare Glen SAC and therefore cumulative effects on the SAC from changes to / loss of riparian habitat upstream are not expected.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Clare Glen SAC

Rationale for Impact Evaluation:

- Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations,
- No overlap between UWF Grid Connection and the Other Elements, as works will take place in separate catchments.
- Separation distance to upstream in combination Projects and consented measures to be implemented as part of those projects;
- The localized nature of any effects, upstream from and outside the SAC.

Qualifying Interests:

- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
- No effects on QI Killarney Fern (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected.

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

Element 2: UWF Related Works

Impact Magnitude:

No works are proposed upstream of Clare Glen SAC. Magnitude is zero.

Significance of the Impact: No adverse effect on European Site Integrity.

Rationale for Impact Evaluation:

- Absence of pathways for adverse effects.

Element 3: UWF Replacement Forestry

Impact Magnitude:

No works are proposed upstream of Clare Glen SAC. Magnitude is zero.

Significance of the Impact: No adverse effect on European Site Integrity.

Rationale for Impact Evaluation:

- Absence of pathways for adverse effects.

Element 4: Upperchurch Windfarm

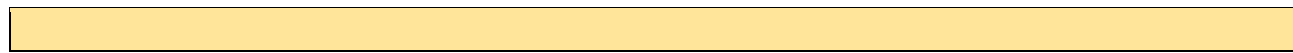
Impact Magnitude:

No works are proposed upstream of Clare Glen SAC. Magnitude is zero.

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<p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity.</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Absence of pathways for adverse effects.
<p>Element 5: UWF Other Activities</p>
<p>The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. No activities occur in close proximity to Clare Glen SAC. Overall magnitude is evaluated as negligible.</p>
<p><u>Significance of the Impact:</u> No adverse effect on European Site Integrity.</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Absence of pathways for adverse effects.
<p>Evaluation of Other Cumulative Impacts – Riparian habitat degradation</p>
<p>Whole UWF Project Effect</p>
<p>Cumulative Impact Magnitude: Whole UWF Project effects are in the order of the UWF Grid connection impact described above. Negligible magnitude in line with the evaluation for the Grid Connection element alone.</p>
<p>Significance of the Whole Project Impact: No adverse effects on the Integrity of the Clare Glen SAC</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited due to the 110kV UGC located within an existing public road and involving already in situ culverts; • The general context of the locations of potential culvert replacements comprising mainly minor drains and watercourses; • Minor clearance of riparian vegetation within the footprint of the potential culvert replacements will be required; • Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions and reversible with reinstatement. • supervision of all culvert replacement works (W14 and 7 no. other locations at watercourses with sub-optimal or no fisheries value) by a member of CIEEM and the Institute of Fisheries Management <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected. • No effects on QI Killarney Fern (<i>Trichomanes speciosum</i>) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p>Impact Magnitude: Whole UWF Project effects in combination with other projects and activities are in the order of the UWF Grid connection in-combination effects, described above. Overall cumulative magnitude is negligible.</p>
<p>Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Clare Glen SAC</p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations, • No overlap between UWF Grid Connection and the Other Elements, as works will take place in separate catchments. • Separation distance to upstream in combination Projects and consented measures to be implemented as part of those projects; • The localized nature of any effects, upstream from and outside the SAC. <p><u>Qualifying Interests:</u></p> <ul style="list-style-type: none"> • No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected. • No effects on QI Killarney Fern (<i>Trichomanes speciosum</i>) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.) as defined in CO targets are expected.

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3.8.3.1.4 Effects on QI habitats and/or species along Pathways 2 & 3 from the Spread of Invasive Aquatic Species within or ex-situ Clare Glen SAC

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> culvert replacement works; excavation works, movement of soils and machinery; <u>Cumulative Impact Source:</u> Instream works; Excavation works, movement of soils and machinery <u>Impact Pathway:</u> Surface water; Movement of soils and machinery</p> <p><u>Impact Description:</u> Invasive aquatic species include non-native, terrestrial invasive species such as Japanese knotweed or Himalayan balsam, invasive riparian vegetation (such as Japanese knotweed) and also fish and mobile invertebrate fauna (such as Asian clam, Signal crayfish, or non-native shrimp species). Aquatic invasive species may be introduced to unaffected catchments or spread within infected watercourses during the course of instream works or transported via excavated material by site machinery.</p> <p>Aquatic invasive species have the potential for significant ecosystem disturbance, disrupting the predator/prey balance or causing habitat disruption within aquatic systems. The spread of aquatic invasive species is not restricted in extent to the footprint of construction/instream works, but can be transported both upstream (mobile species and 3rd party transport) and downstream (hydrological transport) within a watercourse, potentially extending throughout the catchment.</p> <p>Non-native, invasive species potentially affecting the aquatic environment can also include terrestrial species which compromise bank integrity, riparian structural diversity and riparian invertebrate production contributing to habitat diversity and feeding inputs within the aquatic system.</p> <p>Were the impacts described above to occur within an SAC watercourse it may result in direct adverse effects on QI habitats and Conservation objectives such as distribution and extent of QI habitat (including a reduction in size), effects to structure and composition of QI habitat, an altered hydrological regime and through secondary effects on QI species, reduce the distinctiveness of the SAC. Invasive species and the spread thereof within Clare Glen could result in a decline in Killarney Fern through a) increased competition and b) in some instances where woodland management recommends the removal of invasive species (once established), this very removal can alter environmental conditions around light, humidity and temperature.</p> <p>In instances where this impact occurs outside or <i>ex-situ</i> the SAC it may, dependant on source magnitude, degree of hydrological connectivity and presence or absence of mitigating measures in line with tried and tested methods, have secondary adverse effects on supporting habitats and/or species for downstream but ecologically connected Qualifying Interest (QI) Habitats and or/species, thus affecting Site Integrity/Conservation Objectives similarly.</p> <p>The management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plan which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided.</p> <p>Impact Quality: Negative</p>	
Evaluation the Subject Development Impact – Spread of Aquatic Invasive Species	
Element 1: UWF Grid Connection – direct/indirect impact	
<p>Impact Magnitude: There is potential for the introduction of non-native invasive species at all 29 no. (W11-W39 inclusive) watercourse crossings which are located upstream or are hydrologically connected to the downstream Clare Glen SAC. No watercourse crossing locations are within the SAC boundary, therefore there is no potential for direct effects.</p>	

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Apart from a larger crossing of the River Clare itself at Watercourse W36, the 29 no. watercourse crossing locations are all minor streams, drains or first order tributaries of the Clare (Annagh) River, along the regional R503 road. At watercourse W36, which is a bridge structure on the Clare River, works will be limited to the road surface with the cable installed in the structure, road level increased, and the parapet walls at this location will be raised (with works taking place from the road surface over the bridge structure). – no instream works are required.

The remaining crossing points are all over or under existing culverts or bridges on the R503 Regional Road. Due to the nature of some of the culverts (being old masonry box culverts), there is potential that The existing culverts may need to be replaced at 8 no. Watercourses Crossings (W13, W14, W15, W17, W19, W20, W32, & W34).

The potential for the spread of invasive species likely to affect the downstream Clare Glen SAC relates to all crossing works (cable trench) at 29 no. crossings with likelihood increased at 8 no. in the event culvert replacement is required, and due to the movement of machinery over watercourses at existing road crossings; these include the transport, spread or introduction of terrestrial invasive species such as Japanese knotweed or Himalayan balsam, where these species occur widely within the study area. The potential for introduction of aquatic invasive species including mobile invertebrate fauna (such as Asian clam, Signal crayfish, or non-native shrimp species) or invasive riparian vegetation (such as Japanese knotweed), is limited to the culvert replacement locations along the route of the 110kV UGC upstream of Clare Glen (n=8), where works may interact with the aquatic environment to facilitate introduction or spread of aquatic species.

Sequential or cumulative effects may occur dependant on how many watercourse crossings are being worked on simultaneously. It’s likely only between 100 – 300m of the trench will be excavated in any day with only 1 – 3 watercourse crossings being completed in any one day (assumed 3 work crews).

However, all watercourse crossing locations are located outside and upstream of the SAC boundary and the management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plan which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided.

On this basis magnitude is evaluated as negligible.

Significance of the Impact: No adverse effects on the Integrity of the Clare Glen SAC

Rationale for Impact Evaluation:

- The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, spread of aquatic invasive species is evaluated as non-reversible; however
- the implementation of the Invasive Species Management Plan and adherence to best practice Biosecurity Protocols (IFI, 2010) will ensure that there is no likelihood of this effect occurring.

Qualifying Interests:

- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
- No effects on QI Killarney Fern (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.), or the introduction of Invasive Species, as defined in CO targets are expected.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: As evaluated above, there is potential for the spread of invasive species either along the riparian corridor, or within the aquatic environment, at the 29 No. watercourse crossing points associated with UWF Grid Connection, and which are upstream of Clare Glen SAC, due to the carrying out of works at or in close proximity to watercourses, and due to the movement of machinery over watercourses along the road verge, where existing infestations of negative species occur (e.g. Japanese knotweed, Himalayan balsam, etc.).

There is no potential for cumulative effects with the Other Elements of the Whole UWF Project because none of the Other Elements occur or involve instream works or earthworks, within or upstream of Clare Glen SAC and

therefore it is evaluated that the Other Elements of the Whole UWF Project will not contribute to in-combination flow regimes effects to Clare Glen SAC.

In relation to Other Projects: it is expected that Best Practice biosecurity measures will be implemented for the potential Bunkimalta Windfarm (and consented grid connection) to prevent the spread of invasive species by those developments to ensure compliance with legislative requirements. While the consented Castlewaller Windfarm includes the implementation of Best Practice including a monitoring and evaluation Programme in respect of Japanese Knotweed to be implemented as part of its EMP, cumulative impact magnitude is evaluated as Low in the Killeengarrif_SC_010 sub-catchment.

In relation to Rearcross Quarry, This quarry is evaluated as unlikely to result in cumulative effects in relation to the spread of Invasive species to aquatic ecology-based receptors. Whilst traffic to and from the quarry along the R503 may pass in close proximity to identified infestations, the ISMP measures implemented as part of UWF Grid Connection will avoid the influence of quarry related traffic as vectors for the spread of aquatics. In combination magnitude is evaluated as negligible.

Agriculture, forestry and turf cutting are on-going and form part of the baseline conditions. No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area. The magnitude of any potential cumulative effects is evaluated as negligible.

However the management of non-native, invasive species at UWF Grid Connection works locations will be subject to a bespoke Invasive Species Management Plan for UWF Grid Connection which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species (by UWF Grid Connection) is avoided, and therefore it is considered that this cumulative impact is unlikely to occur.

The overall cumulative impact magnitude is negligible.

Significance of the Cumulative Impact: No adverse effects on the Integrity of the Clare Glen SAC

Rationale for Impact Evaluation:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, the spread of aquatic invasive species is evaluated as non-reversible.
- The location of the UWF Grid Connection, upstream of Clare Glen, predominately in a separate catchment to the Other Elements of the Whole UWF Project;
- The implementation of the Invasive Species Management Plan for UWF Grid Connection will avoid the UWF Grid Connection contributing to any effects from Other Elements or Other Projects.

Other Projects

- The construction of the consented Bunkimalta wind farm and its associated elements, will be obliged to meet its statutory requirements with regard to the introduction or spread of invasive species as set out in the birds and habitats regulations- with specific reference to species listed in Annex III of those regulations.
- The construction of the consented Castlewaller wind farm, will be obliged to meet the requirements set out in the Ecological Management Plan, in addition to its statutory requirements with regard to the introduction or spread of invasive species as set out in the birds and habitats regulations- with specific reference to species listed in Annex III of those regulations.
- it is assumed that the Castlewaller grid connection element (which may be proposed at a future date), will include best practice control measures to prevent the spread of invasive species, to meet regulatory requirements.
- No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area

Qualifying Interests:

- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.

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<ul style="list-style-type: none"> • No effects on QI Killarney Fern (<i>Trichomanes speciosum</i>) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.), or the introduction of Invasive Species, as defined in CO targets are expected.
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
Element 2: UWF Related Works
Impact Magnitude: No works are proposed upstream of Clare Glen SAC. Magnitude is zero.
Significance of the Impact: No adverse effect on European Site Integrity.
Rationale for Impact Evaluation: • Absence of pathways for adverse effects.
Element 3: UWF Replacement Forestry
Impact Magnitude: No works are proposed upstream of Clare Glen SAC. Magnitude is zero.
Significance of the Impact: No adverse effect on European Site Integrity.
Rationale for Impact Evaluation: • Absence of pathways for adverse effects.
Element 4: Upperchurch Windfarm
Impact Magnitude: No works are proposed upstream of Clare Glen SAC. Magnitude is zero.
Significance of the Impact: No adverse effect on European Site Integrity.
Rationale for Impact Evaluation: • Absence of pathways for adverse effects.
Element 5: UWF Other Activities
The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities. No works occur in close proximity to Clare Glen SAC. Overall magnitude is evaluated as negligible.
Significance of the Impact: No adverse effect on European Site Integrity.
Rationale for Impact Evaluation: • Absence of pathways for adverse effects.
Evaluation of Other Cumulative Impacts – Spread of Aquatic Invasive Species
Whole UWF Project Effect
Cumulative Impact Magnitude: Evaluated as in the order of the UWF Grid Connection element only i.e. there is potential for the introduction of non-native invasive species at all 29 no. (W11-W39 inclusive) watercourse crossings which are located upstream or are hydrologically connected to the downstream Clare Glen SAC. No watercourse crossing locations are within the SAC boundary, therefore there is no potential for direct effects.
The other elements of the Whole UWF Project do not require instream works upstream or in close proximity to watercourses hydrologically upstream of Clare Glen SAC.
However all watercourse crossing locations are located outside and upstream of the SAC boundary and the management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plans for UWF Grid Connection which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided.
Impact Magnitude is negligible.

Significance of the Whole Project Impact: No adverse effects on the Integrity of the Clare Glen SAC

Rationale for Cumulative Impact Evaluation:

- The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, spread of aquatic invasive species is evaluated as non-reversible; however
- the implementation of the Invasive Species Management Plan and adherence to best practice Biosecurity Protocols (IFI, 2010) will ensure that there is no likelihood of this effect occurring.

Qualifying Interests:

- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
- No effects on QI Killarney Fern (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.), or the introduction of Invasive Species, as defined in CO targets are expected.

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

Cumulative Impact Magnitude:

There is the potential for introduction of non-native, invasive aquatic species at 29 No. watercourse crossing works locations, associated with the Whole UWF Project, and which are outside but hydrologically upstream of Clare Glen SAC.

Although the presence of invasive species throughout the study area, established as the baseline condition and thus contributing to the risk of spread where infestations from one location to another is noted, cognisance is also given to the management of non-native, invasive species through the bespoke Invasive Species Management Plan for both UWF Grid Connection which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided.

With regard to Other Projects, it is considered that while Castlewaller Windfarm and the potential Bunkimalta Windfarm both have potential to spread invasive species, that it is not likely to occur due to the expected implementation and adherence to Best Practice in the eradication and treatment of invasive species to ensure compliance with legislative requirements.

It is also assumed that these other projects will include best practice control measures to prevent the spread of invasive species, to meet regulatory requirements.

The cumulative Impact magnitude is negligible.

Significance of the Whole Project Cumulative Impact: No adverse effect on the Integrity of the Clare Glen SAC

Rationale for Cumulative Impact Evaluation:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, the spread of aquatic invasive species is evaluated as non-reversible.
- The location of the UWF Grid Connection, upstream of Clare Glen, predominately in a separate catchment to the Other Elements of the Whole UWF Project;
- The implementation of the Invasive Species Management Plan for UWF Grid Connection will avoid the UWF Grid Connection contributing to any effects from Other Elements or Other Projects.

Other Projects

- The construction of the consented Bunkimalta wind farm and its associated elements, will be obliged to meet its statutory requirements with regard to the introduction or spread of invasive species as set out in the birds and habitats regulations- with specific reference to species listed in Annex III of those regulations.
- The construction of the consented Castlewaller wind farm, will be obliged to meet the requirements set out in the Ecological Management Plan, in addition to its statutory requirements with regard to the introduction or spread of invasive species as set out in the birds and habitats regulations- with specific reference to species listed in Annex III of those regulations.

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- it is assumed that the Castlewaller grid connection element (which may be proposed at a future date), will include best practice control measures to prevent the spread of invasive species, to meet regulatory requirements.
 - No material changes in agricultural/forestry/turf-cutting practices are expected or planned in the area
- Qualifying Interests:
- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
 - No effects on QI Killarney Fern (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.), or the introduction of Invasive Species, as defined in CO targets are expected.



3.8.4 Summary of the Impact of UWF Grid Connection on Qualifying Interests of Clare Glen SAC

This section (*Section 3.8*) of the NIS has provided further evaluation of the source-impact pathways identified at Stage 1 Screening as having the potential to result in likely significant effects on the Clare Glen SAC and its respective Qualifying Interests screened in for further appraisal.

The Qualifying Interests screened in for evaluation at Stage 2 were:

- Old Oak Woodlands [91A0]
- Killarney Fern (*Trichomanes speciosum*) [1421]

The above Qualifying Interests both habitats and species have been subject to further examination in respect of their specific sensitivities & Conservation Objectives as to whether the identified pathways/effects can be considered likely to result in adverse effects on European Site Integrity via effects on Conservation Objectives; this has concluded that:

- **No effects on QI Habitat Old Oak Woodlands** [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
- **No effects on QI Killarney Fern** (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.), or the introduction of Invasive Species, as defined in CO targets are expected.

Cognisance has been given at this stage to the various Mitigation Measures designed to specifically avoid adverse effects on European Site Integrity, and to in-combination effects with both other project elements of the Whole Upperchurch Windfarm Project in addition to other plans or activities, or consented projects within the defined temporal and spatial overlap for cumulative or in combination effects. Effects both within and without (i.e. ex-situ) the European Site under consideration have been considered.

The evaluation herein has found, that following the examination and analysis presented, it can be concluded on a reasoned basis, that the proposed development will not result in adverse effects on the Integrity of Clare Glen SAC, in circumstances where no reasonable scientific doubt remains.

Table 19, overleaf in Section 3.8.5 summarises the evaluation of the impact of the UWF Grid Connection on the Integrity of the Clare Glen SAC.

3.8.5 Evaluation of the impact of UWF Grid Connection on the Integrity of the Clare Glen SAC

Using the checklist in the Table below, the UWF Grid Connection is examined, both alone and in-combination with other projects, for adverse impacts on the integrity of the Clare Glen SAC is examined.

Table 19: Integrity of Site checklist

<i>Does the project or plan have the potential to: Yes/No</i>	
- cause delays in progress towards achieving the conservation objectives of the site?	No
- interrupt progress towards achieving the conservation objectives of the site?	No
- disrupt those factors that help to maintain the favourable conditions of the site?	No
- interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No
- change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No
- interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No
- reduce the area of key habitats?	No
- reduce the population of key species?	No
- change the balance between key species?	No
- reduce diversity of the site?	No
- result in disturbance that could affect population size or density or the balance between key species?	No

3.9 Evaluation of Adverse Impacts to the Slievefelim to Silvermines Mountain SPA

The Screening stage evaluated the potential for UWF Grid Connection to impact the Slievefelim to Silvermines Mountain SPA via identified impact pathways (Sections 2.9). The potential for impacts was identified with regard to individual Special Conservation Interest of the SPA. These impacts are evaluated further within this Section 3.9 of the Appropriate Assessment report, to determine whether the UWF Grid Connection project (either alone or in-combination) will affect the favourable conservation status of the special conservation interest, and thus the overall integrity of the Slievefelim to Silvermines Mountain SPA.

The evaluation of the impacts of UWF Grid Connection on the integrity of the Slievefelim to Silvermines Mountain SPA takes account of the following information:

- conservation objectives, outlined at Section 3.9.1 below, for the Special Conservation Interest of the Slievefelim to Silvermines Mountain SPA which was screened in for evaluation at Stage 2;
- the potential impact pathways to the Special Conservation Interest which was screened in for evaluation, these impact pathways are identified in Section 3.4;
- The description of the UWF Grid Connection project as described in Section 3.2 of this report, and its Mitigation Measures as described in see Section 3.5 of this report;
- the descriptions of the other projects as outlined in Section 3.2.7.

3.9.1 Conservation Objectives of the Slievefelim to Silvermines Mountain SPA (004165)

The conservation objectives of the Slievefelim to Silvermines Mountains SPA are provided in Table 20 below, and are available on the National Parks & Wildlife Service website at <https://www.npws.ie/protected-sites>. The conservation objectives outlined in the table below were sourced from NPWS *Conservation objectives for Slievefelim to Silvermines Mountains SPA [004165]. Generic Version 6.0*. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. [Version dated 21/02/2018]]

Table 20: Conservation Objectives of Slievefelim to Silvermines Mountains SPA (004165)

Slievefelim to Silvermines Mountains SPA (004165)			
Hen Harrier <i>(Circus cyaneus)</i>	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:		
	Bird Code A082	Common Name Hen Harrier	Scientific Name <i>Circus cyaneus</i>

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3.9.2 Special Conservation Interest of the Slievefelim to Silvermines Mountain SPA and potential impact pathways which were screened in for evaluation

The Special Conservation Interest and potential impact pathways which were screened in for evaluation are:

Table 21: Special Conservation Interest Screened In due to potential for UWF Grid Connection to cause effects

Special Conservation Interest of the Slievefelim to Silvermines Mountain SPA Screened In due to potential or likelihood of UWF Grid Connection causing effects	Impact Screened in for further consideration at Stage 2
Hen Harrier [A082]	SPA Pathway 1, 2, 3

The SPA Impacts 1 to 3 are described below:

<p>SPA Pathway 1: Direct effects to Special Conservation Interest Species within an SPA (i.e. Disturbance, Mortality)</p> <p>SPA Pathway 2: Indirect effects to Special Conservation Interest Species within an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or reduction/loss of connectivity, or through a reduction in prey item species)</p> <p>SPA Pathway 3: Indirect effects to Special Conservation Interest Species ex-situ an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or loss/reduction in connectivity, reductions in prey item species, or through disturbance or mortality effects to Special Conservation Interest bird species outside their respective SPA).</p>
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3.9.3 Evaluation of the Impact of UWF Grid Connection on the Special Conservation Interest of the Slievefelim to Silvermines Mountain SPA

In order to evaluate the effect of UWF Grid Connection on the integrity of the Slievefelim to Silvermines Mountain SPA, the impact pathways identified above are examined in detail, through a number of focused impact evaluations, as per:

<p>SPA Pathway 1 SPA Pathway 2 SPA Pathway 3</p>	<p><i>Will be examined through these impact evaluations:</i></p>	<ul style="list-style-type: none"> • Permanent or Temporary Reduction or Loss of Suitable Foraging Habitat • Disturbance/Displacement of foraging Hen Harrier, during the breeding season • Disturbance/Displacement of foraging Hen Harrier outside the breeding season • Reduction in Prey Item Species
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The Conservation Objective for the Slievefelim to Silvermines Mountains SPA is (taken from NPWS, 2018):

“to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:”

The favourable conservation status of a species is achieved when (taken from NPWS, 2018):

- *Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats and*
- *The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
- *There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*

On the basis of the above, the identified pathways are evaluated as sufficient to inform a considered and reasoned examination and analysis of habitat effects (such as whether sufficient habitat will continue to be available, and/or the range of the species is not being reduced or is likely to be reduced in the foreseeable future within the SPA under consideration) as a result of the proposed development; direct or indirect/cross-factor effects through displacement or exclusion (another form of habitat loss or possible range reduction) either in the breeding season¹⁹ or winter season, direct and secondary effects on individuals such as disturbance and/or loss of prey items and their subsequent effects on population status within the SPA (i.e. maintenance as a favourable reference population following possibly effects on breeding success and/or annual breeding productivity within the SPA , continuing viability of the SPA population).

Evaluation of In-Combination Effects:

The evaluations of the impact of UWF Grid Connection on the Special Conservation Interests of the Slievefelim to Silvermines Mountain SPA takes into account the in-combination effect with the Other Elements of the Whole UWF Project, and with the following other unrelated projects and activities:

- Rearcross Quarry
- Castlewaller Windfarm
- Bunkimalta Windfarm
- Milestone Windfarm
- Curraghduff Quarry
- Agriculture, Forestry and Turf-cutting in the surrounding area.

A description of the other projects is included in Section 3.2.7.

The location of the UWF Grid Connection, and the other projects, in relation to the Slievefelim to Silvermines Mountain SPA is illustrated on the following mapping, which are contained in **Appendix A9: Accompanying Figures** of this Appropriate Assessment Report:

AA Figure 9: Location of UWF Grid Connection in relation to Slievefelim to Silvermines Mountain SPA

AA Figure 15: Location of UWF Grid Connection and other projects in relation to Slievefelim to Silvermines Mountain SPA.

¹⁹ We note that the Site Synopsis for the SPA cites that it is of ‘*ornithological importance because it provides excellent nesting and foraging habitat for breeding Hen Harrier (emphasis added) and is one of the top sites in the country for the species’* – Examination and analysis is also presented herein in respect of possible effects on Hen Harrier outside the breeding season, for completeness and in line with a precautionary principle.

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3.9.3.1 Evaluation of SPA Impacts 1, 2 & 3

3.9.3.1.1 Effects on SCI species along Pathways 2 & 3 from Permanent or Temporary Reduction or Loss of Suitable Foraging Habitat

Impact Description	
Project Life Cycle Stage:	Construction/Operational stage
<p><u>Impact Source:</u> Land cover change, vegetation clearance; earthworks, <u>Cumulative Impact Source:</u> Land cover change, forestry felling, removal of hedgerows, Land cover change from Agricultural Practices such as drainage, Direct habitat loss through peat extraction of intact bog, and habitat loss through forest maturation. Impact Pathway: Land cover</p> <p><u>Impact Description:</u> Hen Harrier is a very high sensitivity receptor of International Importance and special conservation interest of the SPA under consideration.</p> <p>Permanent Land take or land use/cover change of positively selected foraging habitats (i.e. suitable and within the established core range for connectivity to a nest) during the construction stage may cause secondary effects for this Annex I species and SPA special conservation interest. Studies have shown that most foraging takes place within 2km of the nest site, and as per SNH Guidance this is considered the core foraging range for Hen Harrier. The magnitude of effects is distance (to nearest nest) dependant, as the area within a certain radius of the nest increases as the square of this distance, for example hunting concentration becomes 10 times less between 2km and 5km from the nest compared to within 2km of the nest (Irwin <i>et al.</i>, 2012).</p> <p>Although home range size may vary between locations and across individuals, it is clear from studies that Harrier females during the breeding season hunt closer to nests than males (e.g. Arroyo <i>et al.</i>, 2006²⁰); home ranges of females are centred on nest sites and on average may be half the area of that of males. In a Scottish study (Arroyo <i>et al.</i>, 2014²¹) female harriers mostly hunted within 1km of nests.</p> <p>Male birds have larger home ranges (Arroyo <i>et al.</i>, 2006, 2014), but studies also suggest that male harriers mostly hunt within 2km of the nest (Arroyo <i>et al.</i>, 2014), but can hunt further away (out to 10km (SNH, 2016)). In a study of Northern Harrier, Martin 1987, found that 85% of all male activity occurred within 3km of the nest. Furthermore, studies have shown that the amount of time spent foraging by Hen Harrier (expressed in min/km²) decreases with distance from the nest (Madders (2003)).</p> <p>Of particular importance and where pathways for likely significant effects are more likely are lands which provide high quality foraging habitat (both within the SPA boundary and ex-situ) within 2km of nests and on which breeding Hen Harrier (male or female birds) may be dependent during key periods of the breeding cycle such as provisioning young. Loss of suitable habitat may affect breeding success/productivity for one whole cycle, or until vegetation is re-instated both when considered alone and in combination with other possible sources of loss. Loss of high dependency foraging habitat, where it occurs in close proximity to nesting locations, at key periods of the breeding cycle may result in reduced productivity and/or nest success, in particular where it occurs within 2km of a nest location <u>and</u> where limited alternative habitat is available. Effects on nesting success may impact conservation objectives around maintaining the favourable conservation condition of the bird species through affecting breeding success (annual breeding output) and in turn population status and/or future viability. Short</p>	

²⁰ Arroyo, B., Leckie, F., Redpath, S. (2006) Habitat Use and Range Management on Priority Areas for Hen Harriers: Final Report. Report to Scottish Natural Heritage. First draft- March 2006.

²¹ Arroyo, B., Leckie, F., Amar, A., McCluskie, A. & Redpath, S. (2014) Ranging behaviour of Hen Harriers breeding in Special Protection Areas in Scotland. Bird Study 61: 48-55.

term effects such as over a single breeding season are less likely to impact future viability of the SPA population however a precautionary approach is taken.

The degree of existing foraging habitat within the core foraging range (both within and outside the SPA boundary) is relevant in determining the dependency/reliance on any suitable habitat outside of this range, and consequently on the significance of any loss.

The creation of, or sympathetic management of, foraging and nesting habitat within the traditional range of breeding hen harrier positively affect nest success (Forrest *et al.*, 2011).

Impact Quality: Negative, positive and neutral (varies per project)

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

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

There will be no temporary loss of suitable foraging habitat as a result of the construction of UWF Grid Connection within or outside the SPA.

Permanent land use change will only occur at the Mountphilips Substation site in Coole and Mountphilips townlands, located outside the SPA. All works for UWF Grid Connection outside of the Mountphilips Substation site (i.e. the 110kV UGC) will take place on paved roadways where there is no potential for any temporary or permanent, suitable habitat loss.

The amount of suitable habitat loss at the Mountphilips Substation site relates to a very small area (0.05ha or 1/7th of an acre) of wet grassland (GS4) which will permanently change to new access road. This area of suitable habitat is located in the 2nd field between the site entrance and the substation compound. As the nearest nest (Nest Site A) is 4.6km from this suitable habitat at the Mountphilips Substation site, this habitat is considered to be sub-optimal based on distance from nest, within the context of the species preference for nest site fidelity and the available habitat within the core foraging range.

Foraging habitat surveys have shown that c. 33% of lands within 2km of Nest A comprise suitable foraging habitat (420ha at minimum plus 77km of linear features), supporting the assertion that there will be no reliance by nesting birds on the suitable habitat at the Mountphilips Substation site, based on habitat availability closer to the Nest A location. Therefore, the magnitude of foraging habitat loss is evaluated as Negligible.

In addition it is considered that whilst male harriers can occur and forage at distances greater than 3km from a nest, given the project design measures as part of the project, that the probability of foraging birds occurring at this isolated location (in the context of the nearby SPA and available habitat therein), and at frequencies sufficiently high to result in significant consequences on breeding, is very low.

As part of the design of the Mountphilips Substation site, 700m of new hedgerow, comprising a mix of native tree species, will be planted along each side of the new access road during the construction stage, and will provide permanent suitable foraging habitat in the form of new linear features at the Mountphilips Substation site. However, due to the separation distance from the nearest nest, the magnitude of this positive impact will also be Negligible.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier, and Negligible magnitude of foraging habitat loss;
- Long term (permanent) duration, and low reversibility;
- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and;
- the separation distance of >4.5km from landcover change to nearest known nest (Nest Site A) within the study period;
- Studies have shown that most foraging occurs within 2km of a nest and reduces thereafter with distance;
- The very small extent of suitable habitat which will be lost – 0.05ha;

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- The scale and availability of suitable foraging habitat within 2km of Nest Site A, and the distance to Mountphilips;
- The magnitude of effect, on the sensitive aspect Hen Harrier, following Percival *et al.* is evaluated as ‘Negligible’ (0-1% of habitat lost), equivalent to a non-distinguishable change away from baseline conditions, and;
- The provision of 700m of new hedgerow along the new access road, will provide new permanent linear habitat in the longer term for hen harrier.
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability.

Element 2: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The loss of foraging habitat only relates to the Mountphilips Substation, which has been evaluated as being of Negligible magnitude and sub-optimal due to the separation distance (4.6km) from the nearest hen harrier nest (Nest Site A) within the SPA. Habitat surveys at Nest Site A also demonstrate that there is sufficient foraging habitat (at least 33%) within 2km of this nest (within or outside the SPA), and therefore it is evaluated that there would be no reliance on the suitable habitat at Mountphilips, which is also outside the SPA. In addition it is considered that whilst male harriers may occur and forage at distances greater than 3km from a nest, given the project design measures as part of the project, that the probability of foraging birds occurring at this isolated location (in the context of the nearby SPA and available habitat therein), and at frequencies sufficiently high to result in significant consequences on breeding, is very low.

Due to the above, it is evaluated that there is no potential for the Mountphilips Substation site to cumulatively affect Nest Site A in combination with consented Castlewaller Windfarm, potential Bunkimalta Windfarm, Forestry activities, Turf Cutting or Agricultural activities in the surrounding area. In addition, the hen harrier management plans for the windfarm sites will result in Neutral impacts from these projects. Impacts from agriculture and forestry in areas surrounding Mountphilips itself are evaluated as negligible.

It is also considered that the potential for synergistic effects on other nesting territories such as for example if birds from the nearest nest (in this case nest A) were forced to rely on lands elsewhere, resulting in intraspecific competition are avoided due to separation and thus effects on other nests identified are similarly excluded.

In respect of the potential Castlewaller Windfarm grid connection, part of the potential underground cable route is located within 2km of the identified Nest A and Nest C. Any land use change of natural habitats associated with this potential development within 2km of a Hen Harrier is not likely to result in the selection (by Hen Harrier) of lands at Mountphilips for compensatory foraging due to distance, and in combination effects are excluded on this basis.

Due to the separation distance between the Mountphilips Substation site and the Other Elements of the Whole UWF Project, existing Rearcross Quarry or existing Milestone Windfarm, it is considered that no cumulative effects will occur.

There is no potential for cumulative impacts of the 110kV UGC where it is routed through the UWF Related Works/Upperchurch Windfarm area because the route of UWF Grid Connection 110kV UGC is entirely on paved roads (with no foraging habitat loss) within the overlap zone and therefore the UWF Grid Connection 110kV UGC will not cause any loss of habitat and cannot contribute to cumulative impacts. Cumulative impacts with forestry or agriculture, similarly cannot occur with the 110kV UGC works as there is no foraging habitat loss associated with 110kV UGC in the first instance.

No secondary habitat loss will occur in respect of the existing Rear Cross quarrying operations which will provide materials for the development, as aggregate for the UWF Grid Connection and the Other Elements will be supplied within the consented capacity of the quarry.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier, and Negligible magnitude of foraging habitat loss;

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- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and;
- the separation distance of >4.5km from landcover change to nearest known nest (Nest Site A) within the study period, and;
- the loss of suitable foraging habitat at Mountphilips is of too small a scale and too far from the nearest nest (or any other nest) to cause cumulative impacts with other projects or activities in the area.
- Studies have shown that most foraging occurs within 2km of a nest and reduces thereafter with distance;
- No loss of foraging habitat associated with UWF Grid Connection (110kV UGC) where the cumulative evaluation study area overlaps the construction works areas for UWF Related Works and Upperchurch Windfarm.

Other Projects

- The effective habitat loss associated with Milestone Windfarm, Castlewaller Windfarm and Rearcross Quarry is mitigated by the management of lands for the benefit of Hen Harrier, over the lifetime of the wind farm;
- Due to their location within a designated site, the requirement on any future Bunkimalta Windfarm proposal or future Castlewaller grid connection proposal to prove that no significant adverse effects will occur;
- The volumes of aggregate required for the Whole UWF Project will be supplied within the current consented capacity of the Rearcross Quarry;
- The screening process included as part of the NIS submitted with the Curraghduff Quarry proposal determined that the Slievefelim to Silvermines Mountains SPA will 'not be impacted' by the proposed works;
- Further new afforestation not likely within the SPA, in the context of longer term background trends are likely to become neutral, and with requirement on projects within a designated site (including planting /felling licenses and ancillary activities or works) to prove that no significant adverse effects will occur;
- The restrictions on further turf cutting in intact areas/protected areas, the limited extent of lands subject to turbarry (rights to cut turf) within the Hen Harrier SPA overall (4%), with little of this occurring within the cumulative evaluation study area; and the reversibility of any effect, (in the context of Hen Harrier) with birds expected to continue to utilize re-vegetating cutover bog for foraging;
- Information on trends in agriculture in relation to intensification or abandonment is generally unavailable.
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability.

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

Element 2: UWF Related Works

Impact Magnitude:

Note: Within the UWF Related Works site, HW7 is the only location where the site boundary **overlaps the Hen Harrier SPA**. No construction works and no land use change will take place within the SPA boundary, in line with the precautionary principle, to avoid effects on habitats possibly suitable for Hen Harrier. All other UWF Related Works locations and lands are located **outside the SPA**.

Total permanent land take of suitable foraging habitat is confined to improved agricultural grassland (0.12Ha); Wet Grassland (0.07Ha), upland blanket bog/Conifer mosaic (0.01Ha), Mature or closed canopy conifer plantation (0.28Ha) and scrub (0.004Ha) and totals 0.48Ha. None of this 0.48ha of suitable foraging habitat is within 2km (i.e. the core range) of an identified nest- in fact the nearest is Nest Site H1 at 4.5km to the west, within the SPA.

Foraging habitat surveys of the 2km core foraging habitat area around Nest Site H1 demonstrate that there is at minimum 51% suitable foraging habitat within 2km of the nest (644Ha of suitable foraging habitat and ca.24km of linear features), and it is evaluated that there will be no reliance by foraging Hen Harrier on suitable habitat therefore at the UWF Related Works site. There is a Very low probability therefore of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and; Temporary habitat loss relates to up to 4.6km of internal cabling located in agricultural lands and 2.1km located in forestry lands, in addition to c.1500m of temporary access roads at 4 no. differing locations; all of which will occur outside the Hen Harrier breeding season as Project Design. All these lands will be available for foraging within one growing season once vegetation has re-established. All temporarily removed sections of field boundary will be re-instated following the completion of works in any area, with at least 3-year-old native species.

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<p>In addition, a net gain of ca.370m of new hedgerow will be planted at the UWF Related Works site. This will comprise locally sourced native species.</p>
<p>Overall the magnitude of foraging loss as a result of the development of UWF Related Works is evaluated as Negligible.</p>
<p>Significance of the Impact: No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The very high sensitivity rating of the species (context), and negligible magnitude; • The small extent of permanent habitat loss, evaluated as a very slight change from baseline condition, and; • The long-term duration of permanent habitat loss, however; • No effects will take place within the SPA; • The Separation distance from the SPA; • The reversibility of temporary habitat loss is expected within the temporary-short term period, also; • The nearest active Hen Harrier nests are at least 4.5km from works, and foraging habitat surveys demonstrate that at this distance there will be no reliance by nesting Hen Harrier on the foraging habitat at UWF Related Works; • The reversibility of the impact with the reinstatement of lands at temporary works locations. • Based on distance to nest H1 , Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability.
<p>Element 3: UWF Replacement Forestry</p>
<p>Impact Magnitude: UWF Replacement forestry is not located within the SPA. Available foraging habitat for Hen Harrier currently within the land folio boundary comprises improved agricultural grassland (3.54Ha); Wet Grassland (0.44Ha) and Scrub (0.01Ha); in total 3.99Ha. This entire area will undergo landuse change to UWF Replacement Forestry (deciduous forestry) to be managed specifically for the use of Hen Harrier, including the incorporation of ‘tried and tested’ management measures which will facilitate Hen Harrier foraging and usage such as the provision of ride lines and clearings within the new woodland.</p> <p>Although the nearest nest site to UWF Replacement Forestry is 6.8km to the west (Nest Site H1), which has >50% suitable habitat available for foraging within 2km of the nest (636Ha plus ca.23km of linear features), the location of the UWF Replacement Forestry adjacent to Upperchurch Hen Harrier Scheme areas, will increase the availability of suitable foraging habitat for Hen Harrier outside but proximal to the SPA, and therefore the magnitude of this positive impact is evaluated as Medium.</p>
<p>Significance of the Impact: No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The very high sensitivity rating of the species, and the demonstrated sensitivity of Hen Harriers to positive management (context), and; • The small extent of lands to be managed for Hen Harrier, and; • The permanent duration, and; • The Non-reversibility with the new woodland being a permanent woodland, which will not be harvested. • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability.
<p>Element 4: Upperchurch Windfarm</p>
<p>Impact Magnitude: Upperchurch Windfarm is located outside the SPA.</p> <p>As per the 2013 RFI the magnitude of foraging habitat loss was calculated as 95Ha (actual loss plus effective loss through displacement effects). For completeness, given that the estimate of total displacement was based on 2017 as the construction year, an upwardly revised total estimate of 100.22 Ha has been extrapolated from data provided in the Upperchurch Windfarm RFI (2013) (See Volume F9: Reference Documents, Table 7 of the UWF Ecological Management Plan). This figure corresponds with 2020/2021 as the construction year – however it is still less than the 128Ha of lands to be provided/managed as additional favourable foraging areas under the conditioned Upperchurch Hen Harrier Scheme (evaluated other ‘UWF Other Activities’).</p>
<p>Significance of the Impact: No adverse effect on European Site Integrity</p>

Rationale for Impact Evaluation:

- The effective loss of 100.22Ha of habitat constitutes an effect of medium magnitude (5-20% of available habitat lost);
- However, this is located outside the SPA boundary;
- The implementation of the Upperchurch Hen Harrier Scheme, as conditioned;
- Very High sensitivity of the species, and;
- Long term duration.
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability.

Element 5: UWF Other Activities

Impact Magnitude:
Neither Haul Route Activities nor Monitoring Activities nor Overhead Line Activities will not result in any loss of foraging habitat either within or outside the SPA.

In total 128ha of habitat will be managed as part of the Upperchurch Hen Harrier Scheme to increase the area of Hen Harrier foraging habitat in proximity to the consented UWF, measures set down in the Upperchurch Hen Harrier Scheme to achieve this include:

- Rush management to control coverage and increase suitability for foraging habitat, promoting prey item species;
- 2,085m increase in hedgerow, resulting in increased edge habitat for foraging and prey items;
- 3ha enclosures of native scrub and trees, increased cover for prey item species;
- Lines of electric fence with plastic fliers so that they are more visible to the Hen Harrier, to avoid mortality;
- Enhancement of the riparian corridor (to maintain corridor value for foraging Hen Harrier): 1220m of woody scrub species, and erect fencing to make stockproof and exclude access to river by livestock.
- The following restrictions will apply to landowners within the Upperchurch Hen harrier Habitat scheme (to maintain habitat suitability): Limited spreading of fertilizer (every 4-5 years); Limited spreading of lime (every 4-5 years); No burning; No excavation of drains or reclaiming heath or bog.

In addition to the management described, workshops are proposed with landowners to advise landowners on the importance and implementation of the above measures.

In total 128Ha of agricultural lands will be managed for the benefit of Hen Harrier, outside the turbine 250m buffer and the footprint of the development; as per the Upperchurch Windfarm EMP. The net gain to Hen Harrier is 128Ha-100.22Ha which is 27.8Ha. The magnitude of this gain is evaluated as High as it constitutes a major alteration to the baseline features present.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- The demonstrated sensitivity of Hen Harriers to positive management (context), and;
- The extent of lands to be managed for Hen Harrier, and;
- The long term duration, and;
- Low reversibility.
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability.

Evaluation of Other Cumulative Impacts – Reduction in or Loss of Suitable Foraging Habitat

Whole UWF Project Effect

Magnitude:
Both positive and negative quality effects occur with regard to Hen Harrier foraging habitat loss across the Whole UWF Project. No negative quality effects occur within the SPA.

Negative effects which stem from the UWF Grid Connection refer to permanent landcover change of 0.05Ha of suitable foraging habitat (GS4) at the Mountphilips Substation site; and 0.48ha of permanent landcover change of suitable habitat at the UWF Related Works site. The affected habitat at both sites is considered sub-optimal due to the separation distance to the nearest Hen Harrier nest (4.6km and 4.5km respectively). Foraging habitat surveys at nearest nests demonstrate that there is sufficient foraging habitat available to Hen Harrier within the core 2km foraging range of each (34% at Nest A and 51% at Nest H1), and it is considered that there is no reliance on lands at either the Mountphilips Substation site or UWF Related Works sites. Overall the magnitude of negative habitat loss is considered to be Negligible. The provision of 700m of new hedgerow at the Mountphilips Substation site for UWF Grid Connection and 370m of new linear habitat at the UWF Related Works site will provide new linear foraging habitat for Hen Harrier, albeit outside of the core foraging range from the nearest nests.

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<p>The negative effects of Upperchurch Windfarm, outside the SPA, which is evaluated herein within the context of effective displacement based on a revised construction date of 2020 (as per the Upperchurch Windfarm RFI 2013); is effectively mitigated by the activities consented under the Upperchurch Hen Harrier Scheme (UWF Other Activities), which as intended results in a net gain through design to Hen Harrier both in area and quality of habitat. The provision and management of UWF Replacement Forestry (4ha) specifically for Hen Harrier, outside but proximal to the SPA and adjacent to the Upperchurch Hen Harrier Scheme also contributes to an overall net gain to Hen Harrier of an additional 31.8Ha of actively managed foraging habitat (net gain to Hen Harrier due to Hen Harrier Scheme is 128Ha-100.22Ha which is 27.8Ha, and the additional 4ha due to the UWF Replacement Forestry, giving a total net gain of 31.8Ha).</p>
<p>Significance of the Whole Project Effect: <u>No adverse effect on European Site Integrity</u></p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No negative quality effects will occur within the SPA; • The demonstrated sensitivity of Hen Harriers to positive management (context), and; • The extent of lands to be managed for Hen Harrier overall (128Ha + 4ha =132ha), and; • The long term to permanent duration, given that UWF Replacement Forestry will be a permanent woodland and will not be harvested, and; • The negligible magnitude of habitat loss from the UWF Grid Connection Mountphilips Substation site which is located outside of the core foraging range of the nearest nest (4.6km) and also the absence of any habitat loss effects from the UWF Grid Connection 110kV route; • The negligible magnitude of habitat loss from the UWF Related Works site which is located outside of the core foraging range of the nearest nest (4.5km),; • The reversibility of negative effects with reinstatement of lands, provision of new hedgerow, planting of a new permanent woodland and the application of the Upperchurch Hen Harrier Scheme and other measures as described. • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p>The magnitude of foraging habitat loss resulting from the Whole UWF Project, contented Castlewaller Windfarm, potential Bunkimalta Windfarm, existing Milestone Windfarm, and agriculture and turf cutting in the vicinity are evaluated as largely neutral. Forestry activities in the surrounding area are generally a negative trend in the background environment currently with declines in available foraging habitat in the short-medium term (next 10 years & expected to increase subsequently and evaluated as significant in that regard. Effects from Hen Harrier management plans in respect of the consented Castlewaller, potential Bunkimalta and existing Milestone Windfarms will neutralise the effects of these windfarms and it is assumed that the potential Castlewaller grid connection will not result in land use change likely to result in adverse effects on breeding Hen Harrier territories which it potentially overlaps. There will be a net gain from the Whole UWF Project which is at minimum 31.8Ha. Overall the magnitude is Low.</p>
<p>Significance of the Cumulative Impact: <u>No adverse effect on European Site Integrity</u></p>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Absence of negative quality effects from the Whole UWF Project; • The net gain in terms of lands managed specifically for the use of Hen Harrier, and; • Extent of lands to be managed in total, notwithstanding, • The medium-term duration of negative trend in respect of reductions in forestry based foraging habitat. • Separation distances to identified nests, with all locations of habitat loss or reduction located outside the core foraging range of hen harrier (i.e. >2km). <p>Other Projects</p> <ul style="list-style-type: none"> • The effective habitat loss associated with Milestone Windfarm, Castlewaller Windfarm and Rearcross Quarry is mitigated by the management of lands for the benefit of Hen Harrier, over the lifetime of the wind farm; • Due to their location within a designated site, the requirement on any future Bunkimalta Windfarm proposal or future Castlewaller grid connection proposal to prove that no significant adverse effects will occur;

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- The volumes of aggregate required for the Whole UWF Project will be supplied within the current consented capacity of the Rearcross Quarry;
- The screening process included as part of the NIS submitted with the Curraghduff Quarry proposal determined that the Slievefelim to Silvermines Mountains SPA will 'not be impacted' by the proposed works;
- Further new afforestation not likely within the SPA, in the context of longer-term background trends are likely to become neutral, and with requirement on projects within a designated site (including planting /felling licenses and ancillary activities or works) to prove that no significant adverse effects will occur;
- The restrictions on further turf cutting in intact areas/protected areas, the limited extent of lands subject to turbarry (rights to cut turf) within the Hen Harrier SPA overall (4%), with little of this occurring within the cumulative evaluation study area; and the reversibility of any effect, (in the context of Hen Harrier) with birds expected to continue to utilize re-vegetating cutover bog for foraging;
- Information on trends in agriculture in relation to intensification or abandonment is generally unavailable.
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability.



3.9.3.1.2 Effects on SCI species along Pathways 1, 2 & 3 from Disturbance/Displacement of foraging Hen Harrier during the breeding season

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> noise and visual intrusion; operating machinery; presence of construction personnel (at Mountphilips Substation site only)</p> <p><u>Cumulative Impact Source:</u> noise and visual intrusion; operating machinery; presence of construction personnel associated with Upperchurch Windfarm and UWF Replacement Forestry and UWF Other Activities, and associated with farming and forestry management activities, turf-cutting, quarrying works and <i>potentially</i> other windfarm construction sites.</p> <p><u>Impact Pathway:</u> Air, Visibility</p> <p>Impact Description:</p> <p>Breeding Hen Harriers are known to be sensitive to disturbance at or near the nest (Ruddock & Whitfield, 2007). Although estimates of disturbance distances between source and nest differ, a review by Ruddock & Whitfield (2007) suggests a conservative distance of effect of 1,000m, up to which birds at the nest could be disturbed during wind farm construction activities.</p> <p>Disturbance to foraging birds away from the immediate vicinity of nests may also occur (Masden, 2010; Pearce-Higgins <i>et al.</i>, 2012) either within or outside the SPA. This can impair foraging success during critical periods of the breeding season such as when provisioning young or result in increased energy expenditure and subsequent reductions in fitness. This may be dependent on whether or not sequential effects occur, levels of habituation to background disturbance or whether sufficient displacement habitat is available once a bird experiences a disturbance event. The degree or frequency of baseline foraging is an influencing factor, as is distance to nests as this is a likely determinant of dependency. Ultimately the magnitude of such effects if sufficient could impact on favourable conservation condition of a species within an SPA.</p> <p>A minimum approach distance (MAD) as a function of flight initiation distance (FID) is used to determine the likelihood of any effect on an individual. There have been no specific studies examining the FID of foraging Hen Harriers to human disturbance. However, a study on FIDs on Northern Harrier <i>Circus cyaneus</i> from aircraft suggested a mean FID of 70m (Booms <i>et al.</i>, 2010) implying that birds may react to disturbance of similar magnitude (90db) at a distance of 105m. In a wider review of FIDs, Livesey <i>et al.</i> (2016) indicated a mean FIDs for Falconiformes of 89.7m (MAD 134.5m) (for pedestrian-based disturbance) and 79.7m (MAD 119.5m) (for motorised vehicles). Collectively, these data would suggest that foraging Hen Harriers are unlikely to be impacted by disturbance events over 150m away. Hen Harrier will also be habituated to certain background activities such as traffic and machinery on roads and on farmlands and would be expected to react less to artificial noise than to the presence of humans.</p> <p>Therefore, a 150m buffer of the proposed development is taken as the zone wherein effective habitat loss may take place following disturbance through noise or visual intrusion as a result of construction works and/or the presence of construction personnel, both within and outside the SPA. At distances further than 150m from construction works areas, noise or visual intrusion are unlikely to result in any noticeable effect on foraging Hen Harriers.</p> <p>The magnitude of the disturbance/displacement effect is related to the likelihood of Hen Harrier being present within the 150m zone of potential impact, and therefore the availability of suitable foraging habitat and the distance of sources of disturbance/displacement to any given nest location is relevant.</p> <p>The core foraging range for Hen Harrier is considered to be 2km from nests (Arroyo <i>et al.</i>, 2014; SNH, 2017) and only 2% of foraging occurs beyond 4km of nest sites (Arroyo <i>et al.</i>, 2012). Although home range size may vary between locations and across individuals, it is clear from studies that Harrier females during the breeding season</p>	

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hunt closer to nests than males (e.g. Arroyo *et al.*, 2006²²); home ranges of females are centred on nest sites and on average may be half the area of that of males. In a Scottish study (Arroyo *et al.*, 2014²³) female harriers mostly hunted within 1km of nests.

Male birds have larger home ranges (Arroyo *et al.*, 2006, 2014), but studies also suggest that male harriers mostly hunt within 2km of the nest (Arroyo *et al.*, 2014), but can hunt further away (out to 10km (SNH, 2016)). In a study of Northern Harrier, Martin 1987, found that 85% of all male activity occurred within 3km of the nest. Furthermore, studies have shown that the amount of time spent foraging by Hen Harrier (expressed in min/km²) decreases with distance from the nest (Madders (2003)). In this context it is considered that whilst male harriers may occur and forage at distances greater than 4km from a nest, the likelihood of any dependence on (and by inference high frequency of occurrence at) locations where disturbance sources may occur during the breeding season, greater than 4km from a nest, such as present for example at Mountphilips Substation site, is extremely low.

In relation to cumulative (sequential) effects, multiple sources of noise and visual intrusion occurring within the same spatial and/or temporal timeframe may combine should Hen Harriers encounter multiple sources of disturbance displacement in succession.

To avoid any impacts to breeding hen harrier, UWF Grid Connection construction works during the Hen Harrier breeding season (March to August inclusive) will only take place at the Mountphilips Substation Site; construction of the 110kV UGC between the Mountphilips Substation site and the Consented UWF Substation compound will be carried out during the months of September to February inclusive (PD01). Additionally, if works at Mountphilips Substation site are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory Hen Harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the entire construction works area boundary. These surveys will be completed prior to the start-up of all construction activities. No works will take place within 2 km of any identified active Hen Harrier nest during the hen harrier breeding season (PD02). These two project design measures will ensure that disturbance/displacement of foraging Hen Harrier is avoided.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Disturbance/Displacement of foraging Hen Harrier during the breeding season

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

During the breeding season, no works will be carried out within the SPA, and UWF Grid Connection works will be limited to the Mountphilips Substation site. No works will be carried out on the 110kV UGC outside of the Mountphilips Substation site during the breeding season. This means that all works during the breeding season, which will be limited to the Mountphilips Substation site, will take place at distances greater than 4.3km from any traditional nest sites which were recorded during the 2016, 2017 and 2019 breeding surveys.

Habitat surveys of lands within 2km of the known nest sites (2km is considered to be the core foraging area) demonstrate that there is ample suitable foraging habitat, which amounts to 3,580ha (or 42.9%) of the total land area (8,343ha) within the core foraging area around the 10 nests recorded in the upland area over the 2016 to 2019 period. In addition, according to Moran & Wilson-Parr (2015), there is 70% suitable habitat within the SPA as a whole. We therefore evaluate that there is no likelihood of Hen Harrier depending on the habitats within 150m of the construction works areas at Mountphilips Substation site, due to separation distance and the overall extent of habitat availability.

²² Arroyo, B., Leckie, F., Redpath, S. (2006) Habitat Use and Range Management on Priority Areas for Hen Harriers: Final Report. Report to Scottish Natural Heritage. First draft- March 2006.

²³ Arroyo, B., Leckie, F., Amar, A., McCluskie, A. & Redpath, S. (2014) Ranging behaviour of Hen Harriers breeding in Special Protection Areas in Scotland. Bird Study 61: 48-55.

Taking into account that the nearest nest is 4.3km from the only part of the UWF Grid Connection which could be built during the breeding season – i.e. works at Mountphilips Substation site; with studies suggesting that most foraging occurs within 2km of a nest and reduces thereafter with distance; it is evaluated that the magnitude of any disturbance or displacement effects on foraging Hen Harrier during the breeding season will be negligible both within and outside the SPA, and with the application of project design measures (in particular PD02 in relation to Mountphilips Substation site).

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier and Negligible (approximating to ‘no change’) magnitude;
- Works during the breeding season (March-August) will only take place at the Mountphilips Substation site. This means that no works will occur within 4.3km of any known nests, all of which are considered to be traditional nests, being used repeatedly;
- no likelihood of reliance on any suitable foraging habitats either at the Mountphilips Substation site due to separation distance from nests, and the large amount of suitable habitat (3,580ha) within the core foraging range (2km) of the Hen Harrier nests identified
- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and;
- the availability of suitable foraging habitat within the wider area, with 70% suitable habitat available within the SPA;
- in the context of existing background trends and disturbance is primarily related to visual intrusion, and Hen Harrier is likely to already be habituated to road-based and farming-based noise and visual intrusion;
- Effects will be momentary-Brief in duration;
- unlikely to affect any individual >150m from source, and;
- Highly reversible once any individual moves beyond 150m.
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

There is no potential for cumulative impacts with UWF Related Works (constructed outside the breeding season), UWF Replacement forestry (planted by hand), or with the UWF Other Activities Upperchurch Hen Harrier Scheme (similar to farming activities and outside temporal overlap).

Due to the separation distance from breeding season works, at the Mountphilips Substation Site, from Upperchurch Windfarm and UWF Other Activities and from other projects such as the potential Bunkimalta Windfarm, consented Castlewaller Windfarm (and potential grid connection), existing Milestone Windfarm and from the existing Rearcross Quarry, there is a very low probability of cumulative disturbance effects. Forestry or agricultural activities in the area, close to works at the Mountphilips Substation site, are on-going background activities, and any cumulative impact will not be noticeable.

There is no potential for cumulative impacts with consented Upperchurch Windfarm, UWF Other Activities, existing Milestone Windfarm, potential Bunkimalta Windfarm, existing Rearcross Quarry, consented Castlewaller Windfarm (and potential grid connection) or turf cutting activities as the UWF Grid Connection 110kV UGC works will not be carried out during the breeding season. There is no likelihood of significant in-combination impacts (due to works at Mountphilips Substation site) with the application of project design measure PD02.

Overall, the Magnitude of cumulative disturbance/displacement is therefore evaluated as being negligible.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier and Negligible (approximating to ‘no change’) magnitude;
- Fact that most foraging takes place within 2km of the nest site, with only 2% occurring at distances >4km, and no nests are within 4.3km of works which could take place during the breeding season (i.e. at the Mountphilips Substation site);
- Separation distance between Mountphilips substation site and Other Elements and Other Projects, therefore;

- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and;
- Noise/Vibration/Intrusion unlikely to affect any individual >150m from source;
- Birds likely to be habituated to various background activities such as once-off housing, farming practices, , forestry practices and;
- The duration of effects, (momentary-brief) and;
- High reversibility once the bird moves beyond 150m.
- Construction works for 110kV UGC outside of the Mountphilips Substation site will be not be carried out during the hen harrier breeding season March to August inclusive;

Other projects

- The presence of low value habitats for Hen Harrier at Milestone Windfarm; the location of the Milestone Windfarm outside the SPA, and the implementation of a Hen Harrier Management Plan to mitigate for any disturbance effects such as displacement from foraging areas;
- The extent of displacement habitat available for any disturbed birds at Castlewaller Windfarm, in the context of the requirement for demonstration of no adverse effects on Hen Harrier for this project;
- Any future proposals for Bunkimalta Windfarm will be required to prove that adverse effects on European site integrity are avoided, including due to the permanent exclusion of Hen Harrier from suitable habitat – including from disturbance;
- No contrast of Rearcross Quarry activities from background levels, with the reversibility of any disturbance as individual hen harriers move beyond 150m from works, in the context of the provision of displacement habitat (10ha) as part of the quarry’s planning conditions;
- The screening process included as part of the NIS submitted with the Curraghduff Quarry proposal determined that the Slievefelim to Silvermines Mountains SPA will ‘not be impacted’ by the proposed works;
- Forestry, agricultural and turf-cutting activities are not expected to contrast with background levels.
- Forestry activities (such as felling) will be subject to Appropriate Assessment.
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.

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

Element 2: UWF Related Works

Impact Magnitude: None, the UWF Related Works will be constructed outside of the Hen Harrier breeding season March to August inclusive (this includes hedgerow and scrub removal in addition to hedgerow trimming), therefore there is no potential for disturbance/displacement effects during the breeding season.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- Construction works for the UWF Related Works will be not be carried out during the Hen Harrier breeding season March to August inclusive;
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.

Element 3: UWF Replacement Forestry

Impact Magnitude:

All planting will be done by hand and is located outside the SPA. Magnitude is negligible and unlikely to occur given the separation distance to the nearest nest (6.8km).

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

No contrast in activities from background levels, and;

- Momentary – brief duration, with;
- High reversibility once any individual moves beyond 150m
- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success.
- Works are to take place outside the SPA.

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<ul style="list-style-type: none"> • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.
<p>Element 4: Upperchurch Windfarm</p>
<p>Impact Magnitude: Out of 504 ha within the footprint and 150m of the consented Upperchurch Windfarm, only 135 ha (26.8%) is suitable for Hen Harriers to forage. This falls below the 30% threshold indicated as offering an attractive landscape to Hen Harriers (Wilson <i>et al.</i>, 2006). The nearest nest location to the consented Upperchurch Windfarm is 5.3km (within the SPA). There is evidence to show that breeding Hen Harriers rarely (<2% of the time) forage more than 4km from the nest (Arroyo <i>et al.</i>, 2012). Data from field surveys also indicate very low levels of Hen Harrier use within the footprint of the consented Upperchurch Windfarm (in 2019, 120 hours of breeding season VP observations yielded a total of 200 seconds of observed Hen Harrier activity, (of which 44 seconds were within 500m of a consented turbine location). Given the distance from these observations to identified nests/the SPA, these are unlikely to be actively breeding birds, and the magnitude of this impact is considered to be negligible and unlikely to occur given the separation distance to the nearest nest (5.3km).</p>
<p>Significance of the Impact: No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier and Negligible magnitude; • UWF is outside the SPA; • The low proportion (<30%) of suitable habitat for foraging Hen Harriers in the footprint and 150m buffer of the consented Upperchurch Windfarm; coupled with • The distance of separation between the consented Upperchurch Windfarm the nearest Hen Harrier nest within the SPA at 5.3km, as Hen Harriers rarely forage more than 4km from the nest site; resulting in • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and • The irregularity and low number of Hen Harrier observations during the vantage point surveys indicating that the consented Upperchurch Windfarm is used infrequently by breeding Hen Harriers. • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.
<p>Element 5: UWF Other Activities</p>
<p>Impact Magnitude: The Upperchurch Hen Harrier Scheme will involve activities with similar sources of noise/intrusion as farming practices; Haul Route Activities trimming will be similar to existing noise/intrusion from regular maintenance of roadside hedgerows, and works on the Killonan Line will compare with existing maintenance in terms of the scale and magnitude of any noise/intrusion. The magnitude of impact is evaluated as Negligible.</p>
<p>Significance of the Impact: No adverse effects on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The location of activities outside the SPA • No contrast from background levels of noise or intrusion is expected, and; • Birds will already be habituated to road-based noise and visual intrusion; • Effect duration will be brief to momentary for most activities, and; • Highly reversible once any individual moves beyond 150m • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.
<p>Evaluation of Other Cumulative Impacts – Disturbance/Displacement of foraging Hen Harrier during the breeding season</p>
<p>Whole UWF Project Effect</p>
<p>Cumulative Impact Magnitude: The spatial extent of the Whole UWF Project effect during the breeding season relates to the Mountphilips Substation site to the west of the upland area, outside the SPA and the Upperchurch Windfarm site on the eastern side of the upland area, also outside the SPA. UWF Other Activities may also take place at both of these locations, in addition to other locations in the wider area (all of which will be outside, and at a distance from, the SPA). Works during the breeding season may also include planting works for UWF Replacement Forestry – outside the SPA. No works for either the 110kV UGC (outside of the Mountphilips Substation site) or for the UWF Related Works will occur during the breeding season. Overall the magnitude is evaluated as negligible.</p>

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Significance of the Cumulative Impact: No adverse effect on European Site Integrity	
<u>Rationale for Cumulative Impact Evaluation:</u>	
<ul style="list-style-type: none"> • Very High Sensitivity rating for Hen Harrier and negligible magnitude of impact; • Fact that most foraging takes place within 2km of the nest site, with only 2% occurring at distances >4km • no nests are within 4.3km of works during the breeding season; • Very low probability of foraging birds occurring with sufficient frequency at MSS to result in significant consequences on nesting birds or breeding success, and; • Separation distance between works at Mountphilips Substation site and works in the Upperchurch Windfarm area, both of which are outside the SPA; • Noise/Vibration/Intrusion unlikely to affect any individual >150m from source; • Birds likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and; • The duration of effects, (momentary-brief) and; • High reversibility once the bird moves beyond 150m. • Construction works for the 110kV UGC (outside of Mountphilips Substation site) and for UWF Related Works will be not be carried out during the hen harrier breeding season March to August inclusive, avoiding any potential for sequential effects with Other Elements or Other Projects; • The distance to the nearest confirmed nest locations. • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects. 	
All Elements of the Whole UWF Project with Other Projects or Activities	
<u>Cumulative Impact Magnitude:</u>	
<p>There is potential for disturbance to breeding foraging hen harriers resulting from the Whole UWF Project, potential Bunkimalta and Castlewaller Windfarms Milestone Windfarm, Rearcross Quarry, potential Curraghduff Quarry, Agriculture, Forestry in the surrounding area, and turf-cutting activities. Magnitude of effects from the Whole UWF Project is evaluated above as Negligible. When the Other Projects and Activities are collectively taken into account, the magnitude of effect will be negligible.</p>	
Significance of the Cumulative Impact: No adverse effect on European Site Integrity	
<u>Rationale for Cumulative Impact Evaluation:</u>	
<ul style="list-style-type: none"> • Construction works for UWF Grid Connection during the breeding season limited to Mountphilips Substation site which puts works during the breeding season further than 4km from nest sites, avoiding any disturbance effects; • Construction works for the 110kV UGC (outside of Mountphilips Substation site) and for UWF Related Works will be not be carried out during the Hen Harrier breeding season March to August inclusive, avoiding any potential for sequential effects; • The distance to the nearest confirmed nest locations in respect of the UWF Grid Connection (Mountphilips Substation site – 4.3km) and consented Upperchurch Windfarm (5.3km from nearest turbine base), and UWF Replacement Forestry (6.8km from the afforestation lands); • Fact that most foraging takes place within 2km of the nest site, with only 2% occurring at distances >4km • Noise/Vibration/Intrusion unlikely to affect any individual >150m from source; • Birds likely to be habituated to various background activities such as traffic, farming practices, road maintenance, quarrying, forestry practices; • The duration of effects, (momentary-brief); • High reversibility once the individual bird moves beyond 150m; and • The separation distance from UWF Grid Connection works at Mountphilips Substation site and Consented Upperchurch Windfarm from Castlewaller Windfarm site or Bunkimalta Windfarm site (both greater than 4km) precludes sequential effects. • requirement on projects within a designated site to prove that no significant adverse effects will occur • No increase in operations at Rearcross Quarry are expected; • Findings in the submitted NIS for Curraghduff Quarry; • Separation distance to Curraghduff Quarry from the SPA; 	

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Other Projects

- The presence of low value habitats for Hen Harrier at Milestone Windfarm; the location of the Milestone Windfarm outside the SPA, and the implementation of a Hen Harrier Management Plan to mitigate for any disturbance effects such as displacement from foraging areas;
- The extent of displacement habitat available for any disturbed birds at Castlewaller Windfarm, in the context of the requirement for demonstration of no adverse effects on Hen Harrier for this project;
- Any future proposals for Bunkimalta Windfarm will be required to prove that adverse effects on European site integrity are avoided, including due to the permanent exclusion of Hen Harrier from suitable habitat – including from disturbance;
- No contrast of Rearcross Quarry activities from background levels, with the reversibility of any disturbance as individual hen harriers move beyond 150m from works, in the context of the provision of displacement habitat (10ha) as part of the quarry’s planning conditions;
- The screening process included as part of the NIS submitted with the Curraghduff Quarry proposal determined that the Slievefelim to Silvermines Mountains SPA will ‘not be impacted’ by the proposed works;
- Forestry, agricultural and turf-cutting activities are not expected to contrast with background levels.
- Forestry activities (such as felling) will be subject to Appropriate Assessment.

- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.



3.9.3.1.3 Effects on SCI species along Pathways 1, 2 & 3 from Disturbance/Displacement of foraging Hen Harrier outside of the breeding season

Impact Description: Disturbance/Displacement of foraging Hen Harrier outside of the breeding season

Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> noise and visual intrusion; operating machinery; presence of construction personnel <u>Cumulative Impact Source:</u> noise and visual intrusion; operating machinery; presence of construction personnel associated with Upperchurch Windfarm, UWF Related Works, UWF Replacement Forestry and UWF Other Activities; and associated with farming and forestry management activities, turf-cutting, quarrying works and <i>potentially</i> other windfarm construction sites. <u>Impact Pathway:</u> Air, Visibility</p> <p>Impact Description: Between the period September to February inclusive, Hen Harriers are considered to be in their non-breeding season (Watson, 1977). During the non-breeding season, Hen Harriers may move substantial distances from their breeding areas, including immigration into Ireland from the UK (Wernham <i>et al.</i>, 2002; Etheridge & Summers, 2006), as well as movements within Ireland (Irwin <i>et al.</i>, 2011). This reduces reliance on habitats proximal to breeding areas, with Hen Harriers making substantial movements during the non-breeding season, which indicates that Harriers are less likely to be sensitive to disturbance during the non-breeding season compared to during the nesting season (when Hen Harriers are typically limited to foraging with 2km of nesting locations (Arroyo <i>et al.</i>, 2014) with studies suggesting that most foraging occurs within 2km of a nest and reduces thereafter with distance). In addition, the effects of disturbance in the non-breeding season are at an individual level rather than affecting chicks/nest success. As the SPA is of ornithological importance for breeding birds, this results in less likelihood of secondary effects which may impact on favourable conservation condition, however some cognisance is given to the (possible) presence of non-breeding birds from the SPA during the winter months.</p> <p>There are two potential impacts from disturbance during the non-breeding season:</p> <ul style="list-style-type: none"> • disturbance/displacement when foraging; and • disturbance to birds at their night-time roosts (Gilbert <i>et al.</i>, 2011), which has been excluded as no significant effects are reasonably foreseeable due to distance between UWF Grid Connection works and identified roost sites. The selective timing of works as part of Project Design in proximity to roosts will avoid disturbance to birds commuting to communal roosts sites. <p>This impact table addresses the potential for disturbance/displacement to Hen Harrier when foraging.</p> <p>A minimum approach distance (MAD) as a function of flight initiation distance (FID) is used to determine the likelihood of any effect on an individual. There have been no specific studies examining the FID of foraging Hen Harriers to human disturbance. However, a study on FIDs on Northern Harrier <i>Circus cyaneus</i> from aircraft suggested a mean FID of 70m (Booms <i>et al.</i>, 2010) implying that birds may react to disturbance of similar magnitude (90db) at a distance of 105m. In a wider review of FIDs, Livesey <i>et al.</i> (2016) indicated a mean FIDs for Falconiformes of 89.7m (MAD 134.5m) (for pedestrian-based disturbance) and 79.7m (MAD 119.5m) (for motorised vehicles). Collectively, these data would suggest that foraging Hen Harriers are unlikely to be impacted by disturbance events over 150m away. Hen Harrier will also be habituated to certain background activities such as traffic and machinery on roads and on farmlands and would be expected to react less to artificial noise than to the presence of humans. In the winter months, when birds are more nomadic, less reliance is naturally placed on specific locations, thus reduced potential for sequential effects exists.</p> <p>Therefore, construction works and the presence of construction personnel are unlikely to result in any noticeable effect on foraging Hen Harriers more than 150m away from the point of disturbance. A 150m buffer of the proposed development is taken as the zone wherein effective habitat loss may take place following disturbance through noise or visual intrusion, should suitable foraging habitat be present within this radius of works. Due to the linear nature of the 110kV UGC, disturbance and effective habitat loss through displacement would be brief to temporary in nature, whereas any disturbance/displacement from works at the Mountphilips Substation site will be temporary in nature.</p>	

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UWF Grid Connection works during the non-breeding season relates to all works areas for UWF Grid Connection, i.e. the Mountphilips Substation site and the 110kV UGC works, which are predominantly on public roads between the Mountphilips Substation site and the Consented Upperchurch Windfarm Substation compound. 110kV UGC works on the public road network include works on the Regional Road R503, which is located within the boundary of the SPA. To reiterate, as per Project Design, no works will take place outside of the Mountphilips Substation site during the Hen Harrier breeding season, this means that any works within the SPA boundary will only be carried out during the non-breeding season.

In relation to cumulative effects, multiple sources of noise and visual intrusion will occur in and on both sides of the upland area, during the same period of time. The 110kV UGC works in the Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola townlands area will be carried out during the same period as UWF Related Works and Upperchurch Windfarm construction works.

While the 110kV UGC works in the Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola townlands area will be carried out during the same period as UWF Related Works and Upperchurch Windfarm construction works. The magnitude of impact is reduced through the application of project design (which was developed for the protection of residential amenity, but also will reduce the magnitude of cumulative or sequential effects to hen harrier):

PD07 - 110kV UGC construction works along the local roads L2264-50 and L6188-0, will not take place at the same time as the UWF Related Works Haul Route Works on these roads. The 110kV UGC construction works will also be scheduled so that the works do not occur on the same days as concrete deliveries for Consented UWF Turbines along these local roads; and

PD11 - Construction works for the 110kV UGC 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 Related Works or Upperchurch Windfarm where those works also occur within 350m.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Disturbance/Displacement of foraging Hen Harrier outside of the breeding season

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Winter hunting grounds cover a much wider range and greater variety of habitats than Summer (Watson, 1977). Based on studies conducted for the previous planning application (PL92 .301959) the winter population of the UWF Grid Connection study area is estimated as 0-5 birds (based on a maximum of 5 birds recorded concurrently (for the 2018 application) across all roosts on any given day, from 2 winter seasons of effort). This has the potential to increase or decrease dependant on inter-annual variation, weather or other factors. Likely noise levels from construction are evaluated as negligible in the context of existing background trends and disturbance is primarily related to visual intrusion.

Habitat surveys of lands within 150m of the UWF Grid Connection works (150m is considered to be the distance from construction works where disturbance/displacement could occur) indicate that there is potentially 345ha (36%) of foraging habitats where Hen Harriers could be disturbed, which overlap proposed works during the winter period (this would only represent a maximum disturbance should all works be taking place concurrently). Furthermore, this area forms a very small proportion of the available suitable foraging habitat in the wider landscape. For example, a similar calculation on habitat availability for foraging Hen Harriers within 2km of the UWF Grid Connection works indicates that there are some 4,842 ha (39%) of suitable habitats and, according to Moran & Wilson-Parr (2015), there is 70% suitable habitat (ca. 14,642Ha) within the wider SPA as a whole. On this basis there is no likelihood / probability of Hen Harrier exclusively depending on the habitats within 150m of the UWF Grid Connection works during the winter months, thus reducing any likelihood of significant effects. Overall, the Magnitude of cumulative disturbance/displacement is therefore evaluated as being negligible.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier and Negligible magnitude;
- Birds will already be habituated to road-based noise and visual intrusion;

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- Effects will be momentary-brief in duration;
- unlikely to affect any individual >150m from source; and
- Highly reversible once any individual moves beyond 150m, given the extent of suitable foraging habitats available ;
- Demonstrated low numbers of Hen Harriers wintering in the vicinity.
- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently;
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

Due to the separation of the UWF Grid Connection works along the R503 from potential Bunkimalta Windfarm (greater than 4km), it is unlikely that any cumulative disturbance effects will occur. In respect of consented Castlewaller Windfarm and existing Milestone Windfarm (including some of the Milestone Windfarm Hen Harrier management plan lands) and existing Rear Cross Quarry, all occur in close proximity to works proposed during the winter months resulting in the potential for sequential effects due to the nomadic nature of wintering Hen Harriers. In relation to Castlewaller Windfarm potential grid connection works, there is potential for sequential or combined works on the local road along the 110kV UGC on the L6009-0 and R503 roads (where the 110kV UGC is currently proposed and where part of the Castlewaller grid connection route (L6009-0) and a new access point from the R503 for the Castlewaller grid connection works was also indicated during SID pre-application discussions with An Bord Pleanála during 2019).

The magnitude of cumulative effects is evaluated as negligible in relation to existing Milestone Windfarm, potential Bunkimalta Windfarm and existing Rear Cross Quarry, and negligible in relation to consented Castlewaller Windfarm and its potential grid connection.

There is also potential for cumulative impacts via disturbance with Other Elements such as Upperchurch Windfarm, UWF Related works, UWF Replacement Forestry and with the UWF Other Activities Upperchurch Hen Harrier Scheme at the eastern end of the 110kV UGC route within the UWF Grid Connection Cumulative Evaluation Study Area through the accumulation of single disturbance events on foraging birds moving through the landscape. The magnitude of cumulative impacts relates to the potential for concurrent activity encountered sequentially by foraging birds as they move through the areas where works are being undertaken.

The potential for sequential cumulative effects on wintering Hen Harriers is largely mitigated by the scale and availability of suitable displacement habitat, the low numbers overall wintering in the vicinity, and high likelihood that not all are connected to the SPA under consideration, the brief to momentary nature of any individual disturbance event, which is unlikely to result in any significant stress on a foraging Hen Harrier, as typically wintering birds are habituated to moving through the wider Irish landscape and encountering sources of intrusion/disturbance.

The potential for cumulative impacts with nearby forestry, agricultural or turf-cutting activities is primarily related to traffic movements associated with these on the R503, and is evaluated as low.

Overall the magnitude of cumulative disturbance is evaluated as negligible.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier and Negligible Magnitude;
- Noise/Vibration/Intrusion unlikely to affect any individual >150m from source;
- Birds likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and;
- The duration of effects, (momentary-brief) and;
- High reversibility once the bird moves beyond 150m.

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- Availability of foraging habitats within the wider area (4,842ha (39%) within 2km of the UWF Grid Connection works and 70% suitable habitat within the SPA as a whole).
- Habituation by wintering harriers to foraging widely through the landscape;
- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently;

Other Projects

- Milestone windfarm has already been constructed and is located outside the SPA, and therefore wintering Hen Harriers will already be habituated to ambient noise and visual intrusion; the implementation of a Hen Harrier Management Plan to mitigate for any operational disturbance effects such as displacement from foraging areas; in the context of the presence of low value habitats for Hen Harrier at Milestone Windfarm in the first instance, as reported
- The potential for interaction of hen harrier with Castlewaller Windfarm works during the winter months, notwithstanding, wintering Hen Harriers will already be habituated to ambient noise and visual intrusion, and may not even be birds connected to the SPA; and in the context of the extent of displacement habitat available for any disturbed birds; Any grid connection route, which may be proposed at a future date, will be required to show no significant effects to Hen Harrier included through disturbance related pathways
- The consented grid connection is routed along forestry roads and public roads where it occurs within the SPA. Any future proposed Bunkimalta Windfarm will have proven that impacts to Hen Harrier will not be significant (in the context of its location within a Hen Harrier SPA), this is likely to include measures in relation to disturbance and displacement, particularly from suitable habitat
- The operation of Rearcross Quarry will be effectively same as background. No potential for secondary impacts as there the quarry will be able to supply all aggregate to the Whole UWF Project within the current consented capacity of the quarry
- Agricultural activities will not contrast with background levels; and any disturbance will be highly reversible once any individual moves beyond 150m
- The limited extent of lands subject to turbarry (rights to cut turf) within the Hen Harrier SPA overall (4%), with little of this occurring within the Cumulative Evaluation Study Areas or likely to occur in winter;
- The screening process included as part of the NIS submitted with the Curraghduff Quarry proposal determined that the Slievefelim to Silvermines Mountains SPA will ‘not be impacted’ by the proposed works;
- Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.



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

Element 2: UWF Related Works

Impact Magnitude:

Likely noise levels from construction are evaluated as negligible in the context of existing background trends and disturbance is primarily related to visual intrusion.

UWF Related Works will be constructed during the September to February period; disturbance/displacement impacts to foraging Hen Harrier could therefore occur during this time. All works locations are outside the SPA.

Habitat surveys of lands within 150m of the UWF Related Works (150m is considered to be the distance from the disturbance/displacement where impacts on foraging Hen Harrier could occur) indicate that there is potentially 152ha (27%) of foraging habitats where Hen Harriers could be disturbed. However, this forms a very small proportion of the available suitable foraging habitat in the wider landscape. A similar calculation on habitat availability within 2km of the UWF Related Works indicates that there are some 2,050 ha (38%) of suitable habitats within 2km and, according to Moran & Wilson-Parr (2015), there is 70% suitable habitat within the SPA as a whole. We therefore evaluate that there is no likelihood/probability of wintering Hen Harrier depending on the habitats within 150m of the UWF Related Works due to the overall extent of habitat availability.

Significance of the Impact: No adverse effect on European Site Integrity

<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier and Negligible magnitude; • Noise/Vibration/Intrusion unlikely to affect any individual >150m from source; • Birds likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and; • The duration of effects, (momentary-brief) and; • High reversibility once the bird moves beyond 150m. • Availability of foraging habitats within the wider area (2,050ha (38%) within 2km of the UWF Related Works and 70% suitable habitat within the SPA as a whole). • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.

Element 3: UWF Replacement Forestry

Impact Magnitude:
All planting will be done by hand, and is outside the SPA. Magnitude is negligible.

Significance of the Impact: No adverse effect on European Site Integrity

<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • No contrast in activities from background levels, and; • Momentary – brief duration, with; • High reversibility once any individual moves beyond 150m. • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.
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Element 4: Upperchurch Windfarm

Impact Magnitude:
Upperchurch Windfarm is located entirely outside the SPA.
Out of 504 ha within the footprint and 150m of the consented Upperchurch Windfarm, only 135 ha (27%) is suitable for Hen Harriers to forage. Data from field surveys also indicate very low levels of Hen Harrier use within the footprint of the consented Upperchurch Windfarm (in 2 years of additionally commissioned Hen Harrier surveys carried out from March 2015 to April 2017, a representative sample of 379 hours of winter season (Oct-March inclusive) VP observations yielded a total of 600 seconds of observed Hen Harrier activity, (of which 240 seconds were within 150m of works locations (Ecopower Developments 2015, 2016 and 2017). Due to the low proportion of suitable habitat at the windfarm site, the low numbers of Hen Harrier recorded during the winter season, and the availability of suitable habitat in the wider landscape (36% within 2km, 70% within the SPA), it is considered that the magnitude of disturbance/displacement will be negligible.

Significance of the Impact: No adverse effect on European Site Integrity

<p>Rationale for Impact Evaluation:</p> <p><u>UWF is outside the SPA;</u></p> <ul style="list-style-type: none"> • Very High sensitivity of the species and Negligible Magnitude, • Low levels of recorded Hen Harrier activity during the winter; • The low proportion (<30%) of suitable habitat for foraging Hen Harriers in the footprint and 150m buffer of the consented Upperchurch Windfarm; coupled with • Noise/Vibration/Intrusion unlikely to affect any individual >150m from source; • Birds likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and; • The duration of effects, (momentary-brief) and; • High reversibility once the bird moves beyond 150m. • Availability of foraging habitats for Hen Harrier within the wider area (1,846ha (36%) within 2km of the Consented Upperchurch Windfarm and 70% suitable habitat within the SPA as a whole). • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.

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<p>Element 5: UWF Other Activities</p>
<p>Impact Magnitude: The Upperchurch Hen Harrier Scheme will involve activities with similar sources of noise/intrusion as farming practices; Haul Route Activities trimming will be similar to existing noise/intrusion from regular maintenance of roadside boundaries and works on the Killonan Line will compare with existing maintenance in terms of the scale and magnitude of any noise/intrusion. All occur outside the SPA. The magnitude of impact is evaluated as Negligible.</p>
<p><u>Significance of the Impact:</u> No adverse effects on European Site Integrity.</p>
<p>Rationale for Impact Evaluation: <u>Activity locations are outside the SPA:</u></p> <ul style="list-style-type: none"> • No contrast from background levels of noise of intrusion is expected, and; • Wintering Hen Harriers will already be habituated to road-based noise and visual intrusion; • Overhead Line Activities will compare to existing maintenance activities; • Effect duration will be brief to momentary for most activities, and; • Highly reversible once any individual moves beyond 150m. • Favorable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.
<p>Evaluation of Other Cumulative Impacts – Disturbance/Displacement of foraging Hen Harrier outside of the breeding season</p>
<p>Whole UWF Project Effect</p>
<p>Magnitude: Habitat surveys of lands within 150m of the construction works (150m is considered to be the distance from construction works where disturbance/displacement could occur) indicate that there is potentially 345ha of foraging habitats where Hen Harriers could be disturbed within 150m of UWF Grid Connection works; and 480ha of foraging habitats where Hen Harriers could be disturbed within 150m of UWF Related Works/Upperchurch Windfarm works, during the winter period (this would only represent a maximum disturbance should all works be taking place concurrently). These works will be spread over a wide linear area from the Mountphilips Substation site on the western side of the upland area, along public roads through the upland area, and on lands on the eastern side of the upland area. Furthermore, the lands within 150m of construction works form a very small proportion of the available suitable foraging habitat in the wider landscape. The Mountphilips Substation site contains only a small area of suitable foraging habitat with the site generally under improved grassland. No disturbance effects are anticipated for construction at the Upperchurch Windfarm/UWF Related Works area during the winter months due to low numbers of Harriers recorded within the greater area. Overall, the Magnitude of cumulative disturbance/displacement is therefore evaluated as being negligible.</p> <p>In respect of UWF Replacement Forestry, all planting will be done by hand. UWF Other Activities will be small in scale and similar to background farming activities. The Magnitude of both of these activities will be negligible.</p>
<p>Significance of the Cumulative Impact: No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier and Negligible magnitude; • Birds will already be habituated to road-based noise and visual intrusion; • Effects will be momentary-brief in duration; • unlikely to affect any individual >150m from source; and • Highly reversible once any individual moves beyond 150m, given the extent of suitable foraging habitats available; and • Demonstrated low numbers of Hen Harriers wintering in the vicinity; • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p>Cumulative Impact Magnitude: The magnitude of foraging habitat loss resulting from the Whole UWF Project, consented Castlewaller Windfarm and potential grid connection, potential Bunkimalta Windfarm and consented grid connection, existing Milestone</p>

Windfarm, Quarries, Agriculture and turf cutting in the vicinity are evaluated as being negligible. Forestry activities in the surrounding area is generally a negative trend in the background environment currently with declines in available foraging habitat in the short-medium term (next 10 years & expected to increase subsequently) and evaluated of Medium magnitude in that regard. No turf cutting is likely to take place during winter months and agriculture is likely to be the same as existing baseline. There is some potential for birds to encounter sources of noise or visual intrusion sequentially as they move through the landscape.

Overall magnitude is evaluated as negligible.

Significance of the Cumulative Impact: No adverse effect on European Site Integrity

Rationale for Cumulative Evaluation:

- Very High sensitivity rating for Hen Harrier, and Negligible magnitude;
- The potential for sequential events, however;
- Wintering Harriers are likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and;
- Effects will be momentary-brief in duration;
- unlikely to affect any individual >150m from source; and
- Highly reversible once any individual moves beyond 150m, given the extent of suitable foraging habitats available;
- Demonstrated low numbers of Hen Harriers wintering in the vicinity;
- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently

Other Projects

- Milestone windfarm has already been constructed and is located outside the SPA, and therefore wintering Hen Harriers will already be habituated to ambient noise and visual intrusion; the implementation of a Hen Harrier Management Plan to mitigate for any operational disturbance effects such as displacement from foraging areas; in the context of the presence of low value habitats for Hen Harrier at Milestone Windfarm in the first instance, as reported
- The potential for interaction of hen harrier with Castlewaller Windfarm works during the winter months, notwithstanding, wintering Hen Harriers will already be habituated to ambient noise and visual intrusion, and may not even be birds connected to the SPA; and in the context of the extent of displacement habitat available for any disturbed birds; Any grid connection route, which may be proposed at a future date, will be required to show no significant effects to Hen Harrier included through disturbance related pathways
- The consented grid connection is routed along forestry roads and public roads where it occurs within the SPA. Any future proposed Bunkimalta Windfarm will have proven that impacts to Hen Harrier will not be significant (in the context of its location within a Hen Harrier SPA), this is likely to include measures in relation to disturbance and displacement, particularly from suitable habitat
- The operation of Rearcross Quarry will be effectively same as background. No potential for secondary impacts as there the quarry will be able to supply all aggregate to the Whole UWF Project within the current consented capacity of the quarry
- Agricultural activities will not contrast with background levels; and any disturbance will be highly reversible once any individual moves beyond 150m
- The limited extent of lands subject to turbarry (rights to cut turf) within the Hen Harrier SPA overall (4%), with little of this occurring within the Cumulative Evaluation Study Areas or likely to occur in winter;
- The screening process included as part of the NIS submitted with the Curraghduff Quarry proposal determined that the Slievefelim to Silvermines Mountains SPA will 'not be impacted' by the proposed works;
- Favourable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through disturbance or exclusion effects.

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3.9.3.1.4 Effects on SCI species along Pathways 2 & 3 from Reduction in Prey Item Species

Impact Description	
Project Life Cycle Stage:	Construction stage/Operational Stage
<p><u>Impact Source:</u> Land cover change, vegetation clearance, noise and visual intrusion; operating machinery; presence of construction personnel</p> <p><u>Cumulative Impact Source:</u> Excavations, Land Cover Change, Forestry Felling, removal of Hedgerows, land cover change from agricultural practices such as drainage, peat extraction</p> <p><u>Impact Pathway:</u> Mortality/Displacement</p> <p><u>Impact Description:</u> Hen Harrier preferred prey species are typically described as those of open ground, such as Meadow Pipit (<i>Anthus pratensis</i>) and Skylark (<i>Alauda arvensis</i>). Hen Harriers breeding numbers are typically correlated with the abundance of small mammals in the UK (Redpath et al., 2002a; 2002b; Thirgood et al., 2003), however this relationship does not appear to exist in Ireland perhaps due to the absence of short-tailed vole (<i>Microtus agrestis</i>) (see O'Donoghue, 2010). Preferred prey species in Ireland have been described as Meadow Pipit, Wood Mouse (<i>Apodemus sylvaticus</i>) and other small passerines during the breeding season with Meadow Pipit, Brown Rat (<i>Rattus norvegicus</i>) and wintering thrushes predominating in winter (O'Donoghue, 2010).</p> <p>In a published study of 900 Hen Harrier pellets in Ireland covering winter and breeding seasons, Hen Harriers were found to have a diverse diet, which varies between areas and seasons and includes small mammals, birds, amphibians and reptiles - up to 78% of the diet of Hen Harriers in Ireland was shown to comprise passerine species of birds (Irwin et al., 2012). Winter diet at coastal roosts found various bird species forming 77.2% of diet (by percentage frequency); birds were predominantly passerines (Smiddy & Cullen, 2017).</p> <p>Reductions in the availability of Prey Items (passerine songbirds, small mammals, reptiles and amphibians) may disadvantage foraging Hen Harriers, in particular during the breeding season when provisioning young. These reductions will typically be related to construction stage disturbance displacement (although this is likely to be temporary in duration and reversible) and any operational habitat loss (as habitat loss or loss in quality of existing habitat may have a direct effect on the composition and numerical abundance of the prey that inhabit it) and therefore consideration is given to both. Effects on nesting success may impact conservation objectives around maintaining the favourable conservation condition of the bird species through affecting breeding success (annual breeding output) and in turn population status and/or future viability. Short term effects such as over a single breeding season are less likely to impact future viability of the SPA population however a precautionary approach is taken.</p> <p>Intensity of agricultural management is known to negatively affect densities of songbirds with small mammal abundance in grassland related to the height and diversity of vegetation present. The effects of Habitat Loss (permanent or Temporary Reduction or Loss of Suitable Habitat) and the effects thereof on Hen Harrier are considered separately in this NIS (See Section 3.9.3.1.1).</p> <p><u>Impact Quality:</u> neutral, negative and positive</p>	
Evaluation of the Subject Development Impact – Reduction in Prey Item Species	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>General mammal species such as Brown Rat, Shrews, Mice, Bank Vole, Hare and Rabbit have been scoped out from consideration due to the limited extent of permanent land use change of natural habitats, the general low densities likely to be present (resulting in an importance evaluation of Local Importance, Lower Value) and the high likelihood of no observable changes to existing trends as a result of the proposed UWF Grid Connection development (see Chapter 8 Biodiversity, Section 8.9 of the accompanying EIAR Volume C2). Residual impacts on Amphibians and Reptiles have been evaluated as Neutral (see Chapter 8 Biodiversity, Section 8.10 of the accompanying EIAR Volume C2). Effects on general passerine species apart from Meadow Pipit are excluded (see Chapter 8 Biodiversity, Section 8.7 of the accompanying EIAR Volume C2).</p>	

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As per Chapter 8 Biodiversity, Section 8.7 of the accompanying EIAR residual impacts on General Birds range from Imperceptible or Neutral to Slight (Positive). Effects on Meadow Pipit from the UWF Grid Connection were evaluated as ‘not significant’ due to the limited extent of land use change, only at Mountphilips Substation site. This land use change has also been evaluated as to its effect on Hen Harrier through loss of foraging habitat and found to be negligible in magnitude. This land use change has also been evaluated as to its effect on Hen Harrier through loss of foraging habitat and found to be negligible in magnitude. A potential reduction in prey item availability only relates to the Mountphilips Substation Site, where suitable foraging habitat comprising 0.05ha will be lost – evaluated as negligible. Numbers of prey items likely to occur within this area are considered less than negligible in the context of prey availability, for example a typical Meadow Pipit average home range size of 2.18ha has been described, inferring at most a single pair of pipits could be lost permanently.

Overall magnitude is evaluated as Negligible, i.e. barely distinguishable and approximating to a ‘no change’ situation.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- The very high sensitivity of the species and negligible magnitude, however;
- No noticeable changes in the character of the environment from a prey availability perspective are predicted.
- Distance from the only source (Mountphilips Substation site) of a reduction in Prey Items to the nearest hen harrier nest (greater than 4km).
- Favourable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through reductions in prey item effects.

Element 2: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

A potential reduction in prey item availability only relates to the Mountphilips Substation Site, where suitable foraging habitat comprising 0.05ha will be lost – evaluated as negligible. Any reduction in prey items likely to occur within this area are considered less than negligible. Based on separation distance to the nearest nest (Nest A – located within the SPA), and the availability of suitable habitat described, there is no potential source of cumulative effects. Due to the above, it is evaluated that there is no potential for any reduction in prey item availability at the Mountphilips Substation site to cumulatively affect Prey Availability in combination with the consented Castlewaller Windfarm (and preliminary grid connection) or the potential Bunkimalta Windfarm and grid connection, Forestry or Turf Cutting Activities in the area. In addition, the hen harrier management plans for the windfarm sites will result in Neutral impacts from these projects. Synergistic effects on any other nests can also be excluded. In relation to Agriculture, no changes in the baseline agricultural practices in the immediate landholdings around the Mountphilips Substation site are planned or likely to occur in the short term i.e. any additional sources which may exacerbate prey item reduction effects in particular during the construction stage are negligible.

Due to the separation distance from any possible reduction in prey items (i.e. at Mountphilips Substation site) to the Other Elements of the Whole UWF Project, Rearcross Quarry or Milestone Windfarm it is considered that no cumulative effects will occur.

Overall magnitude is evaluated as Negligible, i.e. barely distinguishable and approximating to a ‘no change’ situation.

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:

- The very high sensitivity of the species and negligible magnitude, however;
- No noticeable changes in the character of the environment from a prey availability perspective are predicted.
- Distance from the only source (Mountphilips Substation site) of a reduction in Prey Items to the nearest nest.
- Distance from the only source of a reduction in Prey items to Other Elements of the Whole UWF Project
- Distance from the only source of a reduction in Prey Items to the other Projects and Activities described.

Other Projects

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- the effective habitat loss of Hen Harrier foraging habitat at Milestone Windfarm is mitigated by lands proposed to be managed for the benefit of Hen Harrier, over the lifetime of the wind farm, including the management of habitat for Prey Items:
- At Castlewaller Windfarm, the effective habitat loss is exactly equivalent to the area to be managed and improved for the benefit of Hen Harrier, over the lifetime of the wind farm; residual effects on general flora and fauna, including small mammals and amphibians and reptiles were evaluated as insignificant.
- Any future proposed Bunkimalta Windfarm will have to prove that impacts to Hen Harrier will not be significant (in the context of its location within a Hen Harrier SPA), this is likely to include measures in relation to preventing reductions in prey item species. The consented grid connection is routed along forestry roads and public roads where it occurs within the SPA
- No additional habitat loss (beyond that consented) is predicted in respect of the existing Rearcross Quarry operations thus no reduction in the availability of prey items will be associated with the use of this quarry (including for the supply of aggregate for the Whole UWF Project)
- Low Likelihood of Hen Harrier foraging at an operational quarry, due to the separation distance to Curraghduff Quarry from the SPA
- a negative trend in relation to forestry, where the extent of useable forest is predicted to drop from 23% in 2012 to 11% in 2025 in the Slieve Felim to Silvermines Mountains SPA,
- the potential for intensification or abandonment of agricultural landuse to effect prey item abundance, in the context of the implementation of agri-environmental scheme such as the Hen Harrier Project.
- Restrictions on further turf cutting (and hence prey item habitat) in intact areas/protected areas, and; the limited extent of lands subject to turbarry (rights to cut turf) within the Hen Harrier SPA overall (4%); and the reversibility of any effect, (in the context of Hen Harrier) with birds expected to continue to utilize re-vegetating cutover bog for foraging.
- Favourable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through reductions in prey item effects.

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

Element 2: UWF Related Works

Impact Magnitude: General mammal species such as Brown Rat, Shrews, Mice, Bank Vole, Hare and Rabbit have been scoped out from consideration due to the limited extent of permanent land use change of natural habitats, the general low densities likely to be present (resulting in an importance evaluation of Local Importance, Lower Value) and the high likelihood of no observable changes to existing trends as a result of the UWF Related Works. Residual impacts on Amphibians and Reptiles have been evaluated as Neutral. The impact magnitude of habitat loss on Meadow Pipit (as a receptor) was evaluated as negligible. The likelihood of significant effects on other passerine species were excluded. The nearest Hen Harrier nest to UWF Related Works (H1) is 4.5km and is within the SPA, on this basis foraging habitat loss for Hen Harrier was evaluated as negligible.

Overall any reduction in prey items for Hen Harrier is evaluated as negligible.

Significance of the Impact: Not adverse effects on European Site Integrity

Rationale for Impact Evaluation:

- The very high sensitivity of the species, and Negligible magnitude however;
- Some noticeable changes in the character of the environment from a prey availability perspective to Hen Harrier may be possible;
- The extent of suitable habitat for Meadow Pipit to be affected represents a minor shift away from baseline conditions, and;
- Effects are ameliorated by virtue of distance to the nearest nest/SPA, resulting in an evaluation of no reliance on foraging habitats at the site and in turn prey items which may be present at the UWF Related Works Site.
- Favourable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through reductions in prey item effects.

Element 3: UWF Replacement Forestry

Impact Magnitude:

While the UWF Replacement Forestry will be of benefit to Hen harrier in the long term, during its planting it has potential to disturb or displace prey items with land use change during operation also requiring consideration. It is located outside the SPA under consideration.

General mammal species such as Brown Rat, Shrews, Mice, Bank Vole, Hare and Rabbit have been scoped out from consideration due to the limited extent of planting works, the general (low) densities likely to be present (resulting in an importance evaluation of Local Importance, Lower Value) and the high likelihood of no observable changes to existing trends as a result of the proposed development. No measurable impacts were predicted on Amphibians and Reptiles and therefore no likely significant effects are reasonably foreseeable. The impact magnitude of habitat loss on Meadow Pipit was evaluated as slight based on the change of 3.98Ha of suitable habitat to forestry- inferring up to 2 pairs of Meadow Pipit may be affected. However, the magnitude of displacement of Meadow pipit during the planting stage/early growth stage of the new woodland is reduced through the planting by hand of the new trees, no requirement to clear grass from the site, and the very short duration of works. It is considered that the lands will remain available to Meadow Pipit for a number of years while the new trees start to establish – however in the long term some habitat for ground nesting birds will be lost, to be replaced with habitat for other passerine species, which will also be potentially available to Hen Harrier as prey items. The likelihood of significant negative quality effects on other passerine species were excluded. The nearest Hen Harrier nest to UWF Replacement Forestry (H1) is 6.8km, on the basis of the proposed management of the afforested lands for Hen Harrier, the effects of land cover change on Hen Harrier foraging habitat were evaluated as Very Significant (positive).

Overall any reduction in the availability of prey items for Hen Harrier is evaluated as Low (Positive).

Significance of the Impact: No adverse effect on European Site Integrity

Rationale for Impact Evaluation:
The very high sensitivity of the species, and negligible magnitude:

- Some disturbance/displacement of Meadow Pipit during planting and long term due to land cover change is likely, however;
- Planting works will be carried out by hand, and will not involve the clearance of grass from the lands. The lands will become available to prey items immediately after planting works are complete until the new trees start to establish.
- Effects are reduced by the relatively small extent and duration of works, the replacement of open habitats with habitats to be managed for Hen Harrier and by virtue of distance to the nearest Hen Harrier nest;
- Management measures will also provide foraging opportunities for Hen Harrier, of permanent duration
- Favourable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through reductions in prey item effects.

Element 4: Upperchurch Windfarm

Impact Magnitude:
 UWF is located outside the SPA. The 2013 EIS recorded various prey items as present or likely to be present including Field Mice, Pygmy Shrew, Rabbit, Irish Hare, Common Lizard, Common Frog in addition to passerine bird species including Meadow pipit, Skylark and thrushes. During construction effects on fauna including through noise and anthropogenic effects were evaluated as of low magnitude, temporary in duration and limited to the construction phase with the overall impact not significant. Any reduction in prey item availability to Hen Harrier is evaluated as negligible in the context of distance from nearest nests - H1 is 5.3km.

In terms of operational effects, the magnitude of foraging habitat loss was estimated as 95Ha (now revised to 100.22Ha to reflect a construction year of 2020/2021). 128ha of lands are to be provided and managed as favourable foraging areas including habitats specifically targeted at providing prey for Hen Harrier such as passerine birds and small mammals. A reduction in the intensity of management and the reversion of some fields back to wet grassland will improve the availability of small mammals and birds for Hen Harrier.

Significance of the Impact: No adverse effects on European Site Integrity

Rationale for Impact Evaluation:

- The implementation of the Upperchurch Hen Harrier Scheme, as conditioned;
- Very High sensitivity of the species, and Negligible magnitude;
- Effects are ameliorated by virtue of distance to the nearest nest/SPA, resulting in an evaluation of no reliance on foraging habitats at the windfarm site and in turn prey items present at the windfarm site
- Long term duration.
- Favourable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through reductions in prey item effects.

Element 5: UWF Other Activities

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<p>Impact Magnitude: Due to their scale and nature, the magnitude of any disturbance effect to prey items (and resultant reduction in numbers available to hen harrier) as a result of Haul Route Activities, Monitoring Activities, or Overhead Line Activities will be negligible.</p> <p>Activities for the Upperchurch Hen Harrier Scheme will take place in agricultural lands outside the SPA, where prey item species may occur. However, these activities will be similar to background farming activities. Overall the magnitude of reduction in prey item availability will be negligible. In total the UHHS will provide 128ha of habitat which will be managed to increase the area of Hen Harrier foraging habitat, measures set down in the Upperchurch Hen Harrier Scheme to achieve this include:</p> <p>Rush management to control coverage and increase suitability for foraging habitat, promoting prey item species; 2,085m increase in hedgerow, resulting in increased edge habitat for foraging and prey items; 3ha enclosures of native scrub and trees, increased cover for prey item species</p>
<p>Significance of the Impact: No adverse effects on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Very High sensitivity of the species and negligible magnitude, and; • The implementation of the Upperchurch Hen Harrier Scheme, as conditioned
<p>Evaluation of Other Cumulative Impacts – Reduction in Prey Item Species</p>
<p>Whole UWF Project Effect</p>
<p>Magnitude: The potential for reductions in the abundance in Hen Harrier prey item species will occur across the Whole UWF Project area as a result of habitat loss (both temporary and permanent) and disturbance/displacement from construction works and construction stage activities. Overall, general mammal species such as Brown Rat, Shrews, Mice, Bank Vole, Hare and Rabbit and amphibians and reptiles are likely to be present in low densities and observable changes to existing trends as a result of the construction of the Whole UWF Project are not expected. Due to the abundance of suitable habitat for passerines in the immediate wider area, general passerine species and Meadow pipit will not be significantly affected. Given the very small extent of suitable foraging habitat for Hen Harrier at the Mountphilips Substation Site, and the lack of reliance on habitats at the Upperchurch Windfarm/UWF Related Works site and the separation of both locations from the nearest hen harrier nest (greater than 4km), the likely continued use of the UWF Replacement Forestry lands in early growth stage of the new woodland along with the low numbers of potential prey items lost due to operational landcover change, with additional species likely to be promoted through management, and the nature of the UWF Other Activities, the magnitude of the whole project impact is evaluated as no greater than the UWF Grid Connection alone, i.e. Negligible.</p>
<p>Significance of the Whole Project Effect: No adverse effect on European Site Integrity</p>
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • The extent of lands to be managed for Hen Harrier prey items; • The very high sensitivity of the species and negligible magnitude, however; • No noticeable changes in the character of the environment from a prey availability perspective are predicted. • Distance (and location outside the SPA) from the only source (Mountphilips Substation site) of a reduction in Prey Items to the nearest hen harrier nest (greater than 4km); • The reversibility of the effect on temporary land cover change areas following the completion of construction and reinstatement works, and the completion of activities; and • UWF Replacement Forestry lands will remain available to prey item species following planting works until the new trees start to establish. • Favourable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through reductions in prey item effects.
<p>All Elements of the Whole UWF Project with Other Projects or Activities</p>
<p>Both positive and negative quality effects occur with regard to Hen Harrier foraging habitat loss across the Whole UWF Project. The magnitude of any reduction in prey availability resulting from the Whole UWF Project, consented Castlewaller Wind Farm (including its potential grid connection), potential Bunkimalta Windfarm (including its consented grid connection), and turf cutting in the vicinity are evaluated as cumulative negligible</p>

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due to the abundance of suitable habitat for prey item species in the immediate and wider upland area. Existing Milestone Windfarm and Rearcross Quarry are evaluated as neutral with the current management of lands for the benefit of hen harrier. Curraghduff Quarry is not expected to affect the SPA, while agricultural practices in the vicinity of works generally provide open habitats for hen harrier. Forestry activities in the surrounding area is generally a negative trend in the background environment currently with declines in available foraging habitat in the short-medium term (next 10 years & expected to increase subsequently and evaluated as significant in that regard. Overall the cumulative magnitude of the Whole UWF Project (during its construction) together with the Other Projects and Activities is evaluated as Negligible.

Significance of the Cumulative Impact: No adverse effect on European Site Integrity

Rationale for Cumulative Impact Evaluation:

- Whole UWF Project habitat loss is outside the SPA, and outside the likely range of usage by the nearest nest within the SPA;
- The very high sensitivity of the species and negligible magnitude;
- The availability of suitable habitat in the upland area and SPA;
- The net gain in terms of lands managed specifically for the use of Hen Harrier, and;
- Extent of lands to be managed in total, notwithstanding;
- The medium-term duration of negative trend in respect of reductions in forestry based foraging habitat;
- Distance to Nests from the various lands which will undergo management.

Other projects

- the effective habitat loss of Hen Harrier foraging habitat at Milestone Windfarm is mitigated by lands proposed to be managed for the benefit of Hen Harrier, over the lifetime of the wind farm, including the management of habitat for Prey Items:
- At Castlewaller Windfarm, the effective habitat loss is exactly equivalent to the area to be managed and improved for the benefit of Hen Harrier, over the lifetime of the wind farm; residual effects on general flora and fauna, including small mammals and amphibians and reptiles were evaluated as insignificant.
- Any future proposed Bunkimalta Windfarm will have to prove that impacts to Hen Harrier will not be significant (in the context of its location within a Hen Harrier SPA), this is likely to include measures in relation to preventing reductions in prey item species. The consented grid connection is routed along forestry roads and public roads where it occurs within the SPA
- No additional habitat loss (beyond that consented) is predicted in respect of the existing Rearcross Quarry operations thus no reduction in the availability of prey items will be associated with the use of this quarry (including for the supply of aggregate for the Whole UWF Project)
- Low Likelihood of Hen Harrier foraging at an operational quarry, due to the separation distance to Curraghduff Quarry from the SPA
- a negative trend in relation to forestry, where the extent of useable forest is predicted to drop from 23% in 2012 to 11% in 2025 in the Slieve Felim to Silvermines Mountains SPA,
- the potential for intensification or abandonment of agricultural landuse to effect prey item abundance, in the context of the implementation of agri-environmental scheme such as the Hen Harrier Project.
- Restrictions on further turf cutting (and hence prey item habitat) in intact areas/protected areas, and; the limited extent of lands subject to turbary (rights to cut turf) within the Hen Harrier SPA overall (4%); and the reversibility of any effect, (in the context of Hen Harrier) with birds expected to continue to utilize re-vegetating cutover bog for foraging.
- Favourable Conservation condition of the species, will not be impacted through any reduction in habitat, range, population status or viability through reductions in prey item effects.

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3.9.4 Summary of the Impact of UWF Grid Connection on Qualifying Interests of the Slievefelim to Silvermines Mountain SPA

This section (*Section 3.9*) of the NIS has provided further evaluation of the source-impact pathways identified at Stage 1 Screening as having the potential to result in likely significant effects on the Slievefelim to Silvermines Mountain SPA and its respective Special Conservation Interest screened in for further appraisal.

The Special Conservation Interest screened in for evaluation at Stage 2 were:

- Hen Harrier [A082]

The above Special Conservation Interest species has been subject to further examination in respect of its specific sensitivities & Conservation Objectives as to whether the identified pathways/effects can be considered likely to result in adverse effects on European Site Integrity via effects on Conservation Objectives; and it is concluded that:

- The favorable Conservation condition of the species, or the Integrity of the SPA, will not be adversely affected through any reduction in habitat, range, population status or viability, through permanent or temporary loss of habitat, disturbance or displacement during either the breeding or non-breeding seasons, and any reductions in prey item density.

Cognisance has been given at this stage to the various Mitigation Measures designed to specifically avoid adverse effects on European Site Integrity, and in-combination effects with both other project elements of the Whole Upperchurch Windfarm Project in addition to other plans or activities, or consented projects within the defined temporal and spatial overlap for cumulative or in combination effects. Effects both within and without (i.e. ex-situ) the European Site under consideration have been considered.

The evaluation herein has found, that following the examination and analysis presented, it can be concluded on a reasoned basis, that the proposed development will not result in adverse effects on the Integrity of Slievefelim to Silvermines Mountains SPA, in circumstances where no reasonable scientific doubt remains.

Table 22, overleaf in Section 3.9.5 summarises the evaluation of the impact of the UWF Grid Connection on the Integrity of the Slievefelim to Silvermines Mountain SPA.

3.9.5 Evaluation of the impact of UWF Grid Connection on the Integrity of the Slievefelim to Silvermines Mountain SPA

Using the checklist in the Table below, the UWF Grid Connection is examined, both alone and in-combination with other projects, for adverse impacts on the integrity of the Slievefelim to Silvermines Mountain SPA is examined.

Table 22: Integrity of Site checklist

<i>Does the project or plan have the potential to: Yes/No</i>	
- cause delays in progress towards achieving the conservation objectives of the site?	No
- interrupt progress towards achieving the conservation objectives of the site?	No
- disrupt those factors that help to maintain the favourable conditions of the site?	No
- interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No
- change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No
- interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No
- reduce the area of key habitats?	No
- reduce the population of key species?	No
- change the balance between key species?	No
- reduce diversity of the site?	No
- result in disturbance that could affect population size or density or the balance between key species?	No

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