

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING



Revised Natura Impact Statement



# Natura Impact Statement (NIS)

# **Coom Green Energy Park**

March 2022

# Inís

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# **Quality Assurance**

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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, 2017a), *Guidelines for Preliminary Ecological Appraisals* (CIEEM, 2017b) 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 Acts 1976-2021*, the *European Union (Natural Habitats) Regulations*, the *European Communities (Birds and Natural Habitats) Regulations 2011-2021*, EU Regulation on Invasive Alien Species under EU Regulation 1143/2014, the EU Birds *Directive 2009/147/EC* and *Habitats Directive 92/43/EEC*.

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#### Notice

This report was produced by INIS Environmental Consultants Ltd (INIS) on behalf of Coom Green Energy Park Ltd., the client, for the specific purpose of informing an Appropriate Assessment in respect of the proposed Coom Green Energy Park, Co. Cork, with all reasonable skill, care and due diligence within the terms of the contract with the client, incorporating our terms and conditions and taking account of the resources devoted to it by agreement with the client.

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# 1. Introduction

This Natura Impact Statement (NIS) Report has been prepared by Inis Environmental Consultants to inform the Appropriate Assessment (AA) process required for the proposed Coom Green Energy Park.

#### 1.1 **Project Background**

Coom Green Energy Park Limited, intend to apply for planning consent for a renewable energy development referred to as the Coom Green Energy Park Project (CGEP), located in north County Cork. Coom Green Energy Park Limited is a 50/50 joint venture company including Ørsted and Coillte Cuideachta Ghníomhaíochta Ainmnithe (Coillte). The proposed energy park is located approximately 12km to the south east of Mallow and approximately 5km south west of Ballyhooly, County Cork.

In summary the proposed project will consist of the following:

- Erection of 22 no. wind turbines with a limited range for the turbines (the Turbine Range) as follows: •
  - Tip height range from 165m to 169m
  - Hub height range from 96m to 103m
  - Rotor diameter range from 132m to 138m
- Construction of turbine foundations and crane pad hardstanding areas; ٠
- Construction of approximately 15 km of new site tracks and associated drainage infrastructure;
- Upgrading of approximately 10 km of existing tracks and associated drainage infrastructure where ٠ necessary;
- 3no. on site borrow pits and associated ancillary infrastructure. (New access tracks serving borrow pits shall be reinstated following completion of construction);
- All associated drainage and sediment control;
- Installation of new watercourse or drain crossings consisting of pre-cast concrete box culverts; •
- Re-use or upgrading of existing internal watercourse and drain crossings;
- Construction of 2 no. onsite electrical substations and associated compounds including:
  - Welfare facilities;
  - Electrical infrastructure;
  - Parking;
  - Waste water holding tanks;
  - Rainwater harvesting; and
  - All associated infrastructure, services and site works including landscaping;
- 20 no. of Battery storage units and associated compound;
- Temporary accommodation works associated with the Turbine Delivery Routes to facilitate the delivery of turbine components;
- 3 no. Temporary construction site compounds and associated ancillary infrastructure including parking;
- Tree felling and associated replanting; •
- Installation of approximately 30 km of medium voltage (20/33kV) underground cabling between the proposed turbines and the proposed on-site substations and associated ancillary works;
- Installation of approximately 7.7km of high voltage (110kV) underground cabling between the proposed 2no. on site substations and ancillary works within private lands and public roads including 7 no. pre-cast joint bays;

- Installation of approximately 16.7km of high voltage (110kV) underground cabling between the ٠ proposed on-site substations and the existing Barrymore substation and associated ancillary works within private lands and public roads. The proposed grid connection cable works will include 14 no. existing watercourse and drain crossings and the installation of 17 no. pre-cast joint bays.
- Communication cables and associated infrastructure; and •
- Erection of 2 no. permanent meteorological masts. ٠

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

- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. • Department of Environment, Heritage and Local Government (DoEHLG, 2010);
- Communication from the Commission on the Precautionary Principle (European Commission, 2000); ٠
- Office of the Planning Regulator (OPR) (2021) Practice Note PN01 Appropriate Assessment Screening • for Development Management.
- European Commission (EC) (2018), Managing Natura 2000 Sites: the provisions of Article 6 of the • 'Habitats Directive' 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission;
- EC (2002) 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, Office for Official Publications of the European Communities, Luxembourg. European Commission;
- EC (2007a) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC Clarification of the • concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission;
- EC, (2007b), Guidance document on the strict protection of animal species of Community interest under • the Habitats Directive 92/43/EEC. European Commission;
- EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission; ٠
- Nature and biodiversity cases: Ruling of the European Court of Justice (European Commission, 2006); ٠
- Interpretation Manual of European Union Habitats. Version EUR 28 (European Commission, 2013); ٠
- Article 6 of the Habitats Directive: Rulings of the European Court of Justice (Sundseth and Roth, 2014); •
- The Planning and Development Act 2000-2021 (including Part XAB of the Planning and Development Act 2000);
- The Planning and Development Regulations 2001-2021;
- Birds Directive (Council Directive 2009/147/EC); •
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended); •
- Communication from the Commission on the Precautionary Principle (European Commission, 2000);
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. • Department of the Environment, Heritage and Local Government (2010); and
- National Parks and Wildlife Service (NPWS) Guidance for Planning Authorities (2010). ٠

#### 1.2 Authors and Contributors to the present report

This report has been produced by Inis Environmental Consultants Itd (IEC) with input from Fehily Timoney & Company (FT). IEC has carried out examination and analysis on the whole project elements focused on the CGEP & Grid Connection Route but also including incorporation of the key findings of the Turbine Delivery Route (TDR) assessments. Examination and analysis at both Stage 1 and Stage 2 of the Appropriate Assessment process in respect of the TDR where pertinent, has been carried out by Fehily Timoney (FT).

The following experienced personnel contributed to this AA Screening and NIS.

Mr Howard Williams MCIEEM BSc CEnv MCIEEM CBiol MRSB MIFM reviewed and authorised the report. Mr Williams is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He is a Chartered Environmentalist (CEnv) with the Society for the Environment (Soc Env) and a Chartered Biologist (CBiol) with the Society of Biology. He is also a full member of the Institute of Fisheries Management. Mr Williams has more than 20 years professional experience in the ecology sector, is lead ecologist with INIS Environmental Consultants Ltd and currently project manager on all INIS projects in the Ireland and the UK.

Mr. Roger Macnaughton MCIEEM is Principal Ecologist with Inis Environmental Consultants Ltd. He managed and drafted the updated (2020) draft of the NIS. He is a qualified and experienced environmental consultant specialising in ecology. He has over eighteen year's professional experience in the environmental consultancy sector and an additional seven years of primarily research-based experience in freshwater and marine ecology. He specialises in the delivery of Ecological Impact Assessment (EcIA) and Appropriate Assessment (AA) for a broad range of projects potentially affecting; terrestrial, freshwater and marine ecology.

Mr. Joao Martins B.E. (Hons) MSc edited and drafted the updated 2020 report. He is an Ecologist with 8 years' experience in freshwater monitoring of both lotic and lentic systems. He has worked on the EU Water Framework Directive (WFD), e.g. macroinvertebrates, habitat/hydromorphology, and on other freshwater projects of scientific nature, in Germany, Portugal and Ireland. Beyond his freshwater experience, Joao has developed considerable experience in terrestrial ecology. Joao has been carrying out field surveys and has been responsible for the preparation of screenings for Appropriate Assessment (AA), Ecological Impact Assessments (EcIA), Environmental Impact Assessment Reports (EIAR). Joao has also been involved in specific field surveys, such as Invasive Alien Plant Species, and Bat Activity surveys amongst others.

Dr Alex Copland BSc PhD MIEnvSc undertook review and editing of the report revision in 2022. He is Technical Director with INIS and has over 25 years of professional experience as an ecologist, working in both statutory and private companies, in third-level research institutions and with environmental NGOs. He is proficient in experimental design and data analysis and has managed several large-scale, multi-disciplinary ecology projects. He has written numerous scientific papers, developed and contributed to evidence-based position papers, visions and strategies on birds, biodiversity and habitats in Ireland. He has supervised the successful completion of research theses for several post-graduate students, including doctoral candidates. He lectures to both undergraduate and post-graduate students at UCD, as well as being a collaborative researcher with both UCD and UCC. He is a full member of the Institution of Environmental Sciences and also sits on the Editorial Panel of the scientific journal, Irish Birds.

Fehilly Timony and Company provided detail on the description of the proposed development, detail on other plans and projects (to inform the in-combination impacts assessment), hydrology assessments and associated mitigation measures and the Construction Environment Management Plan (CEMP) Appendix A. FT also conducted the surveys and assessments for the Turbine Delivery Route Assessments. The FT reports for the TDR are provided in **Appendix B**.

#### 1.3 **Legislative Context**

Article 6(3) of the Habitats Directive requires that, in relation to European designated sites (i.e. SACs and SPAs that form the Natura 2000 network), "any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives".

A competent authority (e.g. a Local Authority) can only agree to a plan or project after having determined that it will not adversely affect the integrity of the site concerned. Under article 6(4) of the Directive, if adverse impacts are likely, and in the absence of alternative options, a plan or project must nevertheless proceed for imperative reasons of overriding public interest (IROPI), including social or economic reasons, a Member State is required to take all compensatory measures necessary to ensure the overall integrity of the European site. The European Commission have to be informed of any compensatory measures adopted, unless a priority habitat type or species is present and in which case an opinion from the European Commission is required beforehand (unless for human health or public safety reasons, or of benefit to the environment).

#### 1.4 Appropriate Assessment Process

Appropriate Assessment is the process through which the possible nature conservation implications of any plan or project on the European sites within the Natura 2000 network is considered by a Competent Authority, before a decision is made to allow that plan or project to proceed.

#### 1.4.1 **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), are further described below.

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DoEHLG) (2010). These guidance documents identify a staged approach to conducting an AA, as shown in Figure 1.1



Figure 1-1: The Appropriate Assessment Process (from: Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DoEHLG, 2010).

# 1.4.1.1 Stage 1 - Screening for AA

This stage examines the likely effects of a project either alone or in combination with other projects upon a European site and considers whether it can be objectively concluded that these effects will not be significant.

# 1.4.1.2 Stage 2 – Appropriate Assessment

In this stage, the impact of the project on the integrity of the European site is considered with respect to the conservation objectives of the site and to its structure and function. Mitigation measures should be applied to the point where no adverse impacts on the site(s) remain.

# 1.4.1.3 Stage 3 - Alternative Solutions

Should the Appropriate Assessment determine that adverse impacts are likely upon a European site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts. For the avoidance of doubt, no reliance is placed on Stage 3.

# 1.4.1.4 Stage 4 - IROPI

Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the European site will be necessary. European case law highlights that consideration must be given to alternatives outside the project area in carrying out the IROPI test. It is a rigorous test which projects are generally considered unlikely to pass. In any event, the developer does not purport to place any reliance on Stage 4.

# 2. Receiving Environment

#### 2.1.1 **Context of the Study Area**

The proposed CGEP development is located in north County Cork. It is not located within or adjacent to any European designated site. The receiving environment for the proposed wind turbine locations includes lands under active management predominantly for commercial forestry and smaller areas of intensively managed farmland. The landcover is classified on Corine as pastures, coniferous forest, transitional woodland scrub and mineral extraction sites. In addition, there is an unopened, previously consented municipal landfill in close proximity within the townland of Bottlehill. The Grid connection follows local roads through a mosaic of largely improved farmland and forestry eastwards to a substation at Farran South, near Fermoy.

Features of the local environment on or around the proposed development site include the River Bride and other tributaries of the Blackwater (Munster) River, in addition to the Nagle Mountains to the north of the site.

The design of Coom Green Energy Park has been carried out with consideration for the Environmental Impact Statement, planning permit and waste license associated with the permitted Bottlehill Landfill site.

#### 2.2 Methodologies

#### 2.2.1 Desktop study

Each element of the proposed CGEP Project has been appraised in terms of baseline conditions. The sources of Information that were considered included both desktop studies and fieldwork:

- Conservations Objectives, Site Synopsis and Site boundary information for the European Sites within the study area<sup>1</sup>.
- National Biodiversity Data Centre<sup>2</sup>.
- EPA online mapping for watercourse features<sup>3</sup>. •
- Construction and Environmental Management Plan (Appendix A)
- Site visits and field survey reports conducted yearly between 2016 and October 2020 for the CGEP and Grid Connection carried out by IEC personnel.
- Site visits and field survey reports provided by FT personnel in respect of TDR.
- Review of planning documentation and environmental reports for other plans/projects available on • pertinent County Council and An Bord Pleanála websites.

# 2.2.2 Field Study

# 2.2.2.1 Habitats and Flora

All habitat surveys undertaken for CGEP, CGEP Grid Connection Route and TDR followed best practice guidance (Smith et al., 2011) and utilised the habitat classification presented in Fossitt (2000). All surveys were carried

<sup>&</sup>lt;sup>1</sup> Available at <u>https://www.npws.ie/</u>. Accessed in September 2020.

<sup>&</sup>lt;sup>2</sup> Available at <u>https://maps.biodiversityireland.ie/Map</u>. Accessed in September 2020.

<sup>&</sup>lt;sup>3</sup> Available at <u>https://gis.epa.ie/EPAMaps/</u>. Accessed in September 2020.

out at an appropriate time of the year, during the main vegetation growing and flowering season. Surveys were conducted in 2016, 2019 and 2020

Detailed habitat surveys of the proposed Grid Connection plus a 50m buffer were undertaken in June 2018 and rechecked again in August 2020 to substantiate and confirm the findings of the June 2018 surveys.

During all surveys listed above, a search for Invasive Alien Species (IAS) listed under the Third Schedule of European Communities (Bird and Natural Habitats) Regulations 2011 (S.I. 477 of 2011 (as amended) was conducted.

Terrestrial ecological surveys were undertaken on the Turbine Delivery Route by FT on 16<sup>th</sup> July and 13<sup>th</sup> August 2019 and 13<sup>th</sup> August 2020. The objective of these visits was to obtain data on relevant node locations in regard to the presence of invasive plant species, and habitats or species that are protected and/or are qualifying interests of nearby European sites. The area surveyed was the over sail and load-bearing areas and immediate surroundings for each node, including drainage features. The survey was carried out in accordance with the guidance document Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road-Schemes (NRA, 2009).

# 2.2.2.2 Avifauna

Bird surveys were conducted on the site and environs included a focus on Annex I listed bird species (EU Birds Directive), in particular breeding Hen Harrier. The area of the proposed development is a regularly used breeding area for Hen Harrier, though not designated as an SPA. The site is not considered an ex situ site of any Special Protection Area, given extensive distances (>25km) to the closest breeding Hen Harrier SPA (Mullaghanish to Musheramore Mountains SPA). However, surveys conducted are outlined for Hen Harrier and Merlin given potential national importance of the wider area including the site, specifically for Hen Harrier. Wintering wildfowl survey methods are outlined here as general wildfowl and Annex I listed waders e.g. Golden Plover special conservation interests of SPA's in Ireland, potentially use the area and hence are considered in this report.

#### 2.2.2.2.1 Hen Harrier Flightlines

Vantage point surveys on initial lands under consideration, commenced for Hen Harrier in March 2016 and finished in February 2017 (Year 1- covering March to August inclusive (36hrs) as Breeding Season and September to February inclusive (36hrs) as Wintering Season). A total of 19 vantage points was selected following viewshed analysis to provide ground level coverage of all the lands under consideration at the time and inform the initial constraints-based design layout process.

The above vantage points were also utilised to inform a second year of vantage point flight activity surveys commencing in March 2017 and finishing in February 2018 (Year 2 – covering March to August 2017 (36Hrs) as breeding Season and October to February inclusive as Winter Season (30hrs).

In July 2017, an indicative turbine layout, and revised viewshed analysis led to a reduction in requirement for VP's from 19 in total downwards to 15, with further iterations to turbine layout occurring in July and August of 2017 resulting in a further downwards revision to 14 VP's in total. These 14 no. VP's covering the entire turbine (+500m) envelope were utilised until February 2018.

Year 3 of survey effort commenced in March 2018 (March to August inclusive (36Hrs) as breeding) and completed in February 2019 (October to March inclusive as Winter (36hrs)). A total of 13 no. VP's were used for March 2018, which was dropped to 12 in April 2018 for the remainder of fieldwork, in line with further layout changes. At all times turbine +500m buffer viewshed coverage in line with SNH Guidance was adhered to.

Year 4 of survey effort commenced in April 2019 and was completed in September 2019 (April to September inclusive as breeding (36hrs/VP and 12 no. VP's).

To summarise, available data to inform the current baseline evaluation of flight activity, comprising 4 consecutive breeding seasons (2016-2019 inclusive) is presented, covering the period March-August of Yrs. 1,2 and 3, and April-September of Year 4, representing a total of (36X4) 144Hrs of flight activity data in total at each vantage point location. The variation in months of survey from March-August in 2016, 2017 and 2018 to April-September in 2019 is not considered a significant constraint; March 2019 was also covered as part of winter 2018/19 effort, and thus any information on early displaying Hen Harrier was still available (Hen Harrier begin to occupy breeding areas in the uplands in March with a view towards pair bonding (NPWS, 2015)).

Breeding status surveys were conducted of previously used nesting areas during April – June 2020.

In respect of winter effort, data from 3 consecutive winters (i.e. winter period 2016/17, 2017/18 and 2018/19) is presented, covering the period September to February inclusive (Year 1), October to February inclusive (Year 2) and October to March inclusive (Year 3) (36x1, 30x1 and 36x1) representing 102Hrs in total at each vantage point location.

Additional Grid Connection Route (GCR) VP Surveys covered the period from October 2017 to September 2018 inclusive (12 months). Four vantage points were used in these surveys, resulting in 72Hrs of flight activity data from each vantage point location. These surveys focussed on the GCR eastwards from the substation at Lackendarragh North to Farran South (Remaining lands where the GCR is to be located overlap the CGEP study area) in particular potential suitable Hen Harrier breeding (or winter roosting) habitat within 500m of the likely locations of cable laying works.

In line with Best Practice (SNH, 2014, 2017) recommendations, no impact pathways pertaining to collision mortality are to be expected from an underground Grid Option, therefore, VP coverage was focussed on those areas which could be subject to possible usage by Hen Harrier i.e. suitable Hen Harrier habitat, in particular during the breeding season as possible nest sites (where disturbance pathways become relevant). Survey areas were chosen based on aerial imagery information followed up by ground truthing.

#### 2.2.2.2.2 Hen Harrier Winter Roost Surveys

Winter roosts watches in line with established methods from the Irish Hen Harrier Winter Roost Survey (IHHWRS<sup>4</sup>) were carried out in the winter periods of 2016/17 (winter #1) and 2017/18 (winter #2). Surveys were targeted at known roosts identified through consultation and/or suitable habitat in the hinterland of the proposed development.

In the first winter of survey, roosts watches spanned the months of November 2016 through to March 2017 inclusive and took place at 9no. locations where suitable habitat for roosting birds was either identified from field survey or desktop review, or where consultation with local birdwatchers suggested Hen Harriers may be roosting. Most roosts surveys were conducted at dusk (n=29), but dawn was also utilised on 8no. occasions. A total of 37 watches were completed.

<sup>&</sup>lt;sup>4</sup> http://www.ihhws.ie/

Similarly, in the second winter of survey (2017/18), roosts watches spanned the months of October 2017 through to March 2018 inclusive and took place at 2no. locations where roosts had been confirmed in winter #1. Most roosts surveys were conducted at dusk (n=9), but dawn was also utilised on 8no. occasions. A total of 17 watches were completed.

In the case of one of the above identified roosts, a known nearby roost which was identified from additional studies conducted by IEC (IEC, unpublished) in the winter of 2016/17, data from the winter period of 2016/17 in respect of this location is also utilised in the current appraisal.

#### 2.2.2.2.3 Wintering Wildfowl Surveys

Wintering wildfowl surveys took place in the winter period of 2016/17 and also 2017/18. The purpose of these surveys was to establish numbers if any of wintering Whooper Swan along the Blackwater River corridor, to the north of CGEP, between Mallow town and Fermoy town. This survey comprised a 'round-robin' style survey in line with established methods such as IWeBS/National Swan Census methods whereby suitable locations for feeding/roosting swans on both sides of the Blackwater River corridor (North and South) were visited over the course of a single day per month, across 4 months (October to January inclusive of winter 2016/17 and November to February inclusive of winter 2017/18).

Additional VP watches were also carried out at dawn or dusk during the winter months (1 dawn and 1 dusk watch per month November to February inclusive and usually around the same date as the monthly census), to determine whether or not wildfowl (particularly swans) possibly utilising the corridor eastwards from Mallow town along the Blackwater also occasionally traversed southwards through the proposed development area.

No requirement for Winter Wildfowl surveys was scoped in regarding the proposed Grid Connection Route eastwards from Lackendarragh North to Farran South. Habitats adjacent are unsuitable for larger wintering wildfowl such as geese or swans, the underground cabling will not pose a risk in terms of collision mortality along regularly used flight paths, and the CGEP surveys of the River Blackwater provide background information on numbers of wildfowl. Remaining lands where the GCR is to be located overlap the GCR study area, this includes the section of grid connection route between Mullenboree and Lackendarragh.

#### 2.2.2.2.4 Breeding Merlin

Breeding Merlin surveys took place in 2019 and targeted lands within 2km of CGEP (on foot surveys to within 500m of all suitable habitat). Methods employed were from Hardey et al., 2013. Potentially suitable Merlin habitat within the site boundary as described in Fernández et al., 2010 and Hardey et al., 2013 and 2km outside of the site boundary was identified using aerial photography, these habitats were then ground-truthed and surveyed. The survey consisted of a search for suitable Merlin habitat and identification of potential nesting locations (such as old corvid (crows such as Hooded Crow) nests or plucking posts (fence lines, isolated posts, hummocks, boulders, trees, etc.) which are all checked for faecal droppings, pellets, the plucked remains of kills and moulted Merlin feathers. The locations of any signs found are mapped.

#### 2.2.2.2.5 <u>Kingfisher</u>

Kingfisher surveys of suitable reaches of the Bride River, downstream of CGEP, were undertaken in Spring of 2018. The method involved a systematic search of suitable habitats (slow moving water with suitable nest banks) along the river as far east as the M8 Motorway crossing at Rathcormac, to determine suitability and/or evidence of Kingfisher. Evidence of Kingfisher nesting was also recorded if present during 2020 aquatic surveys.

# 2.2.2.3 Otter

Targeted surveys for this species were focussed on watercourse crossings associated with the proposed Grid Connection, in addition to downstream watercourses where connectivity may exist. Once a refined layout and associated infrastructure was available (2019) then further targeted studies also included evaluation of watercourse crossings occurring within the potential zone of influence for Otter. Updated otter surveys were conducted in August 2020 of all stream crossings along the cable route, and all downstream locations sampled during 2020 aquatic surveys

# 2.2.2.4 Aquatic Environment

Aquatic surveys and assessments have been conducted of receiving waters over an extended period between September 2017 and October 2018 and repeated and extended to include additional areas in July and September 2020. The following summarises the survey approach. The focus of the following section is based on the 2020 survey results, as these are the most up to date and also captured all relevant receiving waters within the drainage catchment of the proposed development, including any new areas introduced by very minor design changes in 2020.

#### 2.2.2.4.1 Walkover surveys

All watercourses which are linked via surface water drainage to the proposed development were considered as part of the current baseline assessment, refer to Table 2.1 and Figure 2.1. This included the proposed cable route crossings of riverine watercourses or watercourses near/draining the proposed wind turbine layout. Detailed aquatic surveys were not required for the proposed TDR works based on nature and scale of works. The nomenclature for the watercourses surveyed is as per the Environmental Protection Agency's (EPA) online map viewer<sup>3</sup>.

The most recent aquatic survey of sites were conducted in July 2020. Survey sites were assessed considering linkage via drainage from the proposed development and associated cable route, with survey effort focused on both instream and riparian habitats at each location. Surveys at each aquatic site included a fisheries assessment (electro-fishing), fisheries habitat appraisal and white-clawed crayfish assessment. A freshwater pearl mussel assessment was undertaken in September 2020 across the wider catchment of the proposed development. Rare, protected and or conservation interest aquatic species, such as otter, were also searched for at each survey site. This holistic approach informed the overall aquatic ecological evaluation of each site in context of the proposed development and cable route.

A broad aquatic habitat assessment was conducted at each site utilising elements of the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (Environment Agency, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). All sites were assessed in terms of:

- Stream width and depth and other physical characteristics; ٠
- Substrate type, listing substrate fractions in order of dominance, i.e. bedrock, boulder, cobble, gravel, • sand, silt, etc;
- Flow type, listing percentage of riffle, glide and pool in the sampling area;
- In-stream macrophyte, bryophytes occurring and their percentage coverage of the stream bottom at the sampling sites; and
- Riparian vegetation composition. •

The watercourse at each aquatic survey site was described in terms of the important aquatic habitats and species, which helped to evaluate species and habitats of ecological value in the vicinity of the proposed development and watercourse crossings.

Site no.	Watercourse	EPA code	Location / townland	ITM (x)	ITM (y)
A1	Unnamed stream	n/a	Knuttery Bridge	562621	591186
A2	Unnamed stream	n/a	Tooreen North	561491	589545
A3	Tooreen North Stream	19T33	Tooreen North	561359	589281
A4	Slievedotia 19 Stream	19509	Daly's Cross Roads	561011	587722
A5	Unnamed stream	n/a	Lissard	559515	588386
A6	Monparson River	18M58	Lissard	558677	590203
B1	Toor River	18T51	Mullenaboree	564085	591709
B2	Coom 18 Stream	18C03	Bottlehill Landfill	563229	589796
В3	Coom 18 River	18C03	Coom	565442	588887
B4	Toor River	18T51	Raheen	565547	589591
B5	Lyravarrig 18 Stream	18L82	Commons	566739	593598
B6	Seefin 18 Stream	18552	Commons	566862	593456
B7	River Bride	18B05	Commons	566523	592989
B8	Lyravarrig 18 Stream	18L66	Mullenaboree	565741	592184
В9	Field Chimney Stream	18F43	Chimneyfield	568146	591922
B10	Inchinanagh River	18116	Inchinanagh	568592	590845
B11	River Bride	18B05	Bride Bridge	568376	590182
B12	Unnamed stream	n/a	Knockdoorty	570075	594332
B13	Unnamed stream	n/a	Powers Bridge	570337	593908
B14	Bunnaglanna Stream	18B07	Moneygorm	570301	593711
B15	River Bride	18B05	Old Bridge	571380	589562
C1	Slumberhill 18 Stream	18540	Knockacullata	564792	594397
C2	Ross Stream	18R02	Knockacullata	563403	593486
D1	Shanowen Trib 1	18542	Ballynahina	578462	595293
D2	Farran North River	18F27	Farran North	582016	594305

Table 2.1: Aquatic survey	site locations in the	footprint of the pr	oposed Coom Green	Energy Park developm	ent. Co. Cork.

#### 2.2.2.4.2 Fisheries assessment (electro-fishing)

An application was made in 2020 under Section 14 of the Fisheries (Consolidation) Act, 1959, as substituted by Section 4 of the Fisheries (Amendment) Act, 1962, to undertake a catchment-wide electro-fishing survey of the proposed CGEP. Permission was granted on Monday 27<sup>th</sup> July 2020 and the survey was undertaken following receipt of this in July 2020.

A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) was used to electro-fish sites on both named and unnamed watercourses in the footprint of the proposed CGEP, following notification to Inland Fisheries Ireland (Macroom) and under the conditions of a Department of Communications, Climate Action & Environment (DCCAE) license. Both river and holding tank water temperature were monitored continually throughout the survey to ensure temperatures of 20°C were not exceeded, thus minimising stress to the captured fish due to low dissolved oxygen levels. A portable battery-powered aerator was also used to further reduce stress to any captured fish contained in the holding tank.

Salmonids, European Eel and other captured fish species were transferred to a holding container with oxygenated fresh river water following capture. Where captured, European Eel and larval lamprey were anaesthetised using 0.5ml/l clove oil solution (emulsified in ethanol at a ratio of 1:9) to facilitate accurate measurement and speciation. All other fish (e.g. salmonids) were not anaesthetised, to reduce fish stress levels. All fish were measured to the nearest millimetre and released in-situ following a suitable recovery period.

As three primary species groups were targeted during the survey, i.e. salmonids, lamprey, and European Eel, the electro-fishing settings were tailored for each species. By undertaking electro-fishing using the rapid electrofishing technique, the broad characterisation of the fish community at each sampling reach could be determined as a longer representative length of channel surveyed. Electro-fishing methodology followed accepted European standards (CEN, 2003) and best practice (e.g. CFB, 2008) and is outlined below.

The catchment-wide electro-fishing (CWEF) survey was undertaken across n=25 sites (see Table 2.1 and Figure 2-1). Length frequency graphs and species composition graphs for all species with numbers captured are illustrated in section 2.4 below.

#### 2.2.2.4.2.1 Salmonids, European Eel and cyprinids

For salmonid species and European Eel, as well as other incidental species such as Three-spined Stickleback (Gasterosteus aculeatus), electro-fishing was carried out in an upstream direction for a 10-minute CPUE, an increasingly common standard approach for wadable streams (Matson et al., 2018). A total of approx. ≥100m channel length was surveyed at each site, where feasible, in order to gain a better representation of fish stock assemblages. At certain, more minor watercourse sites or sites with limited access, it was more feasible to undertake electro-fishing for a 5-minute CPUE. Discrepancies in fishing effort (CPUE) between sites are accounted for in the subsequent results section.

Relative conductivity of the water at each site was checked in-situ with a conductivity meter and the electrofishing backpack was energised with the appropriate voltage and frequency to provide enough draw to attract salmonids and European Eel to the anode without harm. For the low to moderate conductivity waters of the sites (most draining upland/sandstone areas) a voltage of 250-300V, frequency of 40-45Hz and pulse duration of 3.5ms was utilised to draw fish to the anode without causing physical damage.

#### 2.2.2.4.2.2 Lamprey

Electro-fishing for lamprey ammocoetes was conducted using targeted box quadrat-based electro-fishing (as per Harvey & Cowx, 2003) in objectively suitable areas of sand/silt, where encountered. As lamprey take longer to emerge from silts and require a more persistent approach, they were targeted at a lower frequency (30Hz) setting which also allowed detection of European Eel, if present. Settings for lamprey followed those recommended and used by Harvey & Cowx (2003), APEM (2004) and Niven & McAuley (2013). Using this approach, the anode was placed under the water's surface, approx. 10–15 cm above the sediment, to prevent immobilising lamprey ammocoetes within the sediment. The anode was energised with 100V of pulsed DC for 15-20 seconds and then turned off for approximately five seconds to allow ammocoetes to emerge from their burrows. The anode was switched on and off in this way for approximately two minutes. Immobilised ammocoetes were collected by a second operator using a fine-mesh hand net as they emerged.

Lamprey species were identified to with the assistance of a hand lens, through external pigmentation patterns and trunk myomere counts as described by Potter & Osborne (1975) and Gardiner (2003b).

#### 2.2.2.4.2.3 General fisheries habitat

A broad appraisal/overview of the upstream and downstream habitat at each site was also undertaken to evaluate the wider contribution to salmonid and lamprey spawning and general fisheries habitat. River habitat surveys and fisheries assessments were also carried out utilising elements of the approaches in the River Habitat Survey Methodology (Environment Agency, 2003) and Fishery Assessment Methodology (O'Grady, 2006) to broadly characterise the river sites (i.e. channel profiles, substrata etc.).

#### 2.2.2.4.3 White-clawed crayfish

White-clawed Crayfish surveys were undertaken at the aquatic survey sites in 2020 under a National Parks and Wildlife (NPWS) open licence (no. C79/2020), as prescribed by Sections 9, 23 and 34 of the Wildlife Act (1976-2012), to capture and release crayfish to their site of capture, under condition no. 5 of the licence. As per Inland Fisheries Ireland recommendations, the crayfish licence sampling started at the uppermost site(s) of the wind farm catchment/sub-catchments in the survey area to minimise the risk of transfer invasive propagules (including crayfish plague) in an upstream direction.

Hand-searching of instream refugia and sweep netting was undertaken, according to Reynolds et al. (2010). Trapping of crayfish was not feasible given the small nature of most aquatic survey sites sampled. An appraisal of white-clawed crayfish habitat at each site was also carried out based on physical channel attributes, water chemistry and incidental records in otter spraint. Furthermore, a desktop review of known distributions of crayfish within the relevant watercourses and wider catchment(s) was also completed.

#### 2.2.2.4.4 Freshwater Pearl Mussel

Freshwater Pearl Mussel surveys of watercourses in the wider footprint of the proposed CGEP were completed over the 4<sup>th</sup> to 7<sup>th</sup> September 2020. Conditions were suitable, with bright, sunny weather and good water visibility under base flow conditions. This helped to maximise visibility of Freshwater Pearl Mussel against dark substrata and also improved chances of detection when mussels were filter feeding in brighter conditions. Pearl mussel surveys were carried out under a national open licence (licence no. C15/2020), issued by the National Parks and Wildlife Service (NPWS). The survey methodology used was in accordance with the Stage 1 & 2 guidelines given in Irish Wildlife Manual No. 12, NPWS (Anonymous, 2004).

#### 2.2.2.4.5 Biological water quality (macro-invertebrates)

Biological water quality sampling was conducted across the survey area in locations as outlined in Table 2.1, Figure 2.1.

Macro-invertebrate samples were converted to Q-ratings, as per Toner et al. (2005) - Table 2.2. All riverine samples were taken with a standard kick sampling hand net (250mm width, 500µm mesh size) from areas of riffle/glide utilising a two-minute sample, as per ISO standards for water quality sampling (ISO 10870:2012). Large cobble was also washed at each site where present and samples were elutriated and fixed in 70% ethanol for subsequent laboratory identification. Any rare invertebrate species were identified from the NPWS Red List publications for beetles (Foster et al., 2009), mayflies (Kelly-Quinn & Regan, 2012) and other relevant taxa (i.e. Byrne et al., 2009; Feeley et al., 2020; Nelson et al., 2011).

Q Value	WFD Status	Pollution Status	Condition
Q5 or Q4-5	High Status	Unpolluted	Satisfactory
Q4	Good Status	Unpolluted	Satisfactory
Q3-4	Moderate Status	Slightly polluted	Unsatisfactory
Q3 or Q2-3	Poor	Moderately polluted	Unsatisfactory
Q2, Q1-2 or Q1	Bad	Seriously polluted	Unsatisfactory

Table 2.2: Reference Categories for EPA Q-Ratings (Q1 to Q5).

#### 2.2.2.4.6 Aquatic ecological evaluation

#### 2.2.2.4.6.1 Fisheries Habitat Evaluation

A fisheries habitat appraisal of the watercourses in the footprint of the proposed Coom Green Energy Park and associated cable route was undertaken to establish their importance for salmonid, lamprey, European Eel and other fish species. The baseline assessment considered the quality of spawning, nursery and holding habitat within the vicinity of the survey sites using Life Cycle Unit (salmonids) and Lamprey Habitat Quality Index scores (lamprey).

#### 2.2.2.4.6.2 Aquatic Habitat Evaluation

The physical morphology and chemical status of affected waterbodies are evaluated fully in the Water Chapter (Chapter 10), while the aquatic habitat value with regard to biodiversity receptors is evaluated with regard to its supporting function in relation to the conservation objectives as set out for the respective SAC sites, i.e. the Blackwater River (Cork/Waterford) SAC (NPWS, 2012) and also the WFD status and objectives as specified in the River Basin Management Plan (2018-2021) sub-catchment reporting for each respective waterbody / subcatchment. Aquatic habitat is evaluated in terms of the EC Surface Water Regulations (2009) environmental quality standards for WFD status, as well as local biodiversity value for water-dependant receptors identified during this assessment.

#### 2.2.2.4.6.3 Freshwater Pearl Mussel Evaluation

Freshwater Pearl Mussel habitat is evaluated following the requirements of the European Union Environmental Objectives (Freshwater Pearl Muscle (Amendment) Regulations 2018 S.I. No. 355/2018 and following the

assessment criteria published in the Munster Blackwater Sub-basin Management Plan (NS2, 2010) and the Conservation Objectives prescribed for this species within the Blackwater River (Cork/Waterford) SAC (NPWS, 2012).

#### 2.2.2.4.6.4 Aquatic Macroinvertebrate Community Evaluation

The aquatic macroinvertebrate community was evaluated following the EPA standard Q-value assessment (Toner, 2005) with scores attributed according to this biotic index. Additional evaluation scores were attributed to smaller watercourses following the updated Small Stream Risk Score (SSRS) methodology (Walsh, 2005; EPA, 2018) as appropriate.

#### 2.2.2.4.6.5 Summary Aquatic Evaluation

The final summary evaluation of aquatic ecological receptors at all sites (Table 2.1) contained within this report uses the geographic scale and criteria defined in the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009), refer to Table 2.3 below. This evaluation followed an appraisal of each specific aquatic receptor scoring as relevant for each site.

# Table 2.3. Evaluation Criteria for Aquatic Ecology sites

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

Resource Evaluation	NRA Criteria
National	Site designated or proposed as a Natural Heritage Area (NHA).
Importance	Statutory Nature Reserve.
	• Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA);
	Statutory Nature Reserve;
	• Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
	<ul> <li>Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.</li> </ul>
County	Area of Special Amenity.
Importance	Area subject to a Tree Preservation Order.
	• Area of High Amenity, or equivalent, designated under the County Development Plan.
	• Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.
	• Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
	• County important populations of species, viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared.
	• Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
	• Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance	• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
(Higher Value)	• Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.
	• Sites containing semi natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
	• Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Resource Evaluation	NRA Criteria
Local Importance (Lower Value)	• Sites containing small areas of semi natural habitat that are of some local importance for wildlife;
	• Sites or features containing non-native species that is of some importance in maintaining habitat links.

#### 2.2.2.4.7 **Biosecurity**

A strict biosecurity protocol following the Check-Clean-Dry approach was employed during the survey. Equipment and PPE used was disinfected with Virkon<sup>®</sup> between survey sites to prevent the transfer of pathogens and/or invasive species between survey areas. Where feasible, equipment was also be thoroughly dried (through UV exposure) between survey areas. As per best practice, surveys were undertaken at sites in a downstream order (i.e. uppermost site surveyed first etc.) to prevent the upstream mobilisation of invasive propagules and pathogens. Any invasive species recorded within or adjoining the survey area were georeferenced.

#### 2.3 **Desktop Study Results**

A desk study was carried out to collate and review available information, datasets and documentation sources pertaining to the receiving environment as relevant to this NIS.

#### 2.3.1 **Habitats and Flora**

The site is not included in any European Site. However, surveys conducted included identification of Annex I listed habitats to ensure impacts to non-designated habitats of significant ecological importance, were avoided where possible at design stage.

#### 2.3.2 **Invasive Alien Plant Species**

The National Biodiversity Data Centre (NBDC) online database indicates that 16no. Invasive Alien Plant Species have been recorded at the 10x10km Grid Squares W68, W69, W79 and W89, associated with the locations of the proposed CGEP development and Grid Connection Route locations (Table 2.4).

Common Name	Scientific Name	Date of Record	Grid Square	Invasive Impact
American Skunk-cabbage	Lysichiton americanus	12/03/2017	W79	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)
Black Currant	Ribes nigrum	22/06/2007	W69	Medium Impact Invasive Species

Table 2.4: Invasive Alien Plant Species within the Proposed CGEP and Grid Connection Route (Source' NBDC)

Common Name	Scientific Name	Date of Record	Grid Square	Invasive Impact
		23/08/2006	W79	
Butterfly-bush	Buddleja davidii	27/04/2017	W68	Medium Impact Invasive Species
Canadian Waterweed	Elodea canadensis	16/09/2009	W89	High Impact Invasive Species Regulation S.I. 477 (Ireland)
		27/04/2017	W68	
Cherry Laurel	Prunus laurocerasus	23/08/2006	W79	High Impact Invasive Species
		20/07/2004	W89	
Douglas Fir	Pseudotsuga menziesii	31/07/2006	W79	Medium Impact Invasive Species
Fallopia japonica x sachalinen	sis = F. x bohemica	21/04/2017	W68	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Giant Hogweed	Heracleum mantegazzianum	11/03/2020		High Impact Invasive Species Regulation S.I. 477 (Ireland)
Himalayan Knotweed	Persicaria wallichii	16/08/2018	W69	Medium Impact Invasive
		08/09/2015	W68	(Ireland)
	Impatiens glandulifera	16/09/2009	W69	
Indian Balsam		31/07/2015	W68	High Impact Invasive Species
		16/09/2009	W79	Regulation S.I. 477 (Ireland)
		29/07/2017	W89	
		10/10/2007	W69	
Jananese Knotweed	Fallonia ignonica	12/04/2018	W68	High Impact Invasive Species
	r unopiù juponicu	26/01/2019	W79	Regulation S.I. 477 (Ireland)
		08/05/2019	W89	
Nuttall's Waterweed	Elodea nuttallii	12/08/2008	W68	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Rhododendron	Rhododendron ponticum	16/02/2018	W69	High Impact Invasive Species Regulation S.I. 477 (Ireland)

Common Name	Scientific Name	Date of Record	Grid Square	Invasive Impact
		06/03/2019	W79	
		29/04/1997	W89	
		15/11/2018	W69	
Sycamore	Acer pseudoplatanus	27/04/2017	W68	Medium Impact Invasive
Sycamore		16/09/2009	W79	Species
		16/09/2009	W89	
Three-cornered Garlic	Allium triquetrum	21/04/2017	W68	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)
Traveller's-joy	Clematis vitalba	06/10/2015	W89	Medium Impact Invasive Species

High Impact Invasive species were a focus for Field surveys and are discussed in section 2.4.2.

# 2.3.2.1 Turbine Delivery Route (Nodes)

A desk study was carried out to collate and review available information, datasets and documentation sources pertaining to the site's (TDR Nodes) natural environment (emphasis added). Records available on the NPWS and the National Biodiversity Data Centre websites were reviewed (see Appendix B).

#### 2.3.3 Avifauna

The receiving environment within the CGEP and Grid Connection Study Area supports a wide variety of general bird species of open countryside, farmland and woodland (Table 2-5). 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.

**Table 2.5:** Species of Birds recorded historically within the 10km squares (W68, W69, W79 and W89) in which the CGEP development and GCR are located, from desktop review (Source: NBDC<sup>2</sup>)

icaica (acaice: lance )											
Common name	Scientific Name	Birds Directive	BoCCI		W68		W69		W79	-	W89
				Max	Date	Max	Date	Max	Date	Max	Date
Mute Swan	Cygnus olor		Amber	1	29/2/84	17	31/12/11	10	31/12/11	25	31/12/11
Whooper Swan	Cygnus Cygnus	Annex I	Amber			1	31/12/01			5	08/02/15
Shelduck	Tadorna tadorna		Amber			1	31/12/01				
Wigeon	Anas Penelope		Red			1	31/12/01			2	31/12/11
Shoveler	Anas clyptea		Red			1	31/12/01				
Teal	Anas crecca		Amber	1	29/02/84	5	31/12/11	5	31/12/11	11	31/12/11
Pochard	Aythya farina		Red			1	31/12/01				
Tufted Duck	Aythya fuligula		Red			1	31/12/01	2	31/12/11		
Scaup	Aythya marila		Amber	1	29/02/84						
Goldeneye	Bucephala clangula		Red	1	29/02/84	1	31/12/01				
Red Grouse	ragopus lagopus		Red			1	31/07/72				
Grey Partridge	Perdix perdix		Red							2	31/12/11
Little Grebe	Tachybaptus ruficollis		Amber					1	31/07/72	2	31/12/11
Cormorant	Phalacrocorax carbo		Amber	3	31/12/11	6	31/12/11	10	31/12/11	12	31/12/11
Sparrowhawk	Accipiter nisus		Amber	16	04/08/17	15	31/12/11	8	31/12/11	14	31/12/11
Goshawk	Accipiter gentilis		Amber	2	31/12/11	1	31/12/11				
Hen Harrier	Circus cyaneus	Annex I	Amber	11	31/12/11	16	26/6/26	12	10/04/16		
Corncrake	Crex crex	Annex I	Red	1	31/07/72					1	31/07/72
Coot	Fulica atra		Amber			3	31/12/11	2	31/12/11		
Lapwing	Vanellus vanellus		Red	4	31/12/11	1	31/12/01	2	29/02/84	5	31/12/11
Golden Plover	Pluvialis aprocaria	Annex I	Red			1	31/12/01	4	31/12/11	5	31/12/11
Woodcock	Scolopax rusticola		Red	2	31/12/11	9	31/12/11	З	31/12/11	з	31/12/11
Jack Snipe	Lymnocryptes minimus		Amber					2	31/12/11	2	31/12/11
Snipe	Gallinago gallinago		Amber	7	31/12/11	7	31/12/11	4	31/12/11	10	31/12/11
Black-tailed Godwit	Limosa limosa		Amber			1	31/12/01				

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Common name	Scientific Name	Birds Directive	BoCCI	-	W68	-	W69		W79	-	W89
				Max	Date	Мах	Date	Max	Date	Max	Date
Curlew	Numenius arquata		Red	3	03/08/17	4	31/12/11	3	31/07/91	1	29/02/84
Redshank	Tringa totanus		Red			1	31/12/01				
Common Sandpiper	Actitis hypoleucos		Amber			1	31/12/01			3	31/12/11
Dunlin	Calidris alpina	Annex I	Red			1	31/12/01				
Black-headed Gull	Chroicocephalus ridibundus		Red	1	29/02/84	2	31/12/01	4	31/07/91	З	31/12/11
Common Gull	Larus canus		Amber			1	31/12/01	1	29/02/84	2	31/12/11
Great Black-backed Gull	Larus marinus		Amber			1	29/02/84			1	29/02/84
Herring Gull	Larus argentatus		Red	1	29/02/84	1	29/2/84	1	29/02/84		
Lesser Black-backed Gull	Larus fuscus		Amber	1	31/12/01					7	31/12/11
Stock Dove	Columba oenas		Amber	4	31/12/11	5	31/12/11	4	31/12/11	14	31/12/11
Barn Owl	Tyto alba		Red	3	30/11/17	1	27/07/16	4	31/12/11	3	31/12/11
Short-eared Owl	Asio flammeus	Annex I	Amber							2	31/12/11
Nightjar	Caprimulgus europeaus		Red			1	31/7/72				
Swift	Apus apus		Amber	1	31/07/72	5	31/12/11	5	31/12/11	14	31/12/11
Kingfisher	Alcedo atthis	Annex I	Amber			6	31/12/11	11	31/12/11	18	31/12/11
Kestrel	Falco tinnunculus		Amber	14	11/06/17	28	22/09/16	14	31/12/11	15	31/12/11
Merlin	Falco colimbarius	Annex I	Amber	3	31/12/11			1	31/12/11		
Peregrine	Falco peregrinus	Annex I	Green	4	31/12/11	ю	31/12/11	ю	31/12/11	7	31/12/11
Skylark	Alauda arvensis		Amber	7	31/12/11	10	31/12/11	10	31/12/11	10	31/12/11
Sand Martin	Riparia riparia		Amber	3	31/12/11	14	31/12/11	∞	21/05/16	14	31/12/11
Swallow	Hirundo rustica		Amber	13	04/08/17	31	31/12/11	13	31/12/11	24	03/07/16
House Martin	Delichon urbicum		Amber	7	31/12/11	8	31/12/11	10	31/12/11	6	31/12/11
Goldcrest	Regulus regulus		Amber	19	31/12/11	27	31/12/11	14	31/12/11	31	31/12/11
Starling	Sturnus vulgaris		Amber	23	22/05/16	21	31/12/11	10	31/12/11	34	31/12/11
Mistle Thrush	Turdus viscivorus		Amber	11	22/05/16	15	31/12/11	10	31/12/11	21	31/12/11
Spotted Flycatcher	Muscicapa striata		Amber	4	04/08/17	12	31/12/11	4	31/12/11	11	31/12/11
Robin	Erithracus rubecula		Amber	28	31/12/11	32	31/12/11	21	31/12/11	38	03/07/16

Common name	Scientific Name	Birds Directive	BoCCI		W68		69M		W79		W89
				Max	Date	Max	Date	Max	Date	Мах	Date
Stonechat	Saxicola rubicola		Amber	6	31/12/11	19	31/12/11	7	31/12/11	12	31/12/11
Dipper	Cinclus cinclus		Green	6	31/12/11	31	31/12/11	12	31/12/11	36	08/02/15
House Sparrow	Passer domesticus		Amber	12	01/07/17	18	31/12/11	16	31/12/11	31	31/12/11
Grey Wagtail	Motacilla cinerea		Red	10	14/06/16	32	31/12/11	19	31/12/11	45	21/03/12
Meadow Pipit	Anthus pratensis		Red	13	31/12/11	29	31/12/11	14	31/12/11	18	31/12/11
Greenfinch	Carduelis chloris		Amber	6	10/06/17			10	31/12/11	30	31/12/11
Linnet	Linaria cannabina		Amber	13	31/12/11	18	31/12/11	8	31/12/11	13	31/12/11
Yellowhammer	Emberiza citrinella		Red			6	31/12/11	9	31/12/11	16	31/12/11

The desk survey confirmed that the site is not located within any Special Protection Area designated for birds. Special Conservation Interest bird species of national SPA's identified as potentially within the zone of influence of the development based on the findings of the desk study include;

- Hen Harrier (breeding and wintering)
- Peregrine •
- Kingfisher •
- Short eared Owl
- Dunlin
- Whooper wan
- Wader and water fowl species (non Annex 1)

Corncrake do not use this area anymore (no records since early 1970's) and hence no adverse effects are possible or likely.

Focused species-specific surveys to detect these species and establish usage of the windfarm area were conducted and are discussed in section 2.4.3 below.

Given the temporary nature, scale and location of proposed works no bird surveys for the above species were determined as required for the proposed TDR.

#### 2.3.4 Otter

The desktop study for Otter records in the NBDC online database and map viewer<sup>5</sup> revealed the presence of otter (Table 2.6) within the areas potentially affected by the proposed CGEP and Grid Connection Route.

Table 2.6: Records of protected mammal fauna within grid squares W69, W79, W89, W68 (Source: NBDC https://maps.biodiversityireland.ie/Map)

Mammal Name	Legal Protection	Conservation Status (Marnell et al., 2019)
European Otter ( <i>Lutra lutra</i> )	EU Habitats Directive Annex II, IV Wildlife Acts	Least Concern

Otter (Lutra lutra) records were widespread throughout the respective grid squares, with several records overlapping the survey area (NBDC data; NPWS data). A single Otter record was available for the lower Ross Stream, approx. 2.8km downstream from survey site C1, the Lyravarrig Stream approx. 1km downstream from site B8, Bride Bridge on the River Bride (site B11) and at Old Bridge on the River Bride (site B15) (NPWS data).

No otter records were determined for the site of the proposed windfarm and grid route.

Otter surveys were conducted as part of the proposed development and relevant findings are discussed in section 2.4.

<sup>&</sup>lt;sup>5</sup> https://maps.biodiversityireland.ie/

#### 2.3.5 Bats

No records of any bat species listed as qualifying interest for SAC's occur around the proposed development including the TDR. Extensive bat surveys conducted between 2016 and 2020 did not record Lesser Horsehoe Bat (Rhinolophus hipposideros) the only QI bat species, with sites designated as SAC, currently in Ireland. Sites designated for this species are a minimum of 40km (Killarney National Park, Macgillycuddy's Reeks And Caragh River Catchment SAC) from the site and well outside the potential zone of influence of the proposed development.

#### 2.3.6 **Fisheries and Aquatic Ecology**

A sensitive species data request for terrestrial and aquatic flora and fauna covering 10km grid squares adjoining the proposed development (i.e. W58, W59, W68, W69, W78, W79 and W89) revealed records for a number of protected (freshwater) QI aquatic species in the vicinity of the proposed watercourses crossings, as did data from the National Biodiversity Data Centre<sup>2</sup>.

Numerous records for Freshwater Pearl Mussel (Margaritifera margaritifera) were available for the respective grid squares but all were confined to the River Blackwater. No records overlapped with the survey area. Similarly, White-clawed Crayfish (Austropotamobius pallipes) records were available for the River Blackwater and the Ballyclogh Stream (upper tributary upstream of Mallow, W59) but no records overlapped with the survey area.

Numerous Sea Lamprey (Petromyzon marinus) records were available for the Munster Blackwater catchment (e.g. River Blackwater, Clyda River) but no records overlapped with the survey area. River Lamprey (Lampetra fluviatilis) records were available for the River Blackwater and River Bride at Rathcormack Bridge (not within survey area).

A catchment-wide electro-fishing survey was undertaken for an early precursor to the propose CGEP development. The wider catchment was found to support Brown Trout (Salmo trutta), European Eel (Anguilla anguilla), Lampetra sp. ammocoetes and low numbers of Atlantic Salmon in 2017.

### 2.3.6.1 Turbine Delivery Route

A desk study was carried out to collate and review available information, datasets and documentation sources pertaining to the site's (TDR Nodes) natural environment (emphasis added). Records available on the NPWS and the National Biodiversity Data Centre websites were reviewed (see Appendix B). Given the nature, scale and location of proposed works (existing roads) no aquatic surveys were deemed required.

#### 2.4 **Field study**

### 2.4.1 Habitats

No Annex I listed habitats associated with European sites will be affected by the development. No habitats evaluated (NRA, 2009) as being of International, National or county importance will be impacted by the development. No habitats listed under Annex I of the Habitat Directive were recorded within the development site. Downstream (offsite) non designated Annex I river habitat; Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation (3260) was encountered and is discussed as relevant in section 2.4.4.

# 2.4.2 Invasive Alien Plant Species

Invasive Alien 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.

### 2.4.2.1 Proposed CGEP development

Rhododendron (Rhododendron ponticum) was recorded at one location and Japanese Knotweed (Fallopia japonica) or Himalayan Knotweed (Persicaria wallichii) infestations were recorded at 11 locations during habitat assessments on the CGEP development site. None of these infestations however occur within the study area, i.e. within 50m of the proposed CGEP development infrastructure.

Buddliea (Buddleja davidii) and Pheasant Berry (Himalayan Honeysuckle) (Leycesteria formosa) were recorded at one and two locations, respectively. These 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) are listed as a 'Medium impact' non-native invasive species (Kelly et al., 2013a, O' Flynn et al., 2014). Montbretia (Crocosmia x crocosmiflora), which is also considered an invasive species in Ireland was also recorded at one location. Of the above listed 'medium impact' invasive species, only two infestations of Pheasant Berry occur within the CGEP Development study area.

# 2.4.2.2 Grid Connection Route

Three Japanese Knotweed infestations were recorded during habitat assessments on the Grid Connection Route, two of which occur within the Grid Connection study area (i.e. within 50m of the proposed Grid Connection Route). The only other Third Schedule invasive species recorded was Rhododendron, which occurs at one location outside of the study area.

Himalayan Balsam (Impatiens glandulifera) was recorded during the aquatic survey. It was widespread and abundant along both banks of channel at site 13 (Farran North stream) and also present in smaller, scattered patches at site 9 (Bunnaglanna River) (Figure 2.1).

Cotoneaster (Cotoneaster sp.), which is listed as a 'Medium impact' non-native invasive plant species (Kelly et al., 2013a; O' Flynn et al., 2014), was recorded at two locations within the Grid Connection Route study area. Montbretia (Crocosmia x crocosmiflora), was also recorded at two locations, with one of these infestations located within the Grid Connection Route study area. While not listed as a "Medium Impact" invasive species, Montbretia is considered an invasive species in Ireland.

# 2.4.2.3 <u>Turbine Delivery Route (Nodes)</u>

The Invasive Alien Plant Species recorded at and in the vicinity of nodes associated with the TDR are summarised in Table 2-7 below. Their risk of invasiveness impact, legal status and an indication whether or not they will interact with proposed works are outlined.

The only legally restricted species recorded was Japanese knotweed at one location potentially within the zone of influence. Cherry Laurel (Prunus laurocerasus), Snowberry (Symphoricarpos albus), Winter Heliotrope (Petasites fragrans) and Old Man's Beard (Clematis vitalba) are present within the footprint of a number of nodes; Himalayan Honeysuckle is present adjacent to the vegetation clearance footprint at Node 1.4.
Node	Species	Invasiveness impact/legal status	Interaction	
Route 1 Tivoli-Bottlehill				
1.3	Old Man's Beard	Id Man's Beard Medium impact; no legal restriction In load-bearing footprint		
	Old Man's Beard	Medium impact; no legal restriction	In vegetation clearance footprint	
	Cherry Laurel	High impact; no legal restriction	None	
1.4	Japanese Knotweed	High impact; Schedule III listed species*	None likely; al <u>though this</u> <u>species is located within 7m</u> any proposed interaction is unlikely and not likely to contribute to further spread or disturbance above the existing background/baseline levels.	
1.7	Cherry Laurel	High impact; no legal restriction	In vegetation clearance footprint	
	Snowberry	Low impact; no legal restriction	In vegetation clearance footprint	
	Montbretia	Not assessed; no legal restriction	None	
Route 2 Dunkettle – Nagle's Mountains				
2.0	Winter Heliotrope	er Heliotrope Low impact; no legal restriction In bank re-grading footprin		
2.2	Himalayan Honeysuckle	Medium impact; no legal restriction	Potential- adjacent to vegetation clearance footprint	
2.3	Old Man's Beard	Medium impact; no legal restriction	In vegetation clearance footprint	
2.4	Winter Heliotrope	Low impact; no legal restriction	In load-bearing footprint	

### Table 2.7: Invasive Alien Plant Species present at and in the vicinity of the Turbine Delivery Route Nodes

\* Third Schedule listed invasive species under Regulations 49 & 50 S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011.

#### 2.4.3 Avifauna

### 2.4.3.1 CGEP and Grid Connection Route

All wild bird species are protected by legislation under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000. Further international protection is provided to bird species in the Annex I of the EU Birds Directive 2009/147/EC. Notwithstanding the protection afforded to some bird species at National and International levels, the importance of each species in relation to the proposed CGEP Development and Grid Connection Route, in the context of the Appropriate Assessment, takes account of their inclusion as Special Conservation Interest (SCI) species of the European sites within the Zone of Influence of the proposed CGEP Project (see Section 3.7.2).

Taking in consideration the Qualifying Interests (QI) and Special Conservation Interests (SCI) of the European sites within the Zone of Influence of the proposed CGEP Development and Grid Connection Route (Table 3.9), the range of habitat suitability for QI and SCI within the proposed CGEP Development and Grid Connection Route, Whooper Swan was the only pertinent bird species scoped in for further assessment (it is an a SCI species for the Blackwater Callows SPA).

Whooper Swan is sensitive to disturbance at both foraging and roosting sites during the winter. Such sites are usually traditional areas to which birds show high fidelity in respect of both foraging and roosting, and often regularly used corridors for commuting between feeding and/or roosting locations.

Wintering wildfowl surveys took place in the winter periods of 2016/17 and 2017/18. The purpose of these surveys was to establish numbers (if any) of wintering Whooper Swan along the Blackwater River corridor, to the north of CGEP, between Mallow town and Fermoy town. This survey comprised a 'round-robin' style survey in line with established methods such as IWeBS/National Swan Census methods whereby suitable locations for feeding/roosting swans on both sides of the Blackwater River corridor (North and South) were visited over the course of a single day per month, across 4 months (October to January inclusive of winter 2016/17 and November to February inclusive of winter 2017/18).

Additional VP watches were also carried out at dawn or dusk during the winter months (1 dawn and 1 dusk watch per month November to February inclusive and usually around the same date as the monthly census), to determine whether or not wildfowl (particularly swans) possibly utilising the corridor eastwards from Mallow town along the Blackwater, also occasionally traversed southwards through the proposed development area.

No requirement for Winter Wildfowl surveys was scoped in regarding the proposed Grid Connection Route eastwards from Lackendarragh North to Farran South. Habitats adjacent are unsuitable for larger wintering wildfowl such as geese or swans, the underground cabling will not pose a risk in terms of collision mortality along regularly used flight paths, and the CGEP surveys of the River Blackwater provide background information on numbers of wildfowl. Remaining lands where the GCR is to be located overlap the GCR study area, this includes the section of grid connection route between Mullenboree and Lackendarragh.

Records of other pertinent wetland species such as Black-tailed Godwit, Wigeon, Teal which is also an SCI for the Blackwater Callows SPA, were recorded as a matter of course to inform the baseline appraisal.

Key findings of these surveys are outlined below.

#### 2.4.3.1.1 <u>Whooper Swan</u>

Whooper Swan was historically recorded proximal to the study area and were included as a target species for VP watches and also subject to a bespoke survey as outlined above due to potential impacts from the proposed CGEP Development on migratory or commuting birds. No Whooper Swans were recorded during these surveys.

#### 2.4.3.1.2 Wigeon

No records of Wigeon were recorded.

#### 2.4.3.1.3 Teal

One record, ca.30 birds were flushed from a disused sand pit between Mallow and Fermoy in November 2017. None were recorded in the vicinity of the proposed development.

#### 2.4.3.1.4 **Black-tailed Godwit**

No records from the proposed development areas.

#### 2.4.3.1.5 Hen Harrier

Hen Harrier surveys and findings (2016 – 2020) are discussed in detail in the EIAR for the proposed development. It is considered that the site is not an ex situ site (of SPA's designated for this species), given the site is at an extensive distance (>25km) from the closest SPA designated for protection of breeding Hen Harrier. This distance is well outside typical foraging ranges of adult Hen Harrier. Hen Harrier also use the area in the vicinity of the windfarm during the winter period and three winter roost sites are identified in the EIAR close to the site. The closest winter roost to the windfarm is < 2km. Based on a precautionary approach wintering Hen Harrier could include individuals from populations outside the local area, including individuals from distant SPA's. No impacts are identified in the EIAR to wintering Hen Harrier and no disturbance will arise to any wintering Hen Harrier roosts due to the project. It is considered therefore that no significant adverse effects are likely to SCI Hen Harrier associated with SPA's.

Precautionary mitigation is outlined in the EIAR including habitat enhancement measures to minimise risks to local populations of breeding and wintering Hen Harrier that use the locality of the proposed windfarm development. The TDR is not important for Hen Harrier.

#### 2.4.3.1.6 Merlin

No evidence of breeding Merlin was observed during this survey. Several winter records were made. Measures are outlined in the EIAR that will avoid risks to Merlin including positive habitat enhancement measures. The TDR is not suitable for Merlin. It is considered that no significant adverse effects are likely to SCI Merlin associated with national SPA's.

#### 2.4.3.1.7 **Kingfisher**

The site does not have suitable habitat for this species, and none were recorded. No SPA (river) sites occur downstream of the development. It is considered that no significant adverse effects are likely to SCI Kingfisher associated with national SPA's.

#### 2.4.3.1.8 Golden Plover

Small numbers of Golden Plover pass through the area and were recorded occasionally during winter surveys on farmland, away from the proposed development. It is considered that no significant adverse effects are likely to SCI Golden Plover associated with national SPA's.

#### 2.4.3.1.9 Other Annex I listed species

No other records of note of Annex I listed Bird Directive species potentially associated with SPA sites were recorded.

#### 2.4.4 **Aquatic Environment**

### 2.4.4.1 Proposed CGEP development and Grid Connection Route

#### 2.4.4.1.1 Site descriptions

The following describes the location of aquatic sampling locations downstream of the development with a focus on QI aquatic species associated with European sites as relevant. The aquatic sampling locations are outlined in Figure 2-1.

#### 2.4.4.1.1.1 Site A1 – unnamed stream, Knuttery Bridge

Site A1 is located on the upper reaches of a small, unnamed stream (no EPA code; aka Leapford Stream) at Knuttery Bridge. The small stream, a tributary of the Monparson River, had been straightened and deepened historically in the vicinity of the local road crossing and featured a deep V-shaped channel, less than 1m wide with 2.5-3m bank heights over a moderate gradient. The channel did not contain water at the time of survey (100% dry). The bed comprised compacted cobble, gravel and mud (likely dry for a significant period of time). The banks were heavily scrubbed over and comprised primarily Nettle (Urtica dioca), Rosebay Willowherb (Chamaenerion angustifolium), Bracken (Pteridium aquilinum), Foxglove (Digitalis purpurea) and Hogweed (Heracleum sphondylium). Scattered Hawthorn (Crataegus monoygna) and Sitka Spruce (Picea sitchensis) were present downstream. The adjoining land use patterns were of coniferous afforestation (WD4) upstream and heavily improved agricultural grassland (GA1) downstream and adjoining the survey area.

The upper reaches of the unnamed stream at site A1 offered no fisheries value at the time of survey owing to the lack of water and was considered unlikely to support fish throughout much of the year due to evident seasonality. Given the dry nature of the site, it was not possible to take a Q-sample to infer water quality.

#### 2.4.4.1.1.2 Site A2 - unnamed stream, Tooreen North

Site A2 is located on the upper reaches of an unnamed stream (no EPA code) at St. John's Well, Tooreen North. The site represented a small upland eroding watercourses (FW1), 0.5m wide and 0.1-0.2m deep on average. The stream emerges from a spring known as St. John's Well and then flows through a steep valley in a Sitka Spruce plantation (WD4) with a buffer of Grey Willow (Salix cinerea). The gradient steepened significantly moving through the plantation with cascading reaches visible. Low banks (0.5m high) graded into the adjoining valley. The profile is dominated by riffle (95%) with a single localised shallow pool located at the well itself. The substrata were clean and unbedded, dominated by fine, medium and coarse gravels. The riparian areas are dominated by scrub (WS1) with Bracken, Bramble and Nettle being very dense. The site supported no macrophytes although abundant Opposite-Leaved Golden Saxifrage (Chrysosplenium oppositifolium) was present in the margins (visible downstream, away from the well).

No fish were recorded via electro-fishing. The stream was not of fisheries value due to its very small size and location in the very upper reaches of a catchment with limited accessibility for fish. The site was unsuitable for White-clawed Crayfish and offered no Otter value given the lack of prey resource. A biological water quality rating of Q3, corresponding to WFD 'Poor' status was assigned for this site (Table 2.8).





### 2.4.4.1.1.3 Site A3 - Tooreen North Stream, Tooreen North

The Tooreen North Stream (EPA code: 19T33) at site A3 is a small, semi-natural upland eroding watercourse (FW1), characteristic of an upland spate channel. The stream flowed in a deep U-shaped channel (2m to 3m bank heights), 1.5m wide and had shallow water (<0.1m deep). The profile is dominated by riffle (90%) with 10% glide and an absence of pools due to its very small nature. The bed comprised compacted small boulder, cobble and mixed medium and fine gravels. Siltation was considered moderate. The riparian zone is composed of mature conifers (Lodgepole Pine Pinus contorta) and dense Bracken and Bramble scrub (WS1). Adjoining land uses are improved agriculture (GA1) and coniferous afforestation (WD4) upstream. Macrophyte growth was not present although the liverwort species Jagged Germanderwort (Riccardia chamedryfolia) is locally abundant on instream boulders and cobble.

No fish were recorded via electro-fishing. The stream was not considered of fisheries value due to its very small size and location in the very upper reaches of a catchment with limited accessibility for fish. The site is unsuitable for White-clawed Crayfish and offered no Otter value given the lack of prey resource. A biological water quality rating of Q3-4, corresponding to WFD 'Moderate' status was assigned for this site (Table 2.8).

#### 2.4.4.1.1.4 Site A4 - Slievedotia 19 Stream, Daly's Cross

The Slievedotia 19 Stream (EPA code: 19S09) at site A4 is a small drainage channel (FW4) which averaged less than 1 and 0.1m deep. The stream had been historically straightened and deepened in the vicinity of the road crossing (culverted underneath Daly's Cross) and is contained in a deep U-shaped channel. The channel substrata comprised a 100% deep silt base with an imperceptible flow at the time of survey. The channel was bordered to the east by an earthen embankment (2.5m high) and grassy meadow habitat with improved grassland (GA1) to the west. The stream was heavily scrubbed-over with Bramble, Gorse and Bracken scrub (WS1) encroaching into the channel- riparian shading was approaching 100%. Consequently, there were no macrophytes recorded instream. A small block of willow-dominated scrub was present in vicinity of the road crossing with a small linear block of coniferous afforestation (WD4) present along the channel downstream of the survey site.

No fish were recorded present at the site via electro-fishing and it is not considered of fisheries value due to its small size and heavily modified nature and likely seasonality. However, the site may be utilised by migratory European Eel during periods of higher flow (e.g. autumn, winter). The site is unsuitable for White-clawed Crayfish and offered little to no Otter value.

### 2.4.4.1.1.5 Site A5 – unnamed stream, Lissard

Site A5 is located on the upper reaches of unnamed stream at Lissard in the vicinity of a local road crossing. The stream was 100% dry at the time of survey and the 100% dry mud channel bed indicated it had been dry for some time prior to the survey. The channel is 1.0m wide with bank heights of 1.5-2m. The channel was culverted under the local road (small pipe culvert) and was bordered by a treeline (WL2) of Grey Willow, Hawthorn, Blackthorn (Prunus spinosa), Elder (Sambucus nigra) and Gorse on the east bank. The west bank features dense scrub (WS1) with Bramble, Nettle, Great Willowherb (*Epilobium hirsutum*), Wild Angelica (*Angelica sylvestris*) and rank grasses. This adjoins a trackway that was colonised by a dry grassy meadow habitat (GS2). The wider landscape comprises heavily improved grassland (GA1).

The channel is evidently of no fisheries value. However, given downstream connectivity to the Monparson River, the stream may be used by migratory European Eel during periods of higher flow (e.g. autumn, winter) although its overall fisheries value is considered low given likely seasonality.

### 2.4.4.1.1.6 <u>Site A6 – Monparson River, Lissard</u>

The Monparson River (EPA code: 18M58) at site A6 is a small lowland depositing watercourse (FW2), averaging 5-6m wide and 0.2-0.3m deep. Located in the vicinity of a local road crossing, the tributary of the River Clyda had been historically straightened but good recovery was present throughout. The bankfull heights were 1.0m with no historical deepening evident. The river profile was dominated by glide (60%), 30% riffle and 10% pool. The bed was dominated by cobble (60%), boulder 10% with fine and medium gravel making up 20% by surface area of the bed. Coarse gravel, sand and silt made up the remaining 10%. The substrata at time of survey was partially bedded with moderate siltation evident. The riparian areas comprised mature alder and Grey Willow woodland supporting an understory dominated by Nettle, Bracken, Meadowsweet (Filipendula ulmaria), Opposite-Leaved Golden Saxifrage and Bramble. Dry grassy fields (GS2) bordered the river to the south Shading was moderate, locally (higher upstream of the bridge). The macrophyte community comprised abundant Hemlock Water Dropwort in the margins and riparian areas with localised Yellow Iris (Iris psuedacorus). Stream Water Crowfoot (Ranunculus penicillatus var. penicillatus) was rare and was only present in more open riffle areas. The aquatic bryophytes included frequent Chiloscyphus polyanthos on cobble with occasional Fontinalis antipyretica. The macrophyte and bryophyte community composition shared links with the Annex I Habitat, Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation (3260) given the presence of two aquatic bryophyte indicators and crowfoot vegetation. Green filamentous algae was present but very localised (1% cover).

Overall, the site offers excellent salmonid habitat, with good spawning and excellent nursery habitat present. The quality of the spawning substrata is reduced somewhat due to siltation and compaction. High densities of both Atlantic Salmon (Salmo salar) and Brown Trout were recorded via electro-fishing, in addition to moderate abundances of Lampetra sp. ammocoetes. Good quality lamprey spawning and larval habitat is present locally. European Eel habitat is considered moderate to good despite none being recorded via electro-fishing. No White-clawed Crayfish were recorded and the site is considered unsuitable given the species' known absence from the wider catchment (i.e. sandstone dominated). No signs of Otter were recorded but the presence of healthy salmonid population and seclusion from human activity provides high suitability. A biological water quality rating of Q3, corresponding to WFD 'Poor' status was assigned for this site (Table 2.8).

#### 2.4.4.1.1.7 <u>Site B1 – Toor River, Mullenaboree</u>

Site B1 is located on the upper reaches of the Toor River (EPA code: 18T51) at a local road crossing. Here, the channel flows through a deep U-shaped channel, averaging 1-1.5m wide with very shallow water <0.1m deep. The bank heights are variable but typically 1.2m (locally higher downstream of the bridge). The river has been extensively deepened and straightened historically and retains very little natural character. Shallow glide and riffle characterises the site with only very localised shallow pools present downstream of the bridge. The substrata is dominated by small cobble with occasional boulder and frequent pockets of medium to coarse gravels. These are moderately silted. The riparian areas comprises dense Bramble, Gorse, Wild Angelica and Willow scrub with rank grasses. Adjoining the riparian areas, young conifer plantations with 'additional broadleaved' (ADB) Birch (Betula pendula) buffers present. The catchment land use practices are primarily coniferous plantations (WD4) and improved grassland (GA1). The channel features heavy macrophyte cover in open areas (up to 90% cover) with Watercress (Nasturtium officinale), Water-Forget-Me-Not (Myosotis

scorpioides), Water Mint (Mentha aquatica), and localised Common Water Starwort (Callitriche stagnalis). No aquatic bryophytes were recorded.

No fish were recorded during electro-fishing but only 50m<sup>2</sup> was effectively fished due to the overgrown nature of the channel. The site is considered to have poor fisheries value given the shallow, overgrown nature of the river at his site. Given improved fisheries habitat downstream, the site may be utilised by Brown Trout and European Eel during periods of higher flow (e.g. autumn, winter), although its overall fisheries value is considered low at this location. No White-clawed Crayfish were recorded and the site is considered unsuitable given the species' known absence from the wider catchment. No signs of Otter were recorded and suitability is considered low.

#### 2.4.4.1.1.8 Site B2 – Coom Stream, Bottlehill landfill

Site B2 on the upper reaches of the Coom Stream (EPA code: 18C03) is located at a local road crossing near the entrance to the Bottlehill Landfill site. The semi-natural upland eroding watercourse (FW1) averaged 0.5-1m wide with low bank heights grading into the surrounding conifer plantations (WD4). The stream is predominantly shallow (0.1m deep) with localised pools to 0.4m. The channel is dominated by riffle and glide habitat with 40% by surface area of each and 20% pool. The stream bed comprises small boulder, coarse, medium and fine gravels which were angular and unbedded. The riparian zone supports mosaics of wet heath (HH3), scrub (WS1) and wet grassland (GS4) in small, narrow strips between adjoining mixed aged conifer plantations. The stream has good sinuosity meandering through a narrow stream valley and had low levels of siltation. Macrophyte growth was absent and the aquatic bryophyte community was poorly represented.

No fish were recorded during electro-fishing but only 70m<sup>2</sup> was effectively fished due to the overgrown nature of the channel. The site is considered to have poor fisheries value given the shallow, upland nature of the stream at this site. Given improved fisheries habitat downstream, the site may be utilised by European Eel during periods of higher flow (e.g. autumn, winter) although its overall fisheries value was considered low at this location. No White-clawed Crayfish were recorded and the site is considered unsuitable given the species' known absence from the wider catchment. No signs of Otter were recorded, and suitability was considered low.

#### 2.4.4.1.1.9 Site B3 – Coom River, Coom

Site B3 is located on the lower reaches of the Coom River (EPA code: 18C03) at a local road crossing, approx. downstream from site B2. The small, lowland depositing river (FW2) averages 4m wide and 0.1-0.4m deep. The bankfull heights are c.1.0m with no significant deepening. Although the channel has been historically straightened, good recovery was evident (i.e. still retaining good semi-natural habitat). The river profile is characterised by riffle (60%) with 30% glide and 10% pool. The bed comprises abundant boulder and cobble (40%) but was dominated by coarse, medium and fine gravels that formed large patches between coarser substrata. The substrata suffers from partial bedding and moderate siltation. The riparian areas bordering the river is rank grassy areas forming a buffer to adjoining heavily improved pasture (GA1). Scattered Ash (Fraxinus excelsior), Beech (Fagus sylvatica) and conifers are also present in adjoining riparian areas. No macrophytes were recorded present. The aquatic bryophytes are limited to localised Fontanalis Squamosa an oligotrophic indicator species.

The site offers excellent salmonid habitat, with excellent quality nursery and good quality spawning and holding habitat present. The quality of the spawning substrata is reduced somewhat due to siltation and partial compaction. High densities of both Atlantic Salmon and Brown Trout were recorded via electro-fishing. The site is considered of too high energy for lamprey and provides a low value European Eel nursery (none recorded).

No White-clawed Crayfish were recorded, and the site is considered unsuitable given the species' known absence from the wider catchment. No signs of Otter were recorded but the presence of healthy salmonid population provides high suitability. A biological water quality rating of Q3-4, corresponding to WFD 'Moderate' status was assigned for this site (Table 2.8).

#### 2.4.4.1.1.10 Site B4 – Toor River, Raheen

Site B4 is located on the middle reaches of the Toor River (EPA code: 18T51) at a local road crossing. The small lowland depositing watercourse is 3m wide and 0.3-0.6m wide on average. The river had been historically straightened but good recovery is evident (i.e. still retaining good semi-natural habitat). The bankfull heights are 1.0m with no significant deepening. The river profile is dominated by glide (60%), 10% riffle and 30% pool. The bed is dominated by cobble (40%), boulder 30% with coarse and medium gravels making up the remaining 30% by surface area of the bed. The riparian areas comprised of low scrubby areas of Gorse, Bracken, Wild Angelica and Bramble with scattered Blackthorn and Ash. The bordering land uses is heavily improved pasture (GA1) upstream of the bridge and maturing conifer plantation (WD4) downstream. The macrophyte community comprises abundant Hemlock Water Dropwort (Oenanthe crocata) in the margins with localised Branched Bur-Reed (Sparganium erectum). Water crowfoot (Ranunculus sp.) is locally frequent near shallow glide and riffle areas with Common Water Starwort recorded as rare. The aquatic bryophytes includes frequent Chiloscyphus polyanthos on boulder with localised Fontanalis squamosa. The macrophyte and bryophyte community composition shares links with the Annex I Habitat, Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation (3260) given the presence of two aquatic bryophyte indicators and water crowfoot vegetation.

The site is considered a good salmonid nursery with a relatively high number of Brown Trout present in addition to a small number of Atlantic Salmon parr. The site's spawning potential for salmonids is impacted by siltation with partial bedding of the substrata and light to moderate siltation pressures. The site is of too high energy for lamprey and is considered of low value as an eel nursery and foraging habitat. No White-clawed Crayfish were recorded, and the site is considered unsuitable given the species' known absence from the wider catchment. No signs of Otter were recorded but the presence of healthy salmonid population provides high suitability. A biological water quality rating of Q3, corresponding to WFD 'Poor' status was assigned for this site (Table 2.8).

### 2.4.4.1.1.11 Site B5 – Lyravarrig Stream, Commons

Site B5 is located on the Lyravarrig Stream (EPA code: 18L82) at a local road crossing. The stream is a heavily modified lowland depositing watercourse (FW2) habitat, contained in a 1m to 1.5m wide channel that averages 0.1m deep. The stream profile comprised 70% shallow glide, 20% riffle and 10% shallow pool (max. depth 0.25m). The bank heights are variable but typically 2-3m high. The stream flows through a deep U-shaped channel that had been historically straightened and deepened. The stream suffers from very heavy siltation with the majority of the substrata covered in silt. No macrophytes are present due to heavy shading and siltation. The stream is bordered by a mature riparian zone dominated by Ash and Sycamore (Acer psuedoplatanus) with a Bramble understory. The land use is predominantly heavily improved grassland (GA1) bordering the stream with the upstream catchment comprising mature conifer plantations (WD4).

The stream is considered a lower value nursery and spawning area for Brown Trout (moderate quality habitat), with low numbers recorded via electro-fishing. It is also a lower value nursery for European Eel. The stream appears to be of moderate value for lamprey (given abundant silt accumulations), but none were recorded during the survey. No White-clawed Crayfish were recorded and the site is considered unsuitable given high siltation, small nature and the species' known absence from the wider catchment. The site is not considered of value for Otter.

#### 2.4.4.1.1.12 <u>Site B6 – Seefin Stream, Commons</u>

Site B6 on Seefin Stream (EPA code: 18S52) is located in the vicinity of a local road crossing (pipe culvert). Here, the stream is a heavily modified, historically straightened and over-deepened watercourse contained in a 1-1.5m wide channel that averages 0.05m deep. The site was semi-dry at the time of survey, with low flows and localised near-stagnant pools. The stream profile comprises of 90% slow glide and 10% riffle with very low flow in a very deep, U-shaped channel. The bank heights are variable but typically 3-4m. The substrata comprises 20% boulder, 40% cobble and 30% sand and silt. There is also a small proportion of medium and fine gravels (10% overall). The stream suffers from moderate to heavy siltation with the majority of the wetted substrata covered in silt. The land use is predominantly of heavily improved grassland (GA1) bordering the stream with the upstream catchment comprising mature conifer plantations (WD4). The stream is bordered by a mature treeline of Beech, Ash, Hawthorn and Grey Willow. No macrophytes are present due to heavy shading and siltation.

The stream has very poor inherent fisheries value given the small size and low flows apart from a single European Eel captured during targeted electro-fishing. The site is not of value for salmonids, lamprey, Whiteclawed Crayfish or Otter.

#### 2.4.4.1.1.13 Site B7 – River Bride, Commons

Site B7, located on the upper River Bride (EPA code: 18B05), is transitional between an upland eroding watercourse (FW1) and a lowland depositing watercourse (FW2). The spate channel is 2.5m wide and 0.2m deep with substrata dominated by small boulder and cobble (40% by area of both). The remaining proportions are of coarse gravel that was situated between boulder and cobble areas. The river profile comprises 40% glide and 40% riffle with 20% pool, invariably located on meanders. The bank heights are between 0.5-1.2m. The river has some localised straightening but retains some meanders and has overall a good semi-natural profile with a well-defined thalweg. The stream suffers from moderate siltation with silt plumes underfoot. Livestock poaching is frequent throughout the site (no riparian fencing). The river is bordered by mature treelines of Norway Spruce (Picea abies), scattered Grey Willow and Rowan (Sorbus aucuparia) with frequent Bilberry (Vaccinium myrtillus), Gorse, Marsh Thistle (Cirsium palustre), Butterbur (Petasites hybridus), Meadowsweet, Soft Rush, Foxglove, Marsh Ragwort, Fuchsia (Fuchsia magellanica), Bramble and Nettle. The adjoining land use is predominantly of heavily improved grassland (GA1) and large tracts of Gorse and Bramble-dominated scrub (WS1). Instream macrophytes are limited to Common Water Starwort (rare) and marginal Reed Canary Grass (Phalaris arundinacea). Instream, the bryophyte community is represented by occasional Chiloscyphus polyanthos and Hygroamblystegium fluviatile. The river suffers from heavy enrichment with filamentous algae visible on the bed covering 40% by surface area.

The river is evidently a very good salmonid nursery, with moderate numbers of juvenile and small adult Brown Trout only recorded via electro-fishing. However, the overall value of the site is diminished due to siltation and enrichment. Spawning habitat is good locally with some good holding habitat present locally, especially in association with meanders. European Eel habitat was moderate given the paucity of deeper pool areas and instream refugia. Although some localised lamprey spawning habitat is present (interstitial spaces), larval lamprey habitat is not present (i.e. no fine sediment accumulations). There is no White-clawed Crayfish potential given the known absence of the species from the wider catchment. There were no Otter signs

recorded in the vicinity of the survey site although there is good potential. A biological water quality rating of Q3, corresponding to WFD 'Poor' status was assigned for this site (Table 2.8).

#### 2.4.4.1.1.14 <u>Site B8 – Lyravarrig Stream, Mullenaboree</u>

Site B8 on the Lyravarrig Stream (EPA code: 18L66; not the same watercourse as site B5 despite identical nomenclature) is located at a local track crossing approx. 1.4km upstream of the River Bride confluence. Here, the stream is a semi-natural lowland depositing watercourse (FW2) that is 2.0m wide and 0.1-0.2m deep. The bank heights are between 0.5m and 1.2m high. The substrata is dominated by small boulder and cobble (35% by area of both) with coarse medium and fine gravels making up 25% of the remaining composition along with a small proportion of silt (5%). The profile comprises 45% glide and 45% riffle with 10% pool. The stream exhibits historical straightening and deepening but retains some meanders and has a moderate to good semi-natural profile, overall. The stream, however, suffers from moderate to heavy siltation with heavy bedding of the substrata and evident filling of interstitial gravels between boulder and cobble. The river is bordered by mature treelines of Grey Willow and Hawthorn, with frequent Bramble scrub, particularly downstream of the bridge. Cattle poaching of the banks upstream and downstream of the bridge is evident and runoff from the adjoining land is contributing to heavy siltation. The land uses beyond the immediate riparian areas are improved grassland (GA1, very wet in nature) and mature Sitka Spruce plantations (WD4).

The river is evidently a good Brown Trout nursery, with relatively high numbers of juveniles recorded via electrofishing. Adult numbers were low. Spawning habitat is impacted by siltation pressures and holding habitat is largely lacking in the shallow stream. European Eel were present in low numbers and the habitat is considered moderate overall. No lamprey were recorded and the site was considered sub-optimal (no larval habitat). There is no White-clawed Crayfish potential given the known absence of the species from the wider catchment. There were no Otter signs recorded in the vicinity of the survey site although there is some low potential for the species. A biological water quality rating of Q3, corresponding to WFD 'Poor' status was assigned for this site (Table 2.8).

### 2.4.4.1.1.15 <u>Site B9 – Field Chimney Stream, Chimneyfield</u>

Site B9 on the Field Chimney Stream (EPA code: 18F43) is located approx. 1.2km upstream from site B10. The site is a semi-natural upland eroding channel (FW1) that is 1.5m wide and between 0.1m to 0.2m deep. The bank heights are between 0.5m and 1.5m high but there is no evidence of channel modification works at the survey location; the stream exhibited good sinuosity. The stream profile comprises 30% glide and 60% riffle with 10% pool. The substrata comprises abundant small boulder and cobble (both making up 50% by surface area) with coarse medium and fine gravels making up the remaining 45%, along with a small proportion of silt and sand (5%). However, moderate siltation (plumes underfoot) is evident with partial bedding of the substrata. The river is bordered by a broadleaved buffer zone of Beech, Rowan, Ash and Grey Willow for approximately 15m. The riparian buffer area adjoins large tracts of mature conifer plantation (WD4).

The site is evidently a good salmonid nursery, with moderate numbers of Brown Trout and low numbers Atlantic Salmon recorded via electro-fishing (all juveniles). Salmonid spawning (impacted by siltation) and holding habitat are both considered of moderate value. The site is of too high energy to support lamprey and none were recorded. Despite some moderate suitability as a nursery/foraging area, no European Eel were recorded. There was no White-clawed Crayfish potential given the known absence of the species from the wider catchment. There were no Otter signs in the vicinity of the survey site although there was good potential.

#### 2.4.4.1.1.16 <u>Site B10 - Inchinanagh River, Inchinanagh</u>

Site B10 on the Inchinanagh River (EPA code: 18116) (also known locally as the Chimneyfield River) is a seminatural lowland depositing river (FW2) that averaged 2.0m wide and 0.1-0.2m deep. The bank heights are between 1.2m high and the site had a well-defined thalweg. The substrata has good proportions of small boulder and cobble making up 60% of the bed area with coarse, medium and fine gravels making up the remaining 50%. The bed however suffers from moderate siltation with evident partial bedding of the substrata and silt plumes underfoot. The profile comprises of 40% glide and 50% riffle with 10% pool. The river is bordered by rank grassy areas with scrub comprising Bramble, Great Willowherb, Rosebay Willowherb, Gorse, Bracken and Bramble. The land uses beyond the immediate riparian areas are of improved grassland (GA1) with mature Sitka Spruce plantations (WD4), c.0.5km upstream. Instream macrophytes are absent with occasional Chiloscyphus polyanthos and Hygroamblystegium fluviatile on instream boulder.

The river is evidently a good salmonid nursery with a particularly high abundance of juvenile Brown Trout recorded via electro-fishing, in addition to low numbers of small adults. Brown Trout density recorded was the highest recorded across all survey sites (0.385 fish per m2). A low number of Atlantic Salmon parr (two size classes) and adult European Eel were also present. The site is of too high energy for larval lamprey. The site is considered a good eel nursery/foraging area with ample boulder habitat present throughout. There is no Whiteclawed Crayfish potential given the known absence of the species from the wider catchment. A single old Otter spraint (containing salmonid bones) was present on an instream boulder (ITM 568573, 590853). A biological water quality rating of Q3-4, corresponding to WFD 'Moderate' status was assigned for this site (Table 2.8).

### 2.4.4.1.1.17 <u>Site B11 – River Bride, Bride Bridge</u>

Site B11 is located on the River Bride (EPA code: 18B05) at Bride Bridge. The river represents an upland eroding watercourse (FW1) with cascading reaches of channel with a largely natural profile. The river averages 6-7m in width and 0.2-06m deep, with localised deeper pools to >1.2m. The bank height varied from 1.5-3m. The substrata is largely free of sediment and dominated by cobble (40%) and boulder (20%) with plentiful wellsorted medium-coarse gravels. Exposed bedrock is also present (10%) at this high energy site. Riffle, glide and pool are present in roughly equal proportions. The river is bordered by dense Willow/Bracken and Brambledominated scrub (WS1) and treelines. Moving away from the riparian zone, the site is adjoined by mature coniferous afforestation (WD4) and improved agricultural grassland (GA1). Given the high shading and high flow rates, instream macrophytes are absent. The bryophyte community is well developed with Chiloscyphus polyanthos and Hygroamblystegium fluviatile frequent on instream boulders.

The upland, cascading site offers excellent holding habitat for adult salmonids, in addition to being an evidently good nursery. Brown Trout and Atlantic Salmon were present in moderate numbers. The same species assemblage was also recorded during a 2017 survey of this site, although abundances of Atlantic Salmon were notably higher in 2020. Spawning habitat is of good quality (frequent well-sorted coarse-medium gravels) although typically more suited to Atlantic Salmon. The site is not suitable for lamprey given the higher energy nature of the site. While no European Eel was recorded during the survey, the site offers some good suitability for the species, especially in deeper pool areas. There is no White-clawed Crayfish potential given the known absence of the species from the wider catchment and high energy nature. There were no Otter signs in the vicinity of the survey site although there is good potential throughout.

### 2.4.4.1.1.18 Site B12 – unnamed stream, Knockdoorty

Site B12 is located on an unnamed historical branch of the Bunnaglanna River at a forestry track crossing. The small upland eroding watercourse (FW1) averages 1-1.5m wide and 0.1m deep and flowed in a V-shaped channel that grades into a natural river valley with bank heights at the gradient of the stream grading into the valley. The river profile is dominated by riffle (80%) with 15% glide and 5% pool. The bed is dominated by boulder and cobble that make up 70% by surface area of the streambed. The remaining proportions are comprised of coarse, medium and fine gravels with sand. The substrata is heavily bedded with moderate siltation evident. The riparian areas are Hazel (Corylus aveilana) woodland with scattered Rowan (WN2). The understory comprises of Bramble, Wood Sorrel (Oxalis acetosella) and a well-developed moss layer. Away from the riparian buffer areas, mature conifer plantations (WD4) is present. No macrophytes are present due to heavy shading of the channel. The aquatic bryophytes are limited to frequent Chiloscyphus polyanthos on submerged boulders and in splash zones.

No fish were recorded during electro-fishing at site B12. The shallow, upland nature of the small channel with heavily bedded substrata (moderate siltation) reduces its viability for salmonids albeit populations would be present further downstream in higher order reaches. Lamprey habitat is absent. The stream may be utilised seasonally by migratory European Eel during periods of higher flow (e.g. autumn, winter) although the site's overall fisheries value is considered low. The site is not suitable for White-clawed Crayfish and no Otter signs were recorded (suitability low).

#### 2.4.4.1.1.19 Site B13 – unnamed stream, Powers Bridge

Site B13 is located on an unnamed historical branch of the Bunnaglanna River at Powers Bridge, approx. 1km downstream of site B12. The stream represents an upland eroding watercourse (FW1) which averages 2-3m wide and 0.1m deep which features a V-shaped channel of variable gradient. The banks grade into a natural river valley with bank heights at the gradient of the stream. The river profile is dominated by riffle (60%) with 30% glide and 10% pool. The bed is dominated by boulder and cobble that make up 60% by surface area of the riverbed, with the remaining proportions comprised of coarse, medium and fine gravels with sand. The substrata is heavily bedded with moderate siltation evident. The riparian areas comprise of dense Willow, Bracken and Bramble scrub (WD1) with mature conifer plantations (WD4) upstream. No macrophytes are present due to heavy shading. The aquatic bryophytes are limited to frequent Chiloscyphus polyanthos on submerged boulders and in splash zones.

The shallow nature of the small river channel with heavily bedded substrata reduces its viability for salmonids (none recorded) albeit populations are present downstream as the channel deepens. However, a small Eel population is present. The site is not suitable for White-clawed Crayfish and no Otter signs were recorded (suitability low). A biological water quality rating of Q3-4, corresponding to WFD 'Moderate' status was assigned for this site (Table 2.8).

### 2.4.4.1.1.20 <u>Site B14 – Bunnaglanna River, Moneygorm</u>

Site B14 is located on the upper reaches of the Bunnaglanna River (EPA code: 18B07) at a local road crossing. The small upland eroding watercourse (FW1) averages 2m wide and 0.15m deep in a shallow V-shaped channel grading into a natural river valley. The river profile is dominated by riffle (50%) with 30% glide and 10% pool. The bed is dominated by boulder and sand 40% by surface area of each with coarse, medium and fine gravels making up the remaining 20%. The substrata is heavily bedded with heavy siltation evident. The riparian areas comprise of dense Willow, Bracken and Bramble scrub (WS1) with mature conifer plantations (WD4) upstream. No macrophytes are present due to heavy riparian shading. The aquatic bryophytes are limited to locally frequent Water Earwort (Scapania undulata) on the topsides of instream boulders and more locally Chiloscyphus polyanthos on submerged boulders.

No fish were recorded during electro-fishing at site B14. The shallow, upland nature of the small channel with heavily bedded substrata and heavy siltation reduces its viability for salmonids albeit populations are present further downstream in higher order reaches. Lamprey habitat is absent. The stream may be utilised seasonally by migratory European Eel during periods of higher flow (e.g. autumn, winter) although the site's overall fisheries value is considered low. The site is not suitable for White-clawed Crayfish and no Otter signs were recorded (suitability low).

### 2.4.4.1.1.21 Site B15 – River Bride, Old Bridge

Site B11 is located on the River Bride (EPA code: 18B05) at Old Bridge, approx. 3.3km downstream from site B11. The river represents a large upland eroding watercourse (FW1) that is approximately 8m wide with depths of 0.4-0.6m deep. The bank heights are low and were 0.5-1m high. The substrata is dominated by boulder and cobble (60%) with coarse medium and fine gravels making up the remaining 40% of the riverbed in small pockets between areas of larger substrata. The substrata is largely unbedded and clean with light siltation only. The stream profile comprises of 70% deeper glide, 20% riffle and 10% pool. The channel exhibits a high degree of naturalness with no evident significant bank modification works. The river is more open near the bridge with areas of amenity grassland (GA2) near picnic areas. However, further upstream the channel becomes more canopied with a mature riparian zone of Alder, Ash and Willow (WD1/WL2). The land uses beyond the immediate riparian areas comprise of mixed broadleaved woodland (WD1) and conifer woodland (WD4). Macrophytes are absent apart from a very localised stand of Water Crowfoot.

The site is evidently an excellent salmonid nursery and also exhibits good spawning habitat locally, as reflected by the stock demographic captured during the survey (moderate numbers of Atlantic Salmon and Brown Trout). With the exception of European Eel, the same species assemblage was also recorded during a 2017 survey of this site, although abundances of juvenile Atlantic Salmon and Brown Trout were notably higher in 2020. However, the River Bride is of too high energy at site B15 to support lamprey species. Some suitability exists as an eel nursery in the boulder and cobble areas although none were recorded during the survey. No Whiteclawed Crayfish were recorded; unsurprising given the known absence of the species from the wider catchment. There were no Otter signs in the vicinity of the survey site although there is good potential throughout. A biological water quality rating of Q4, corresponding to WFD 'Good' status was assigned for this site (Table 2.8).

### Site C1 – Slumberhill Stream, Knockacullata 2.4.4.1.1.22

Site C1 is located on the Slumberhill Stream (EPA code: 18S40) in the Ross River (Killavullen) sub-catchment at a local road crossing (pipe culvert) and flowed north away from the proposed development boundary. The channel represents an upland eroding stream habitat (FW1) contained in a 1-1.5m wide channel that is, on average, 0.05m deep. The bank heights are variable but typically 1-1.5m high. The stream has been historically straightened and deepened (a two-stage channel had naturally formed in places). The stream sits in a shallow U-shaped channel with some local bank erosion indicating a spate nature. The profile is dominated by shallow glide and riffle with very little pool (0.1m max where present). The substrata comprises of coarse gravel and small cobble (70% overall) with localised finer gravels. Siltation is light overall. Flow was slight at the time of survey. The stream is heavily shaded by low-lying riparian vegetation which includes Soft Rush, Great Willowherb, rank grasses, Hogweed, Marsh Ragwort, St. John's Wort (Hypericum sp.), Selfheal (Prunella vulgaris), Wild Angelica, Creeping Thistle (Cirsium arvense), Broad-Leaved Dock (Rumex obtusifolius), Nettle and Bramble. A treeline of Grey Willow scrub with abundant Rosebay Willowherb is present along the roadside. Species-poor wet grassland (GS4) borders the stream on the south bank with improved agricultural grassland

(GA1) to the north. Macrophytes are limited to occasional Watercress and some localised Brooklime (Veronica beccabunga).

The site has poor fisheries value given the very shallow and likely seasonal nature of the stream at this location. No fish were recorded via electro-fishing although the site had some low suitability for European Eel. The site is not suitable for White-Clawed crayfish or Otter.

#### 2.4.4.1.1.23 Site C2 – Ross Stream, Knockacullata

Site C2 is located on the upper reaches of the Ross Stream (EPA code: 18R02) in the Ross River (Killavullen) subcatchment. The site represents a small upland eroding stream habitat (FW1), contained in a 1-1.5m wide channel that averaged just 0.1-0.15m deep. The bank heights are variable but typically 1.5-2.5m high. The stream flows through a deep U-shaped channel that has been recently straightened upstream of the road crossing and historically deepened downstream. Downstream of the road culvert, the stream retains some semi-natural characteristics with riffle, glide and pool sequences in roughly equal proportions. It does however suffer from heavy livestock poaching of the northern bank and resultant heavy siltation. Much of the bedrock, boulder, cobble and coarse gravels are covered with silt. The stream is bordered by a mature riparian zone dominated by alder with localised Grey Willow and dense Bramble scrub. The land use iss predominantly of heavily improved grassland (GA1). Riparian shading of the narrow channel is locally high. No macrophytes are present due to heavy shading but Chiloscyphus polyanthos is present on instream cobbles. Filamentous algae covered 20% by surface area of the bed at time of survey.

The site has poor fisheries value given the shallow and very heavily silted nature. However, a low number of Brown Trout (juveniles and small adults) were recorded in addition to European Eel. The stream is considered to be of moderate value, at best, for both species. The site is not suitable for White-clawed Crayfish and is poor habitat for Otter.

#### 2.4.4.1.1.24 Site D1 – Shanowen Trib 1 Stream, Ballynahina

Site D1 is located on the upper reaches of the Shanowen Trib 1 Stream (EPA code: 18S42) in the Bride (Blackwater)\_030 sub-catchment at a proposed cable route crossing (i.e. local road crossing). The site represents a small, very shallow lowland depositing small stream habitat (FW2) that is very heavily modified in a shallow U-shaped channel which has been historically deepened and straightened. The stream is 0.5-1m wide and 0.05m deep, with bank heights of 1.0m. The river profile is dominated by slow moving shallow glide and riffle (approximately 50% by area of each). The substrata comprises small boulder, cobble with mixed coarse, medium and fine gravels. The channel bed suffers from moderate siltation with the majority of the harder substrata bedded. No filamentous algae was visible on the stream bed. The small stream channel is bordered by a Hawthorn hedgerow (WL1) with Bramble, Foxglove, Willowherb and rank grasses in the understory. The channel is bordered by heavily improved pasture (GA1) downstream.

No fish were recorded via electro-fishing and the site is considered too shallow to be of fisheries value (seasonality likely). In higher flow periods, the site is considered likely to offer some low suitability for European Eel as a migratory pathway. The site is not suitable for White-clawed Crayfish and is poor habitat for Otter. A biological water quality rating of Q3, corresponding to WFD 'Poor' status was assigned for this site (Table 2.8).

#### 2.4.4.1.1.25 Site D2 – Farran North River, Farran North

Site D2 is located on the Farran North River (EPA code: 18F27) in the Bride (Blackwater)\_030 sub-catchment at a proposed cable route crossing (i.e. local road crossing). The site represents a small lowland depositing habitat (FW2) that is very heavily modified in a deep U-shaped channel which had been historically deepened and straightened. The bank heights are variable but typically 1.5-2.5m. The profile is dominated by slow moving glide and pool (approximately 50% by area of each). The channel bed suffers from very heavy siltation with the majority of the harder substrata not visible apart from the overgrown upper reaches upstream of the meander bordering the road crossing. At this location the channel is dominated by bedded coarse and medium gravels with more localised cobble. Deep beds of fine soft silt to 0.4m deep make up the majority of the bed composition. Filamentous algae covered 10% by surface area of the bed along with localised sewage fungus present (5% cover). The site evidently suffers from water quality issues and a storm drain at the meander appeared to be contributing to the majority of the habitat degradation. The site is bordered by a mature Beech, Willow and Ash (WD1) with Bramble and Nettle in the understory. The channel is bordered by a road upstream and heavily improved pasture (GA1) downstream.

A total of five fish species were recorded from site D2 on the Farran North Stream. Larval lamprey (Lampetra sp.) were the most abundant, followed by Brown Trout, European Eel, Three-spined Stickleback and a low number Atlantic Salmon parr. The density of lamprey ammocoetes was the highest recorded across all survey sites (16.25 larvae per m<sup>2</sup> of targeted 1m<sup>2</sup> quadrat). A 2017 electro-fishing survey of this site reported only Brown Trout and Lampetra sp. ammocoetes.

The site is considered a lower value salmonid nursery area (due to siltation), with better spawning habitat noted upstream of the survey area. However, the site is considered an excellent nursery area for lamprey (likely Brook Lamprey) and a good Eel habitat also, despite evident water quality issues. No White-clawed Crayfish or Otter signs were recorded. A biological water quality rating of Q3, corresponding to WFD 'Poor' status was assigned for this site (Table 2.8).

### 2.4.4.1.2 White-Clawed Crayfish

No White-clawed Crayfish were recorded from the n=25 riverine survey sites. Furthermore, no crayfish remains were identified in mustelid spraint, where encountered, in the vicinity of the survey sites. There were no historical or contemporary records for the species within the survey area, although crayfish are known from the wider River Blackwater SAC (002170) site (i.e. Blackwater main channel).

### 2.4.4.1.3 Freshwater Pearl Mussel

No Freshwater Pearl Mussel (Margaritifera margaritifera) were recorded from wider catchment of the proposed development, including sites on the River Bride, Martin and Clyda. This was despite some physical habitat suitability (e.g. River Bride). There were no Freshwater Pearl Mussel records farther downstream of the stretches surveyed in the Rivers Bride and Martin. Freshwater Pearl Mussel is known to occur in the Munster River Blackwater, downstream of the Clyda River confluence. The current absence of mussels from the lower reaches of the Clyda River was considered probably due to land use practices.

### 2.4.4.1.4 **Biological water quality**

Q-samples were collected and analysed from n=12 riverine sites in the footprint of the proposed CGEP development and associated cable route. A total of n=46 species across n=33 families were recorded in the kick samples.

Following the methodology of Toner et al. (2005), the Environmental Protection Agency (EPA) group invertebrates into classes whereby pollution intolerant species are denoted class A, and species with greater pollution tolerance fall into successive classes (B through E, respectively). As such, the presence or absence of these groups and their relative abundance facilitates an assessment of biological river health. Good status (Q4) unpolluted water quality is achieved according to the EPA if at least one Group A taxon is present in, at least, fair numbers (5-10% total sample composition). Group B taxa may be common or absent and Baetis rhodani (Large Dark Olive Mayfly) is often dominant. Other Group C taxa are never excessive and group D/E taxa are present in small numbers or absent (Toner et al., 2005). Our results are discussed in this context in order to interpret potential changes in the macroinvertebrate community composition.

Of the 12 Q sampling sites seven (A2, A6, B4, B7, B8, D1 & D2) had Q3 poor status water quality. These sites typically had low numbers of EPA group B taxa and a dominance of EPA group C taxa. Four sites (site A3, B3, B10 & B13) had Q3-4 water quality. These sites had low numbers of EPA group A taxa and from only a single taxonomic group only (i.e. clean water Stonefly or Mayfly species).

A single site, B15 on the River Bride at Old Bridge, achieved 'good status (Q4) water quality as required under the Water Framework Directive. The presence of moderate numbers of clean-water EPA group A (Plecoptera) Stoneflies and good numbers of class B Stoneflies (Plecoptera) was indicative of cleaner water.

No invertebrate species of higher conservation value than 'least concern' were recorded in the invertebrate assemblage when compared to national red lists (Byrne et al., 2009; Feeley et al., 2020; Foster et al., 2009; Kelly-Quinn & Regan, 2012).

Site	Q Rating	WFD Status
Site A2	Q3	Poor
Site A3	Q3-4	Mod
Site A6	Q3	Poor
Site B3	Q3-4	Mod
Site B4	Q3	Poor
Site B7	Q3	Poor
Site B8	Q3	Poor
Site B10	Q3-4	Mod
Site B13	Q3-4	Mod
Site B15	Q4	Good
Site D1	Q3	Poor
Site D2	Q3	Poor

Table 2.8: Summary of the biological water quality (Q-rating) recorded at selected sites in the footprint of the proposed CGEP development.

#### Aquatic ecological evaluation 2.4.4.1.5

An evaluation of each aquatic survey site was based on the results of the aquatic surveys (Table 2.9). A total of eleven aquatic survey sites (A6, B3, B4, B5, B6, B7, B8, B9, B13, C2, D2) were considered of local importance (higher value) given the presence of moderate to good salmonid, Lamprey and or European Eel habitat.

A further eleven sites (A1, A2, A3, A4, A5, B1, B2, B12, B14, C1 and D1) were considered of local importance (lower value) due to their small size, low fisheries value and absence of good status Q4 water quality.

A total of three sites (B10 (Inchinanagh River) and B11 & B15 (River Bride) were considered of International importance given they form part of the Blackwater River SAC (002170).

Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
A1	Unnamed stream	n/a	Local Importance (lower value)	No fisheries value (100% dry habitat)
A2	Unnamed stream	n/a	Local Importance (lower value)	No fisheries value
A3	Tooreen North Stream	19T33	Local Importance (lower value)	No fisheries value
A4	Slievedotia 19 Stream	19509	Local Importance (lower value)	Low fisheries value
A5	Unnamed stream	n/a	Local Importance (lower value)	No fisheries value (100% dry habitat)
A6	Monparson River	18M58	Local Importance (higher value)	Excellent quality salmonid habitat; Atlantic Salmon, lamprey and European Eel present
B1	Toor River	18T51	Local Importance (lower value)	Low fisheries value
B2	Coom 18 Stream	18C03	Local Importance (lower value)	No fisheries value
B3	Coom 18 River	18C03	Local Importance (higher value)	Excellent quality salmonid habitat
B4	Toor River	18T51	Local Importance (higher value)	Good quality salmonid habitat
B5	Lyravarrig 18 Stream	18L82	Local Importance (higher value)	Salmonids and European eel present
B6	Seefin 18 Stream	18552	Local Importance (higher value)	European eel present
B7	River Bride	18B05	Local Importance (higher value)	Good quality salmonid habitat; European Eel present
B8	Lyravarrig 18 Stream	18L66	Local Importance (higher value)	Good salmonid nursery; European Eel present
B9	Field Chimney Stream	18F43	Local Importance (higher value)	Good salmonid nursery (Atlantic Salmon & Brown Trout)
B10	Inchinanagh River	18 16	International importance	Within River Blackwater SAC (002170)
B11	River Bride	18B05	International importance	Within River Blackwater SAC (002170)
B12	Unnamed stream	n/a	Local Importance (lower value)	Low fisheries value
B13	Unnamed stream	n/a	Local Importance (higher value)	European Eel present

Table 2.9: Aquatic evaluation s	summary of the survey s	ites (according to NRA,	2009 guidelines).
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Site no.	Watercourse	EPA code	Evaluation of importance	Rationale summary
B14	Bunnaglanna Stream	18B07	Local Importance (lower value)	Low fisheries value
B15	River Bride	18B05	International importance	Within River Blackwater SAC (002170)
C1	Slumberhill 18 Stream	18540	Local Importance (lower value)	Low fisheries value
C2	Ross Stream	18R02	Local Importance (higher value)	Salmonids and European Eel present
D1	Shanowen Trib 1	18542	Local Importance (lower value)	Low fisheries value
D2	Farran North River	18F27	Local Importance (higher value)	Excellent lamprey nursery; good salmonid habitat; European Eel present

# 3. Stage 1: Screening for Appropriate Assessment

#### 3.1 **Screening Evaluation Process**

The purpose of the screening state is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in-combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site's conservation objectives. The Screening evaluation comprises four steps, as outlined in Figure 3-1:



Figure 3-1: Flow Chart for the Assessment of Plans and Projects.

### 3.2 Screening: Overview of the Proposed CGEP Project

Coom Green Energy Park Limited (CGEPL) is applying to An Bord Pleanála for consent for the proposed Coom Green Energy Park (CGEP) in County Cork. The proposed energy park is located approximately 12km to the south east of Mallow, and approximately 13 km west of Fermoy in County Cork.

The proposed project development will primarily consist of a wind farm of 22 no. wind turbine generators (WTG's), 2 no. substation compounds and a battery energy storage system along with ancillary civil and electrical infrastructure. The associated grid connection route (GCR) will consist entirely of underground cable and will connect the on-site substations to an existing 110kV substation at Barrymore, within the townland of Farran South near Rathcormac.

The project also considers the turbine delivery route and associated minor works along access roads to allow delivery of the turbines to the site.

### 3.3 Screening: Is the Development Directly Connected to or Necessary for the Management of an 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.

The proposed CGEP and associated elements are not directly connected to, or necessary for, the management of any European site.

### 3.4 Screening: Description of the Proposed CGEP Project

The proposed project development will primarily consist of a wind farm of 22 no. wind turbine generators (WTG's), 2 no. substation compounds and a battery energy storage system along with ancillary civil and electrical infrastructure. The proposed CGEP site is detailed in Figure 3.2.

The total Maximum Export Capacity (MEC) of the energy park is approximately 105MW. The exact MEC will be dependent on the output power of the models available at procurement stage.

The exact rating and design of the proposed turbine and preferred battery energy storage system (BESS) unit will be subject to a competitive procurement process that will only commence if the project receives consent. The proposed turbine will be detailed by the turbine and BESS manufacturer on award of the contract. However, the Turbine Range will be as followed

- Tip height range from 165m to 169m •
- Hub height range from 96m to 103m
- Rotor diameter range from 132m to 138m

Within this Turbine Range, various configurations of hub height, rotor diameter and ground to blade tip height may be used. The exact make and model of the turbine will be dictated by a competitive tender process, but it will not exceed the maximum size envelope set out above. Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics with only minor cosmetic differences differentiating one from another.

The associated grid connection route (GCR) will consist entirely of underground cable and will connect the on-site substations to an existing 110kV substation at Barrymore, within the townland of Farran South near Rathcormac. The GCR will be ca.24.4km in length, with ca. 16.7km to be constructed within the existing road corridor. The proposed GCR arrangement is illustrated in Figure 3.3 The 110kV grid connection cable will follow public roads and shall feature horizontal directional drilling (HDD) at up to 4 no. locations to cross existing watercourses and the M8 motorway. Watercourse crossing locations are shown in Figure 3-3.

It is expected that large components associated with the wind farm construction will be transported to site via two separate turbine delivery routes (TDR's) Figure 3-4. One route will approach from the N20 to the west of the site (the West TDR) and shall enter the site via an existing Coillte forestry access point which will be upgraded as part of the development. The second route (the East TDR) shall come from the M8 motorway at Junction 14 and approach the site from the east along the N72 via Fermoy, Castlehyde, turning south onto local roads just to the east of Ballyhooly and entering the site at an existing Coillte forestry access which will be upgraded as part of the development.

The West TDR shall primarily serve the areas of the wind farm located at Bottlehill and Mullenaboree including a proposed onsite substation at Knockacullata. Components for 15no. WTG's, the substation and ancillary works will be carried to site via this route. In order to access the site via the existing Coillte entrance point on the L-1219-0, turbine delivery vehicles shall pass the final junction to the site entrance between the L-1217 and L-1219-0, turn at a temporary hard standing in Coillte land at Glashaboy South which is located approximately 2km south-east of the proposed site entrance and make their final approach to the site from the east and south. At the offsite turning area, wind turbine blade components shall be transferred via crane from standard extendable trailers to 'Superwing' blade lifting trailers which will allow them to negotiate the L-1217/L-1219-0 junction. The East TDR shall primarily facilitate the construction of the areas of the windfarm at Knockdoorty and Glannasack including a proposed onsite substation at Lackendarragh North. Components for 7no. WTG's, the substation and ancillary works will be carried to site via this route.

The development shall include the opening of 3no. borrow pits on site. The locations of the proposed borrow pits are shown in Figure 3.2. The proposed borrow pits shall provide site-won stone that will significantly reduce the amount of construction aggregates that would need to be delivered to site. The proposed borrow pits shall also act as soil deposition areas which will avoid the need to export waste spoil to off-site facilities.

The Battery Energy Storage System (BESS) consists of 20 no. battery storage units to facilitate on site energy storage and to provide ancillary services to the electricity grid. The units will be situated next to the onsite substation compound at Lackendarragh North. The storage units will use Lithium-ion battery storage technology, which is a widely available and globally used energy storage option which is utilised to provide storage services to the grid at a local level. The battery storage unit will be subject to adequate measures and standards in relation to fire detection, with measures in place for detecting issues, to controlling of temperatures within the storage units, the identification of potential fire risk and the incorporation of fire suppression systems. In particular the BESS units shall comply with Irish building regulations Part B (Fire Safety) of the Second Schedule to the Regulations, 2006 as amended and Irish Standard I.S. EN 54: Fire Detection and Fire Alarm Systems. The above guidance and standards provide details on the following requirements that shall be complied with in the design, construction and operation of the proposed BESS.

- Means of escape in case of fire; •
- Internal fire spread (linings and structure);
- External fire spread;
- Access and facilities for the fire service;
- Fire detection and fire alarm systems.

The batteries will be located on a battery rack and sealed within a container where they will be continually monitored and controlled for performance, temperature and other safety factors. The Battery Management System (BMS) shall be capable of detecting problems (e.g. high temperatures, electrical faults) using cell and module voltage measurements and select temperature measurements within the batteries. Automatic disconnect of the batteries will occur if any unusual parameters are measured (i.e. parameters such as system temperature outside normal operational conditions). In the event of an electrical fault, the system will automatically shut down.

Each battery container will comprise high-quality galvanised metal with a separate external Heating, Ventilation and Air Conditioning (HVAC) to provide external climate control. The battery containers are 16.15m (L) x 2.59 (W) x 2.9 (H) each, and will sit on concrete pad foundations above the finished ground level. Technicians can access the containers with full width steps at one end and an emergency exit with steps at the other.

The cabling trenches and access infrastructure will be completed first. The foundations necessary for elevating the battery containers will then be completed and the empty metal containers brought on to the site and accurately placed in their final position by a mobile crane. Following the placing of the containers, they are then filled with battery racks brought to the site by lorry and connected together via wiring. Upon completion of the wiring of the containerized solution, all the ancillary infrastructure (inverter units, step up transformers and cooling units) will then be installed and connected.

In the extremely rare instance of a fire occurring within an individual container, the internal fire suppression technology will ensure the isolation of the fire within the fireproof container. Furthermore, in the unlikely event of a fire that needs to be extinguished, any water run-off or contaminates associated with fire retardant chemicals will be wholly contained within the specific container, and will be tankered off site by an authorised waste collector to a wastewater treatment plant. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007, will be employed to transport wastewater away from the site as described in Chapter 3 of the EIAR. The internal fire suppression technology is considered robust in nature and will act as the first response in the unlikely event of a fire incident.

The external colouring of the containers will be of a colour that is amenable to the surrounding landscape and does not create a visual intrusion (e.g. colours that would represent more natural background colours and be best absorbed into the existing landscape such as greens, browns or greys). The colour which will be used on the containers from the above options will be agreed with Cork County Council prior to commencement of construction. The BESS system has been sized at 50MW storage capacity. The exact rating and design of the proposed turbine and selected BESS unit will be subject to a competitive procurement process that will only commence if the project receives consent.



Figure 3-2: Proposed CGEP Site Overview Map









In summary the proposed project will consist of the following:

- Erection of 22 no. wind turbines with a limited range for the turbines (the Turbine Range) as follows:
  - Tip height range from 165m to 169m
  - Hub height range from 96m to 103m
  - -Rotor diameter range from 132m to 138m
- Construction of turbine foundations and crane pad hardstanding areas;
- Construction of approximately 15 km of new site tracks and associated drainage infrastructure;
- Upgrading of approximately 10 km of existing tracks and associated drainage infrastructure where necessary;
- 3no. on site borrow pits and associated ancillary infrastructure. (New access tracks serving borrow pits shall be reinstated following completion of construction);
- All associated drainage and sediment control;
- Installation of new watercourse or drain crossings consisting of pre-cast concrete box culverts.
- Re-use or upgrading of existing internal watercourse and drain crossings;
- Construction of 2 no. onsite electrical substations and associated compounds including:
  - Welfare facilities; -
  - Electrical infrastructure;
  - Parking;
  - Waste water holding tanks;
  - Rainwater harvesting
  - All associated infrastructure, services and site works including landscaping; -
- 20 no. of Battery storage units and associated compound;
- Temporary accommodation works associated with the Turbine Delivery Routes to facilitate the delivery of turbine components;
- 3 no. Temporary construction site compounds and associated ancillary infrastructure including parking;
- Tree felling and associated replanting (if required);
- Installation of approximately 30 km of medium voltage (20/33kV) underground cabling between the proposed turbines and the proposed on-site substations and associated ancillary works;
- Installation of approximately 7.7km of high voltage (110kV) underground cabling between the proposed 2no. on site substations and ancillary works within private lands and public roads including 7 no. pre-cast joint bays;
- Installation of approximately 16.7km of high voltage (110kV) underground cabling between the proposed on-site substations and the existing Barrymore substation and associated ancillary works within private lands and public roads. The proposed grid connection cable works will include 14 no. existing watercourse and drain crossings and the installation of 17 no. pre-cast joint bays.
- Communication cables and associated infrastructure;
- Erection of 2 no. permanent meteorological masts;

#### 3.4.1 Summary of the Statutory Development Description for Consent

The proposed grid connection to the national grid at Barrymore substation proposed on the public road is considered as part of the project's assessment in this EIAR but does not form part of this application for consent. Therefore, the development description, for which consent from An Bord Pleanála is being sought, is as follows:

In accordance with section 37E of the Planning and Development Act 2000, as amended, Coom Green Energy Park Limited seeks permission for a period of 10 years, for development consisting the construction of a wind farm and related works. The development will consist of:

- Erection of 22 no. wind turbines with a limited range for the turbines (the Turbine Range) as follows:
  - Tip height range from 165m to 169m
  - Hub height range from 96m to 103m
  - Rotor diameter range from 132m to 138m
- Upgrade of existing site tracks and the construction of new site tracks and associated drainage infrastructure both permanent and temporary;
- 3 no. on site borrow pits and associated ancillary infrastructure within the townlands of Tooreen South, Mullenaboree and Lackendarragh North;
- Construction of 2 no. onsite electrical substations including control buildings and electrical plant and equipment, a battery energy storage facility, welfare facilities, carparking and waste water holding tanks within the townlands of Knockacullata and Lackendarragh North;
- 3 no. Temporary construction site compounds and associated ancillary infrastructure including parking within the townlands of Tooreen South, Knockdoorty and Lackendarragh North;
- All associated underground electrical and communications cabling within private lands connecting the wind turbines to the 2no. proposed on-site substation;
- Upgrade of existing access junctions for temporary construction access from the local roads, • L-1219-0 and L-1501 within the townlands of Tooreen South and Lackendarragh North;
- Permanent access junctions; from the local road L-1219-0 within the townland of Tooreen . South, and from the local road L-1501 within the townland of Lackendarragh North.
- Erection of 2no. permanent meteorological masts with a maximum height of 100 m for the measuring of metrological conditions within the townlands of Tooreen South and Knoppoge;
- Temporary accommodation works at 6 no. locations to facilitate delivery of abnormal loads • on the public road within the townlands of Grange West, Castlehyde, Ballyhooly South, Glashaboy South and Castleblagh. These works will primarily relate to the cutting back of hedgerows and lowering of boundary walls and the temporary installation of hardcore including an off-site turning area;
- All related site works and ancillary development including landscaping and drainage;
- A 10 year planning permission and 30 year operational life from the date of commissioning of the entire wind farm.

# 3.4.2 Turbine Layout

The layout of the proposed wind farm has been designed to minimise the potential environmental effects of the wind farm while at the same time maximising the energy yield of the wind resource passing over the site. Figure 3-2 shows the proposed CGEP layout. The layout reflects the outcome of the iterative design process. The turbines are referenced from T2 to T23 and the co-ordinates in Irish Transverse Mercator (ITM) are detailed in Table 3-1. This reflects the original assigned turbine numbering system in which several turbines were removed including T1.

Turbine ID	X (ITM)	Y (ITM)
T2	562583	590234
Т3	563227	589449
Τ4	563039	589951
T5	563936	589713
T6	564212	590214
Т7	563907	590734
Т8	563567	591306
Т9	564146	591247
T10	564550	590806
T11	564002	592625
T12	563969	592119
T13	564515	591909
T14	564961	591567
T15	564661	592686
T16	565156	592556
T17	568267	591705
T18	568612	592430
T19	568206	593193
T20	568229	593738
T21	567708	593928
T22	568905	593906
T23	569943	593950

### Table 3.1: Proposed Coom Green Energy Park Turbine Coordinates.

#### 3.4.3 **Power Output**

The lowest and highest MW output from the Turbine Range equates to 92.4 MW to 121 MW respectively. Turbines of the exact same make, model and dimensions can have different power outputs depending on the capacity of the electrical generator installed in the turbine nacelle.

A rated capacity of between 92.4 MW and 121 MW has been used below to calculate the power output of the proposed wind farm. The proposed wind farm has the potential to produce between 267,110 MWh (megawatt hours) and 349,787 MWh of electricity per year, based on the following calculation:

A x B x C = Megawatt Hours of electricity produced per year

where:

A = The number of hours in a year: 8,760 hours

B = The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 33 % is applied here

C = Rated capacity of the wind farm: between 92.4 and 121 MW

The electricity produced by the proposed wind farm would be sufficient to supply approximately between 63,597 and 83,282 Irish households with electricity per year, based on the average Irish household using 4.2 MWh of electricity (this latest figure is available from the March 2017 CER Review of Typical Consumption Figures Decision).

The Census of Ireland recorded a total of 195,853 private households in Cork (City and County) in 2016. Based on a capacity factor of 33%, the proposed wind farm would therefore produce enough electricity for the equivalent of one third of all households in Co. Cork.

EirGrid in their All Island Generation Capacity Statement (2019-2028) estimates a capacity factor of approximately 28.5% for onshore wind. The capacity factor applied for the proposed development is greater than the EirGrid estimation as a result of improvements in turbine technology and the good wind flows at the site. The proposed turbine type allows for the use of fewer, taller turbines with an increased efficiency and in return greater economic benefit to the consumer.

# 3.4.4 Turbines

# 3.4.4.1 Turbine Description

The proposed Turbine Range will have a tip height of between 165 and 169m. Detailed drawings, which accompany the planning application, show a turbine that may be used for the proposed development. However, the exact make and model of the turbine will be dictated by a competitive tender process which is informed by the energy production efficiencies of various turbines on the market at the time but will not exceed the Turbine Range set out within the development description. The proposed Turbine Range has been assessed in the NIS

Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics with only minor cosmetic differences differentiating one from another.

The wind turbines that will be installed on site will be conventional three-blade turbines, that will be designed to ensure the rotors of all turbines rotate in the same direction at all times. Each discipline within the EIAR has assessed various types and sizes of turbines within the Turbine Range . The exact combination of rotor diameter and hub height will be dictated by the final selection of the turbine make and model at turbine selection stage/pre-construction but will in any case comply with the environmental impact limits set out in this NIS.

The turbine will be of the generic three bladed, tubular tower model with horizontal axis. The rotor blades are bolted to the central hub, which is connected to a generator located in the nacelle. The nacelle holds the following turbine components:

- Generator;
- Electrical components; and
- Control unit.

A glass fibre reinforcing polyester hood covers the nacelle. Earthing and isolation protect all components from lightning strikes.

# 3.4.4.2 Turbine Blades

The blades of a modern turbine are typically made up of glass fibre reinforced polyester. They typically turn at between 5 and 15 revolutions per minute depending on wind speed and make of turbine.

A typical turbine begins generating electricity at a wind speed of 3 to 4m/s depending on turbine type, with rated power generation at wind speeds of approximately 12 to 14m/s.

The turbines usually shut down at wind speeds greater than 25m/s, although some machines are designed to operate at up to 30m/s. The yaw machine mechanism turns the nacelle and blades into and out of the wind. A wind vane on the nacelle controls the yaw mechanism. Blades are pitched to match the wind conditions.

# 3.4.4.3 Turbine Tower and Foundation

The tower of the turbine is a conical steel tube, with multiple paint finish. It is generally delivered to site in four or five sections. The first section is bolted to the steel base, which is cast into the concrete foundation.

The shape and size of the foundation can vary depending on the turbine manufacturer however it is approximately 22m in diameter and approximately 3m in depth.

The upper sections of the tower are bolted to the lower ones in sequence. The base of the tower is typically around 4-5m in diameter, tapering to approximately 2-3m, where it is attached to the nacelle. The first floor of the tower is approximately 2-3m above ground level and it is accessed by a galvanised steel staircase and a steel hatch door, which will be kept locked, except during maintenance. The exact details of the turbine tower will be dictated by final selection of the turbine make and model for maximum efficiency of wind energy production.

# 3.4.4.4 Turbine Transformer

The turbine will have a transformer located within the tower. The turbine will generate electricity at approximately 660volts, depending on the machine chosen. The turbine transformer will step up the voltage to approximately 33kV to reduce the electrical loss on the cabling connector circuits that connect to the site substation.

# 3.4.4.5 Turbine Colour

The turbines have a multiple coating to protect against corrosion. They are coloured off-white or light grey to blend into the sky background. This minimises visual impact, as recommended by the following guidelines on wind energy development:

- "Wind Energy Development – Planning Guidelines" (2006), Department of the Environment, Heritage and Local Government;
- "The Influence of Colour on the Aesthetics of Wind Turbine Generators", ETSU W/14/00533/00/00;
- PAN 45, The Scottish Office Environment Department;
- PPG22, Department of the Environment Welsh Office; and
- Technical Advice Note 8, Welsh Assembly, 2005.

#### 3.4.5 **Turbine Delivery Route Access Tracks and Hardstandings**

# 3.4.5.1 Turbine Delivery Route (TDR)

The proposed turbine delivery routes are presented in Figure 3-4. Turbine deliveries will be from Ringaskiddy and be delivered along two distinct routes. One route to the west of the site, servicing the Bottlehill and Mullenaboree parts of the site and a second route servicing the Knockdoorty part of the site.

#### 3.4.5.1.1 Turbine Delivery to the West

The port of entry is Ringaskiddy where the turbine components will be offloaded and transported to the site, via the N28 and the N40 to the Dunkettle Interchange. At the Dunkettle Interchange, the components will take the N8 to Silversprings and then take the R635 (north ring road) around the north side of Cork City. At Blackpool, the components will join the N20 and turn off at the junction with the L-1217 towards Bottlehill Landfill.

In order to access the site via the existing Coillte entrance point on the L-1219-0, turbine delivery vehicles shall pass the final junction to the site entrance between the L-1217 and L-1219-0, turn at a temporary hard standing in Coillte land at Glashaboy South which is located approximately 2km southeast of the proposed site entrance and make their final approach to the site from the east and south. At the temporary turning area, wind turbine blade components shall be transferred via crane from standard extendable trailers to 'Superwing' blade lifting trailers which will allow them to negotiate the L-1217/L-1219-0 junction.

#### 3.4.5.1.2 Turbine Delivery to the East

The port of entry is the same as above and the turbine components will take the same route to Dunkettle Interchange. At the Dunkettle Interchange, the turbine components will travel north along the M8 motorway. At Junction 14 on the M8, the turbine components will exit the motorway and travel south into Fermoy. Once the turbines reach Fermoy, they will travel west along the N72 and turning south just east of Ballyhooly. From there they will follow local roads across the Blackwater River and to the site entrance at Lackendarragh North.

# 3.4.5.2 Site Entrances

The Coom Green Energy Park will be served by four site entrances. Two entrances are required to the west to access the Bottlehill and Mullenaboree areas of the proposed development. Two site entrances will be required to the east. One of these is required for access to the turbines and associated infrastructure in the Knockdoorty area and the other is required for access to construct the substation at Lackendarragh North.

One of the western (Bottlehill) access points is located at the Bottlehill Landfill site (off the L-1217 local road) and is already constructed to TII guidelines (DN-GEO03060). The site entrance here will accommodate access to the Bottlehill part of the site for standard construction vehicles. Vehicles entering the site at this point shall only have the right to access turbines T2 – T7.

Access to the remaining turbines in the Bottlehill and Mullenaboree parts of the site shall be via the main site access off the L-1219-0. The main site access serving the Bottlehill and Mullenaboree parts of the site is an existing Coillte forestry access located on the L-1219-0 which will be upgraded to facilitate oversize loads associated with wind turbine component deliveries. All oversize turbine delivery vehicles for the Bottlehill and Mullenaboree areas of the site shall use this entrance.

The existing forestry access from the L-1504 local road at Mullenaboree shall not be used during the construction phase but shall remain as an access point for forestry operations and operational access to the proposed substation at Knockacullata.

The main Knockdoorty site entrance to the east is an existing Coillte forestry entrance which will be upgraded to facilitate the wind farm construction and operations in the Knockdoorty area. This will be a dedicated site entrance located along the L-1501 Ballyhooly to Chimneyfield road. This site entrance has been designed in accordance with TII guidelines and shall be upgraded to achieve sightlines of 160m in both directions at a setback distance of 3m. The Cork County Council requirements for local roads here are 90m sight lines in both directions.

A new entrance will also be located near the Knockdoorty site entrance to facilitate access for the construction of the proposed Lackendarragh North substation off the L-1501 local road. The new site entrance to the proposed Lackendarragh North substation will be constructed in line with Cork County Council requirements.

### 3.4.5.3 Temporary Accommodation Works

In some cases, accommodation works are required along the turbine delivery route such as hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and local road widening. Any accommodation works will be carried out in advance of the turbine deliveries, following consultation and agreement with the local authority.

5 no. locations have been identified where more extensive works will be required and are described below. The locations requiring additional works are as follows:

- Local widening near Castlehyde along the N72 between Fermoy and Ballyhooly in the townlands of Grange West and Castlehyde (Nodes 2.3 & 2.4);
- Local widening at the junction of the N72 and the Ballyhooly North Road east of Ballyhooly in the townland of Ballyhooly South (Node 2.5);
- Local widening at the approach road to the Blackwater Bridge south of Ballyhooly in the townland of Ballyhooly South (Nodes 2.6 & 2.7);
- Removal of trees and construction of an aggregate hard standing at Castleblagh south of Ballyhooly in the townlands of Castleblagh and Gortroche (Node 2.8);
- Widening of existing forestry access, tree felling and construction of an off-site turning area at Glashaboy South (Temporary turning and transfer area);

The location and nature of proposed temporary accommodation works are described in further detail in Chapter 13 of the accompanying EIAR.

# 3.4.5.4 Internal Access Tracks

Approximately 10 km of internal access tracks will be required to be upgraded as part of the development and 15 km of new internal access tracks will be required. Figure 3-2 illustrates the internal access tracks within the proposed CGEP development site. The proposed internal site track layout will permit access for vehicles during the construction phase, for maintenance during the

operational phase and for vehicles to decommission the turbines at the end of the life of the proposed CGEP development. An extensive network of agricultural and forestry access tracks exists within the site. These existing access tracks have been utilised wherever possible for the proposed CGEP development.

All access tracks will be approximately 4.5-5m wide along straight sections and wider at bends. The tracks will be finished with a well graded aggregate. The drainage system will be installed adjacent to the internal access tracks. Existing drainage infrastructure will be maintained and upgraded where necessary.

It is anticipated that the stone required for the construction of the internal access roads will be sourced from quarries in the vicinity and 3no. on-site borrow pits at locations shown in Figure 3-2.

Access track formation will consist of a minimum 500mm hardcore on geo-textile membrane. The construction methodology for newly constructed tracks will be as follows:

- The formation will be prepared to receive the geotextile membrane;
- Stone will be placed and compacted in layers to minimum 500mm depth; •
- A drainage ditch will be formed, within the excavated width and along the sides of the . track; and
- Surplus excavated material will be placed along the side of sections of the tracks and dressed to blend in with surrounding landscaping and partially obscure sight of the track.

# 3.4.5.5 Turbine Hardstandings

A turbine hardstanding area consists of a main crane pad hardstanding of approximately 40m x 75m with a number of additional smaller hardstandings that act as set down and assembly areas, located as shown on the accompanying planning drawings. This area will accommodate a main crane and an assist crane during the assembly of the turbine, as well as during occasional maintenance periods during the operation of the wind farm.

# 3.4.6 Temporary Site Facilities

During the construction phase, it will be necessary to provide temporary facilities for the construction personnel. The location of the temporary site compounds is shown on **Figure 3-2**. A wheel wash facility will be provided at site entrances. CGEP will have 3no. temporary compounds, two of which will be located near the entrance to the Bottlehill and Knockdoorty areas of the site with a third located within the Knockdoorty site which shall be used as a temporary storage area. Site welfare facilities and offices shall be located at the main temporary compounds near the site entrances.

Temporary compounds shall be aggregate hard standings, located as shown on the accompanying drawings. Temporary facilities will be removed and the lands reinstated on completion of the construction phase.

Facilities to be provided in the temporary site compound will include the following:

- site offices, of Portacabin type construction;
- employee parking; •
- portaloos;
- bunded fuel storage;
- bottled water for potable supply;
- contractor lock-up facility; •
- a water tanker to supply water used for other purposes; and •
- diesel generator. •
- canteen facilities;
- waste management areas; and
- storage areas.

#### 3.4.7 **Grid Connection**

The CRU introduced a new grid connection policy in April 2018 to replace the older systems of Gates and non-GPA ((Group Processing Approach) – the Enduring Connection Policy (ECP-1: 2018 Batch). The purpose of the ECP is to provide more frequent opportunities for projects to connect to the network. Applicants are required to have gained planning permission for the wind farm in order to lodge an application for the grid connection as of the first ECP-1 stage. The applicant intends to apply for a grid connection as soon as possible as part of the ECP2 application process.

The proposed CGEP development will have an export capacity of 105 MW, depending on final turbine and BESS technology installed. Connection will be sought under the Enduring Connection Process (ECP) grid access regime. Following consultation with EirGrid to date and an in-depth examination of grid capacity as part of this project, it is anticipated that the project will connect from the onsite substations via underground 110 kV cable to Barrymore 110kV substation in the townland of Farran South. The cable will be installed along the public road and shall feature horizontal directional drilling at up to 4 no. locations to cross existing watercourses and the M8 Motorway. The proposed grid connection is shown in Figure 3.3. No overhead lines are required for this connection.

Electricity generated from wind turbines at the Bottlehill and Mullenaboree parts of the site shall be collected at medium voltage (20/33kV) by an internal circuit of buried cables, which will follow on-site access tracks. This circuit shall be terminated at a proposed onsite substation at Knockacullata in the Mullanboree part of the site. The power from this western part of the site shall be transferred to the onsite substation at Lackendarragh via a buried 110kV cable through private lands and a section of public road as shown on Figure 3-4. Electricity generated from wind turbines at the Knockdoorty part of the site shall also be collected at medium voltage (20/33kV) by an internal circuit of buried cables which will follow on-site access tracks and terminated directly into the on-site substation at Lackendarragh and exported to the grid via a 110kV buried cable to the existing Barrymore substation.

The proposed 110 kV grid connection route will cross private lands and will follow the existing road to the substation at Barrymore.

Connection works will involve the installation of ducting, joint bays, drainage and ancillary infrastructure and the subsequent running of cables along the existing road network. This will require delivery of plant and construction materials, followed by excavation, laying of cables and subsequent reinstatement of trenches.

It is expected that full road closures will be put in place to facilitate cabling works rather than partial road closures or stop/go systems. This will enable the works to be completed as quickly and as safely as possible, with minimal disruption time for residents of the area. These would typically be undertaken on a rolling basis with short sections closed for short periods before moving onto the next section.

# 3.4.7.1 Crossing of the M8 Motorway

Where the grid connection route crosses the M8 motorway, horizontal directional drilling (HDD) will be used, namely a 110kV duct crossing at Corrin View Estate to the South of Junction 15, as shown on Figure 3-3.

The locations of the launch and reception pits will be adequately spaced from the carriageway to ensure the bore is at such depth as not to conflict with the drainage or surface of the motorway or associated embankments.

Consideration was given to trying to accommodate the cables in the over-bridge which spans the motorway at this location however following consultation with TII, Direct Route, and Cork County Council, it was deemed preferable to employ the proposed crossing technique.

There is sufficient room available to accommodate the necessary equipment. The cables will be laid at sufficient depth below the motorway to stay below the motorway drainage and without impacting on the road foundations. There will be a detailed consultation and agreement with TII and the PPP Company, Direct Route in advance of completing the works.

The locations of start and finish points for the HDD have been identified following desktop assessments, site visits and consultation with both the local authority, TII and Direct Route. Detailed designs for the motorway embankment and bridge crossing as well as site investigation records were reviewed by FT's geotechnical engineers to confirm the suitability of the proposed crossing method at this location.

#### 3.4.8 Watercourse Crossings

### 3.4.8.1 Proposed CGEP

The proposed development layout will have 9 stream crossings within the site boundary. These crossings are listed in **Table 3.2** and shown in **Figure 3.2**.

Existing crossing WC028 will be replaced with box culvert of minimum 1,200 mm width and 400 mm height, with additional height required for embedment and freeboard.

There will be one new proposed watercourse crossing WC024 over the unnamed tributary of the Coom River and one new proposed crossing WC025 over the Coom River required as a result of the development. There will be one new proposed watercourse crossing WC027 over the Toor River required as a result of the development.

Feature ID	ітм_х	ITM_Y	Existing/ Proposed	Feature/Activity	Proposed Method of Crossing
WC024	563175.65	589720.58	Proposed	Grid cable crossing and proposed new access track crossing over the unknown tributary of the Coom River	New Crossing. Box culvert 900mm x 900mm. Cable over the culvert

### Table 3.2: Onsite Access Watercourse Crossings.

Feature ID	ітм_х	ITM_Y	Existing/ Proposed	Feature/Activity	Proposed Method of Crossing
WC025	563250.25	589754.30	Proposed	Grid cable crossing and proposed new access track crossing over the tributary of the Coom River	New Crossing. Box culvert 900mm x 900mm. Cable over the culvert
WC027	564133.20	591667.40	Proposed	Grid cable crossing and proposed new access track crossing over the Toor River	New Crossing. Box culvert 2000mmx1100mm + freeboard + embedment, cable over the culvert
WC028	564171.10	591981.30	Existing	Grid cable and proposed new access track crossing over the Toor River	Replace existing pipe with a box culvert of min 1200mm x400mm + freeboard + embedment, cable over the culvert
WC030	568492.90	592029.20	Existing	Grid cable and existing forestry track crossing over the forestry ditch, tributary of the Inchinanagh stream	Standard trench crossing above or below existing culvert.
WC031	568375.20	593820.90	Existing	Grid cable and existing forestry track crossing over the forestry ditch.	Standard trench crossing under existing service. Pipe to be extended to facilitate widening of existing access road or replaced with suitable pipe of same or greater diameter
WC035	569019.61	593940.22	Existing	Grid cable and existing forestry track crossing over the forestry ditch, in the proximity of turbine T20	Standard trench crossing under existing service. Pipe to be extended to facilitate widening of existing access road or replaced with suitable pipe of same or greater diameter

Feature ID	ітм_х	ITM_Y	Existing/ Proposed	Feature/Activity	Proposed Method of Crossing
WC049	568425.66	593132.46	Proposed	Grid cable and proposed new access track crossing over drain east of turbine T19	New Crossing. Box culvert 900mm x 900mm. Cable over the culvert
WC050	570093.25	594420.14	Proposed	Grid cable and proposed new access track crossing over drain north of turbine T23	New Crossing. Box culvert 900mm x 900mm. Cable over the culvert

A description of construction methodologies for watercourse crossings is presented in the CEMP (Appendix A).

# 3.4.8.2 Watercourse Crossings Along the GCR

Table 3.3 summarises existing watercourse and service crossing locations and proposed method for crossing same along the proposed 110kV grid connection route, which are projected in Figure 3.3.

Feature	ITM_X	ITM_Y	Feature	Proposed Crossing Method
			туре	
WC006	565856.78	594166.05	Watercourse	HDD under structure within public road
			Crossing	corridor. Alternative: Concrete bridge beam
				in road deck with ducts in flat profile.
				Reinstate bridge surface to same level as
				existing.
WC007	566767.03	593590.72	Watercourse	HDD under structure within public road
			Crossing	corridor.
WC008	566855.33	593463.30	Watercourse	Trench in road above structure and reinstate
			Crossing	road surface to existing levels.
WC009	566953.13	593308.63	Drain	Standard trench crossing under existing
			Crossing	service
WC013	571579.31	593438.66	Drain	Standard trench crossing under existing
			Crossing	service
WC014	571953.73	593251.56	Drain	Standard trench crossing under existing
			Crossing	service

# Table 3.3: Summary of Watercourse and Buried Service Crossings Along GCR.

Feature ID	ІТМ_Х	ITM_Y	Feature Type	Proposed Crossing Method
WC015	574302.28	593592.15	Drain Crossing	Standard trench crossing under existing service
WC016	574563.28	593659.12	Drain Crossing	Standard trench crossing under existing service
WC017	578448.83	595314.38	Watercourse Crossing	Standard trench crossing under existing service
WC018	582024.33	594307.32	Watercourse Crossing	Replace existing stone culvert with an RC box culvert and bring ducts underneath.
WC019	582076.81	594271.41	Watercourse Crossing	HDD under structure within public road corridor. Alternative: Concrete bridge beam in road deck with ducts in flat profile. Reinstate bridge surface to approximately 100mm above existing.
WC020	574506.00	593616.00	Drain Crossing	Standard trench crossing under existing service.
WC029	567015.50	593633.90	Drain Crossing	Standard trench crossing above or below existing culvert.

### 3.4.8.3 TDR Watercourse Crossings

There are 3no. existing watercourse crossings along the TDR between the M8 and the site at the locations shown in Table 3-4 below. No works are expected to be required at any of these locations.

There are 2no. existing watercourse crossings between the N20 and Bottlehill Area site entrance. No works are expected to be required at either of these locations.

Existing watercourse crossing structures between the proposed port of entry and the respective turnoff points from the M8 and N20 were not assessed as they consist of routes which make up part of the national motorway and primary national road network. It is considered that any existing crossing structures located along these routes would be of sufficient design and condition so as to not require any modification works.

ID	ітм_х	ITM_Y	Route	Water Framework Directive (WFD) Waterbody Designation
WC001	559419.37	586219.49	TDR West	MARTIN_010
WC002	560960.04	587718.62	TDR West	MARTIN_020
WC032	571881.00	595965.50	TDR East	BLACKWATER (MUNSTER)_180
WC033	572870.50	598793.70	TDR East	BLACKWATER (MUNSTER)_170
WC034	582013.97	598842.80	TDR East	BLACKWATER (MUNSTER)_190

### Table 3.4: TDR Watercourse crossings

#### 3.4.9 **Onsite Electricity Substation**

It is proposed to construct 2 no. onsite electricity substations within the proposed CGEP development site. These will provide a connection point between the wind farm and the proposed grid connection point at the existing Barrymore substation.

Electricity generated from wind turbines at the Bottlehill and Mullenaboree parts of the site shall be collected at medium voltage (20/33kV) by an internal circuit of buried cables which will follow on-site access tracks. This circuit shall be terminated at a proposed onsite substation at Knockacullata in the Mullanboree part of the site. The power from this western part of the site shall be transferred to the onsite substation at Lackendarragh North via a buried 110kV cable through private lands and a section of public road as shown on Figure 3-4. Electricity generated from wind turbines at the Knockdoorty part of the site shall also be collected at medium voltage (20/33kV) by an internal circuit of buried cables which will follow on-site access tracks and terminate at the on-site substation at Lackendarragh North and transformed to 110 kV. Electricity from Bottlehill, Mullenaboree and Knockacullata circuits will be exported from Lackendarragh North substation to the existing grid via a 110kV buried cable to the existing Barrymore substation.

The dimensions of the proposed substation compounds will be approximately 178m x 153m and 124m x 104m at Lackendarragh and Knockacullata, respectively, and will include a substation control building and electrical components necessary to export the electricity generated from the wind farm to the national grid. The substation compounds will be surrounded by a ca. 2.5m high steel palisade fence and internal fences will also be provided to segregate different areas within the main substation compound.

Lighting will be required on site and this will be provided by lighting poles located around the substation and exterior wall mounted lights on the control buildings.

At each of the locations, one control building will be located within the substation compound and will measure approximately 20m by 10m and approximately 6m in height. The control building will include the Independent Power Production (IPP) and grid operator control rooms, an office space and welfare facilities for staff during the operational phase of the wind farm. Due to the nature of the project there will be a small water requirement for occasional toilet flushing/hand washing with a rainwater harvesting tank adjacent to the control building.

A wastewater holding tank will be provided outside the substation compound fence line so that it can be maintained where required without requiring access to the substation compound. The wastewater holding tank will be a sealed storage tank with all wastewater tankered off site as required by an authorised waste collector to a wastewater treatment plant. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007, will be employed to transport wastewater away from the site. The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. The wastewater storage tank alarm will be part of a continuous stream of data from the site's turbines, wind measurement devices and electricity substation that will be monitored remotely 24 hours a day, 7 days per week. This approach for managing wastewater on site has become standard practice on wind farm sites, which are often proposed in areas where finding the necessary percolation requirements for on-site treatment can be challenging and has been accepted by numerous Planning Authorities and An Bord Pleanála as an acceptable proposal.

### 3.4.10 Electrical Cabling

Electricity generated from wind turbines at the Bottlehill and Mullenaboree parts of the site shall be collected at medium voltage by an internal circuit of buried cables which will follow on-site access tracks. This circuit shall be terminated at a proposed onsite substation at Knockacullata in the Mullanboree part of the site. The power from this western part of the site shall be transferred to the onsite substation at Lackendarragh via a buried 110kV cable through private lands and a section of public road. Electricity generated from wind turbines at the Knockdoorty part of the site shall also be collected at medium voltage by an internal circuit of buried cables which will follow on-site access tracks and terminated directly into the on-site substation at Lackendarragh before being exported to the grid via a 110kV buried cable to the existing Barrymore substation. The proposed grid connection is shown in Figure 3-3.

Internal collector circuit cable routes are shown indicatively on the planning application drawings and will generally follow the alignment of the internal access tracks.

The electricity will be transmitted as a three-phase power supply so there will be three individual conductors (or individual cables) in each cable circuit. The three conductors will each be laid in separate ducts which will usually be laid in a trefoil formation but may also be laid in a flat formation. The specification for the cables and cable-laying will be in accordance with ESBN requirements

The width of a cable trench with a trefoil formation will be 600mm, a flat formation would require a wider trench width. The depth of cover to the ducts carrying the cables will usually be 950mm cover to the top of the upper duct in public roadways and grassed areas. The depth of trench for the cables will be approximately 1220mm and the depth of cover for the cables will usually be 950mm. However, in certain instances, for example when crossing a bridge with shallow cover, a shallower depth of 450-950mm could be utilised. In those circumstances, the particular design will be agreed with Eirgrid and additional cable protection measures such as steel plates or reinforced concrete cover may be required. Cables laid within the site will be laid to a depth of up to 1100mm to the top of the upper

duct in field locations. The diameter of the ducting will be selected to suit the range of cross-sectional areas of electrical cables and is likely to fall between 100mm and 200mm diameter.

#### 3.4.10.1 **Cable Installation**

The specifications for cables and cable installation will be in accordance with Eirgrid requirements. An description of cable installation works is presented in the CEMP (Appendix A).

#### 3.4.10.2 **Buried Drains and Service Crossings**

Watercourse crossings required for the proposed 110kV cable route are summarised in Table 3.2. For the crossing of culverts or services, if encountered, the following options for construction may be used:

- Piped Culvert Crossings Where sufficient cover is available, the cable ducts will be laid . above the culvert with a minimum separation distance, typically 300mm to be agreed with the local authority and Eirgrid;
- Piped Culvert Crossings Where sufficient cover is not available, the cable ducts will be laid under the culvert with a minimum separation distance, typically 300mm to be agreed with the local authority and Eirgrid; and
- Flatbed Formation over Culverts where the cable duct is to be installed over an existing culvert where sufficient cover is not available, the ducts will be laid in a much shallower trench the depth of which will be determined by the location of the top of the culvert. The duct will be laid in this trench in a flatbed formation over the existing culvert and will be encased in 6mm thick steel galvanized plate with a 30N concrete surround as per Eirgrid specification.

#### 3.4.10.3 **Joint Bays**

Joint bays are pre-cast concrete chambers where individual lengths of cables are joined to form one continuous cable. These locations may be adjusted slightly at detailed design stage assessed if required in consultation with Eirgrid and Cork Co. Co. It is expected that 24no. of joint bays will be required for the UGC. Of these, 17 no. joint bays shall be located in public roads with 7no. located on private lands.

A joint bay will be constructed in a pit. The bay typically will be approximately 4.5m x 1.8m x 1.2m deep. A reinforced concrete slab will be constructed in the bay to accommodate the jointing enclosure.

Communication chambers, which are similar to small manholes, will also be installed at the joint bay locations to facilitate connection of fibre-optic communication cables.

# 3.4.11 Traffic Management

A careful approach will be taken to planning the works to ensure minimal impacts on road users and the general public. As discussed during consultation with Cork County Council, the cable trenching will be carried out with the aid of either a lane closure or road closure, which will ensure that the trenching works are completed as expeditiously as possible. Due to the length of cabling within the road corridor (ca. 16km), these works could be conducted over 10-month period of time (ca. 40weeks). The road closures will be applied for by the appointed contractor and will outline local diversions whilst maintaining local access at all times for residents, farms and businesses. Road closures will be subject to the applicable statutory processes as implemented by the roads authority. Road closures will be facilitated by the good network of roads in the area. 'Rolling road closures' will be implemented, whereby the site will progress each day along a road, which will have the effect of reducing the impact for local residents.

A traffic management plan for the cable trenching will be adopted in consultation with Cork County Council to provide a safe environment for road users and construction workers.

A Traffic Management Plan is contained in the Construction Environmental Management Plan (Appendix A). The Traffic Management Plan shall be finalised following the appointment of the contractor for the main construction works in consultation with Cork County Council and will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by the Board.

## 3.4.12 Peat Management

There are no peat deposition areas required as part of this proposed CGEP development following assessment of the existing environment. Peat excavated for the construction of access roads within the site will be re-used on site in berms and for landscaping purposes and along the margins of the access roads. A number of berms will also be created around turbine hardstandings and parallel to the access tracks.

These berms will be created from suitable excavated material and are located on the opposite side of infrastructure to any interceptor drains. The berms will therefore not obstruct flow or risk siltation to interceptor drains. Berms will be placed outside the roadside drains which drain the new access tracks. Further details on soils and peat management can be found in the Soils Management Plan contained within the CEMP, in Appendix A.

# 3.4.13 Drainage

The drainage system will be constructed alongside all turbine hardstands, internal access tracks, substation and the temporary construction compound. The drainage system for the existing tracks and roads will largely be retained. Where the roads require widening, this will involve the slight relocation of existing roadside swales to allow for widening. Further details on the hydrology and drainage are contained in the CEMP in Appendix A.

The number of stilling pond, dimensions and locations of stilling ponds are provided in Surface Water Management Plan (SWMP), within the CEMP (Appendix A).

# 3.4.14 Temporary Stockpile Areas

Due to the possibility of soil-borne diseases, all topsoil recovered from each farm property will remain on the same property. These stockpiles will be covered and where required, drainage and sediment controls including temporary silt fencing will be put in place. The topsoil will be re-used for landscaping and will also be used for reinstatement purposes around turbine bases and hardstanding areas.

Further details on soils management can be found in the Soils Management Plan contained within the CEMP in Appendix A. Further details on site drainage can be found in the Site Drainage Management Plan contained within the CEMP (Appendix A).

# 3.4.15 Tree Felling

Much of the proposed CGEP development site comprises commercial coniferous forestry. 15no. turbines are located within forestry and consequently tree felling will be required as part of the project. Felling of approximately 62.8 ha of coniferous forestry is required within and around the wind farm infrastructure to accommodate the construction of some turbines, hardstands, crane pads, access tracks and the proposed onsite substation. The felling area proposed is the minimum necessary to construct the proposed CGEP development and comply with any environmental mitigation.

The felling will be the subject of a Felling Licence Application to the Forest Service prior to construction as per the Forest Service's policy on granting felling licenses for wind farm developments.

The Forest Service Policy requires that a copy of the planning permission for the wind farm be submitted with a felling licence application therefore the felling licence cannot be applied for until planning permission is received for the proposed development site. The licence will include the provision of relevant replant lands to be planted in lieu of the proposed tree felling on the site as discussed in Section 3.4.16 below. It should be noted that the forestry within the proposed wind farm site was originally planted as a commercial crop and will be felled in the coming years should the wind farm proceed or not.

To ensure a tree clearance method that reduces the potential for sediment and nutrient runoff, the construction methodology will follow the specifications set out in the Forest Service Forestry and Water Quality Guidelines (2000) and Forest Harvesting and Environmental Guidelines (2000).

Before any harvesting works commence on site all personnel, particularly machine operators, will be made aware of the following and will have copies of relevant documentation, including:

- the felling plan, surface water management, construction management, emergency plans and any contingency plans;
- environmental issues relating to the site;
- the outer perimeter of all buffer and exclusion zones; and •
- all health & safety issues relating to the site.

The proposed method of tree felling near 'infrastructure' will be limited to:

- 20m wide corridors for new and upgraded access tracks; •
- 10m buffer surrounding hardstandings and compounds;
- 6m corridor for buried cables in private lands; and •
- 50m buffer from turbine blades located in forestry for bat impact mitigation; buffer distance • (on the ground) dependent upon the specified Turbine Range:
  - Hub Height 103m; Blade length 69m; Buffer distance 85.3m
  - Hub Height 96m; Blade length 69m; Buffer distance 91.6m
  - Hub Height 103m; Blade length 66m; Buffer distance 81.0m 0
  - Hub Height 96m; Blade length 66m; Buffer distance 87.6m 0

# 3.4.16 Permanent Meteorological Masts

Two permanent meteorological (Met) masts shall be erected on site at Bottlehill and Knockdoorty as shown in Figure 3-2. These shall replace two existing temporary met masts which are located at Mullenaboree and Knockdoorty. These temporary met masts shall be dismantled and removed from site prior to construction of CGEP.

The temporary met masts are both lattice structures of 100m height which are fixed to ground anchors by guy wires.

The permanent met masts shall be of the following general configuration:

• A 100m high lattice steel mast with foundation dimensions of 22m diameter x 4m depth (please note that there will be no guy wires);

# 3.4.17 Construction Stage

#### 3.4.17.1 **Construction and Environmental Plan**

A Construction and Environmental Management Plan (CEMP) is contained in Appendix A.

The CEMP sets out the key environmental management measures associated with the construction, operation and decommissioning of the proposed wind farm, to ensure that during these phases of the development, the environment is protected, and any potential impacts are minimised. In the event An Bord Pleanála (the Board) decides to grant approval for the proposed development, the final CEMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by the Board.

#### 3.4.17.2 **Construction Activities**

The construction sequence will be as follows. Tree felling, upgrading of existing site tracks and the provision of new site tracks will precede all other activities. Drainage infrastructure will be constructed in parallel with the track construction. This will be followed by the construction of the turbine foundations and the provision of the hardstanding areas.

In parallel with these works the on-site electrical works; sub-station and internal cable network and off-site connection works to the national grid will be completed. An outline of construction techniques is contained in the CEMP in **Appendix A**.

#### 3.4.17.3 Site Access Tracks and Drainage

Access tracks are required to facilitate the construction of the proposed wind farm and to provide access to each of the turbines. Drainage infrastructure will be constructed in parallel with the access track construction.

Access tracks to facilitate turbine and material deliveries for CGEP shall consist of the construction of approximately 15 km of new site tracks and associated drainage infrastructure. The project will incorporate the upgrading of approximately 10 km of existing forest tracks. Existing drainage infrastructure shall be retained where possible and improved as necessary

#### 3.4.17.4 **Cable Trenches**

The proposed cable route is indicated in Figure 3-3. As part of the scoping and consultation process for the proposed CGEP project, searches of existing utility services were carried out to identify areas where existing major assets exist such as high voltage electricity cables or gas mains. Private utility and telecommunications companies were also consulted during this period. In advance of the construction phase, records of services such as watermains, sewers, gas mains and other power cables will be obtained from the relevant service providers. Cable detection tools, a ground penetrating radar and slit trenches will be used, as appropriate, to find the exact locations of existing services. The final locations of the cable routes in the public roads and in the verge along the public road will be selected to minimise conflicts with other services.

A minimum separation distance of 300mm will be maintained with existing services. Usually the new cables will be laid below existing services.

For cable trenches located in public roads, the contractor will excavate cable trenches and then lay high density polyethylene (HDPE) ducting in the trench in a surround of cement bound material (CBM). A rope will be inserted into the ducts to facilitate cable-pulling later. The as-constructed detail of the cable duct locations will be carefully recorded. Cable marker strips will be placed above the ducts and the two communication ducts will also be laid. An additional layer of cable marker strips will be laid above the communication ducts and the trench back-filled. Back-filling and reinstatement in public roads will be to a specification to be agreed with the road authority and will be at least as good as the existing.

A similar construction methodology will apply for cable trenches laid within site access tracks. In this case the cable-ducts will generally be laid when the track is being constructed and will follow the edge of the site access tracks. The trenches within these locations will generally be backfilled using the excavated material.

The following is a synopsis of the main activities for the installation of cabling:

- All relevant bodies, i.e. ESBN, Gas Networks Ireland, Eir, Cork County Council, Irish Water etc., will be contacted and all drawings for all existing services will be sought to confirm the conditions predicted in this EIAR
- Immediately prior to construction taking place the area where excavations are planned will be surveyed and all existing services will be identified, and temporary warning signs erected where necessary;
- For cable works in the public road, the traffic management plan will be implemented. Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works;
- An excavator will be used to excavate the trench to the dimensions of approximately 600mm wide by approximately 1.2m deep;
- A silt filtration system will be installed on all existing drainage channels for the duration of the cable construction to prevent contamination of any watercourse;
- Any ingress of ground water will be removed from the trench using submersible pumps and • pumped to the nearest available existing drainage channel

- Once the trench has been excavated, a bedding layer of sand or 15 Newton concrete will be • installed and compacted. All concrete will be offloaded directly from the concrete truck into the trench;
- PVC ducts will be installed on top of the compacted base layer material in the trench;
- Once the ducts have been installed, couplers will be fitted and capped to prevent any dirt etc. • entering the unjointed open end of the duct. In poor ground conditions, the open end of the duct will be shimmed up off the bed of the trench to prevent any possible ingress of water and dirt into the duct. The shims will be removed once the next length of duct has been joined to the duct system;
- The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to ensure recording of exact location of the ducts, and hence the operational electricity cable. These co-ordinates will be plotted on as-built record drawings for the grid connection cable operational phase;
- When ducts have been installed in the correct position on the trench base layer, sand (in road • trench) or Lean-mix CBM4 (CL1093) (off road trench) will be carefully installed in the trench around the ducts so as not to displace the duct and compacted;
- Spacer templates will be used during installation to ensure that the correct cover of duct surround material is achieved above, below and at the sides of the duct in the trench;
- A red cable protection strip will be installed above duct surround layer of material and for the full length of the cable route;
- A layer of Lean-mix CBM4 (CL1093) (in road) or excavated material (off road) will be installed on top of the duct surround material to a level 300mm below the finished surface level;
- Yellow marker warning tape will be installed for the full width of the trench, and for the full • length of the cable route, 300mm from the finished surface level;
- The finished surface of the road, road verge, or agricultural land will be reinstated as per its original condition or to the requirements of the Cork Area Engineer;
- Precast concrete cable joint bays will be installed within excavations in line with the trench. • The cable joint bays are backfilled and the finished surface above the joint bay reinstated as per its original condition. The cable joint bays are re-excavated a second time during cable pulling and jointing, after which the finished surface above the joint bays is reinstated again to its original condition;
- When trenching and ducting is complete, the installation of the grid connection cable will commence between the wind farm onsite sub-stations to the existing Barrymore 110kV substation;
- Construction work areas and traffic management measures will be setup at 2 no. consecutive cable joint bays simultaneously. The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable is pulled through;
- The cables are jointed within the precast concrete cable joint bays; and
- The finished surface above each cable joint bay is reinstated to its original condition, and the • construction work area removed.

For simplicity, each cable circuit is referred to as a cable in the remainder of this document.

#### 3.4.17.5 Watercourse Crossings

Watercourse crossings can generally be classified as follows:

- Existing structures (bridges or culverts) that need to be crossed by infrastructure (access tracks • or cables) associated with the proposed CGEP development, without a need to modify the existing structure;
- Installation of new structures to facilitate the crossing of existing watercourses by infrastructure associated with the proposed CGEP development;
- Existing structures that need to be either replaced or upgraded to facilitate the crossing of • existing watercourses by infrastructure associated with the proposed CGEP development;

The proposed methods for crossing existing watercourses along the grid connection route are described in Table 3.3.

The sequence of works associated with the proposed watercourse crossing methods for watercourses listed is described below.

#### 3.4.17.5.1 Box Culvert Crossing (Access Tracks and Electrical Cables)

In order that flood flows would not be obstructed, the stream crossings will be sized to convey a 1 in 100-year flood flow with a 20% allowance for Climate Change.

For the construction of the box culvert crossings, the following methodology shall apply:

- The access track construction will finish at least 10m from the nearside bank of the drain;
- All environmental mitigation measures will be implemented locally in advance of the works, in accordance with the measures outlined in the CEMP (Appendix A);
- Culvert installation will only take place during dry periods;
- The bed of the drain will be prepared using a mechanical digger and hand tools to the required levels in accordance with the design;
- A bedding layer will be laid in the base of the watercourse using Class 6 aggregate material and blinding to the desired levels in accordance with the design;
- The box culvert is laid in one lift or in sections using a crane in accordance with an approved lift plan;
- Bedding material is placed and compacted around the culvert to the desired levels in accordance with the design;
- 500mm of suitable bedding material in the form of clean round gravel between 10-100mm diameter, shall be laid in the base of the culvert in accordance with the recommendations set out in Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Watercourses from Inland Fisheries Ireland;
- The culvert shall be covered using compacted Class 6N fill material in accordance with the design up to the levels required by the access track sub formation;
- Rock armour headwalls will be constructed where necessary to protect culvert ends and the base of slope embankments on either side of the track;
- The access track construction continues over the crossing in accordance with the design; and
- Ductwork will be installed above the box culvert in accordance with the design to carry the • grid connection cables across the watercourse.

#### 3.4.17.5.2 Horizontal Directional Drilling (HDD) Under Existing Structure (Electrical Cables)

HDD will be employed at up to 4no. locations along the grid connection route as part of the proposed CGEP development as shown on the site layout plans. 3 no. of these locations will be for the crossing of existing watercourses.

The operation shall take place from one side of the watercourse within the public road corridor or verge and will be carried out by an experienced HDD specialist. Each crossing is expected to take place in a single day under one mobilisation.

A traffic management plan shall be finalised in advance in agreement with the County Council and implemented in advance of the works.

The process will involve setting up a small tracked drilling rig on one side of the watercourse, within the public road corridor, and at least 10m back from the stream bank.

A shallow starter pit will be excavated at the point of entry and shall be located at a sufficient distance from the watercourse to achieve a minimum clearance depth below the bed of the watercourse.

A pilot hole will be bored as per the agreed alignment and shall be tracked and controlled using a transmitter in the drill head. By tracking the depth, position and pitch of the drill head the operator can accurately steer the line of the drilling operation. Typically, the drilling operation is lubricated using a fluid. When the pilot hole has been drilled to the correct profile, its diameter is increased, if necessary, to match the external diameter of the cable duct. The flexible plastic ducting is then pulled through the pre-drilled hole and sealed at each end until required for cable installation.

A detailed method statement with site specific mitigation measures for this activity is included in the CEMP (Appendix A). Minimum environmental protection measures to be implemented on site shall include the following:

- A site-specific drilling design, risk assessment and method statement shall be prepared by the contractor prior to the works;
- If drilling fluids are required, a biodegradable fluid such as CLEARBORE shall be used rather than Bentonite;
- HDD operations to be limited to daytime hours and conditions when low levels of rainfall are forecast;
- The depth of the bore shall be at least 3m below the bed of the watercourse;
- Visual inspection to take place at all times along the bore path of the alignment;
- A field response plan to minimise loss of returns of drilling fluid and actions to restore returns shall be provided;
- Silt fences will be constructed around proposed work areas prior to commencement of works; •
- No refuelling will take place within 50m of the watercourse or any sensitive habitats; •
- Pre-construction verification surveys shall take place at drilling sites to flag any sensitive • species occurring; and
- A qualified Ecological Clerk of Works (ECoW) will be onsite for the duration of the drilling • operation.

The depth of the bore shall be at least 3m below the level of the public road and stream bed. A detailed survey of buried services will be carried out by the contractor prior to commencement of the operation. The council will be made aware in advance of the operation and invited to oversee the activity.

Where the grid connection route crosses the M8 motorway, horizontal directional drilling (HDD) will be used, namely a 110kV duct crossing at Corrin View Estate to the South of Junction 15, as shown on Figure 3-3 and accompanying planning drawings.

The locations of the launch and reception pits will be adequately spaced from the carriageway to ensure the bore is at such depth as not to conflict with the drainage or surface of the motorway or associated embankments.

Consideration was given to accommodate the cables in the over-bridge which spans the motorway at this location however following consultation with TII, Direct Route, and Cork County Council, it was deemed preferable to employ the proposed crossing technique.

There is sufficient room available to accommodate the necessary equipment. The cables will be laid at sufficient depth below the motorway to stay below the motorway drainage and without impacting on the road foundations. There will be a detailed consultation and agreement with TII and the PPP Company, Direct Route in advance of commencing the works.

### 3.4.17.5.3 Alternative: Concrete Bridge Beam in Road Deck with Ducts in Flat Profile (Electrical Cables)

An alternative to HDD at 2no. bridge crossing locations (WC006 and WC019) is to install the cable ducts in flat formation with a concrete encasement referred to as a concrete bridge beam. The methodology for this option is described as follows:

- All environmental mitigation measures will be implemented locally in advance of the works, in accordance with the measures outlined in the CEMP (Appendix A).
- Setting out and location of services will be carried out in the same manner as for trench excavations.
- Traffic management to be set up as per traffic management plan. A TMP has been prepared as part of the EIAR and can be found in Appendix 3-2 of the EIAR.
- The road surface along the route will be milled by road plainer and skid steer. ٠
- A 360-degree excavator will first remove the top layer from the route along the roadside and load onto a haulage truck. This material will be recycled, then the excavation of trench will commence and a trained spotter will be used to assist machine operators while reversing or when their visibility becomes restricted.
- Excavator to run at low revs to avoid damage to the existing structure by sudden movement. •
- A banksman to dig trial holes after each layer of the road surface is removed. The maximum depth will be exposed to allow for the greatest cover to be achieved.
- Where necessary as per the engineer's design, protective steel plates will be placed at the • base of the excavation such as over the top of bridge key stones.
- Ducts will be placed into trench manually, having been delivered to roadside embankment/verge areas by way of tractor and pipe trailer and then offloaded by hand.
- Concrete is then poured between and 50mm over the ducts maintaining the required spacing's as per the engineer's design.

- A protective steel plate is placed to the sides and over the newly laid ducts as per the engineer's design.
- Cable marker strips in accordance with ESB code:2955103 are placed on top of the steel plates.
- Additional concrete is then placed over the marker tape followed by steel reinforcing mesh.
- Additional concrete is then placed on top of the mesh to the required finished level. •
- Depending on the finished levels, if the finish level is below ground level than the remaining • depth will be filled with approved fill material the following day after the concrete has set.
- Warning tape will be placed above the concrete beam. The top level will be finished as per the Local Authority Requirements.

It is expected that if the above method is employed, sufficient cover is in place to facilitate the ducting without any need to raise the level of the road carriageway at one location and at the second location (WC019), the potential increase in elevation of the surface level of the road would be less than 150mm and would not result in the need to alter the bridge parapets walls.

#### 3.4.17.5.4 Standard Trench Crossings of Existing Culverts or Services (Electrical Cables)

For the crossing of buried pipe drains, culverts or services, if encountered, the following options for construction may be used:

- Piped Culvert Crossings Where sufficient cover is available, the cable ducts will be laid above • the culvert with a minimum separation distance, typically 300mm to be agreed with the local authority and Eirgrid.
- Piped Culvert Crossings - Where sufficient cover is not available, the cable ducts will be laid under the culvert with a minimum separation distance, typically 300mm to be agreed with the local authority and Eirgrid.
- Flatbed Formation over Culverts where the cable duct is to be installed over an existing culvert where sufficient cover is not available, the ducts will be laid in a much shallower trench the depth of which will be determined by the location of the top of the culvert. The duct will be laid in this trench in a flatbed formation over the existing culvert and will be encased in a reinforced concrete surround as per Eirgrid specification.

When crossing existing culverts or buried services, the following methodology will be employed:

- The general method of trench construction will follow the procedure outlined above for Installation of cable ducting.
- The service infrastructure shall be located and marked by an engineer in accordance with the Code of Practice for Avoiding Underground Services.
- All services will be safeguarded and protected in accordance with the asset owner's specifications.
- Within 500mm of the existing service, hand digging will be employed to expose it.
- Cable ducts shall pass over or under the existing service, depending on the depth of the service and other constraints. Plate 3-2 shows typical design details for ducts passing in flat formation above existing culverts and buried services.
- A minimum separation distance of 300mm shall be maintained between the cable ducts and the existing services.

Existing services within the trench shall be left in the same condition as they were found. Any • issues shall be reported to the asset owner immediately.

#### 3.4.17.5.4.1 <u>Piped Culvert Crossing – Ducting Over Culvert</u>

Watercourses will not be directly impacted upon since no instream works or bridge/culvert alterations are proposed. Where sufficient cover exists above the culvert, the trench will be excavated above the culvert and the ducts will be installed in the trefoil arrangement passing over the sealed pipe where no contact will be made with the watercourses. This method of duct installation is further detailed in Figure 3.7.



Figure 3-5: Typical Piped Culver Crossing - Ducting over culvert crossing details.

#### 3.4.17.5.4.2 Piped Culvert Crossings – Ducting Under Culvert

Where the culvert consists of a socketed concrete or sealed plastic pipe where sufficient cover over the culvert does not exist to accommodate the cable trench, a trench will then be excavated beneath the culvert and cable ducts will be installed in the trefoil arrangement under the sealed pipe.

This method of crossing is illustrated in Figure 3-6 below. If these duct installation methods cannot be achieved or utilized, the ducts will be installed by alternative means as set out in the following sections.



Figure 3-6: Typical Piped Culvert Crossings - Ducting under culvert crossing details.

#### 3.4.17.5.4.3 Flatbed Formation Over Culverts

Where cable ducts are to be installed over an existing culvert where sufficient cover cannot be achieved by installing the ducts in a standard trefoil arrangement, the ducts will be laid in a much shallower trench, the depth of which will be determined by the location of the top of the culvert. The ducts will be laid in a flatbed formation over the existing service and will be encased in a reinforced concrete surround as per Eirgrid specification (Figure 3-7).

After the crossing over the culvert has been achieved, the ducts will resume to the trefoil arrangement within a standard trench. This will be done gradually to comply with minimum duct and cable design bend requirements. In transition sections between trefoil and flat formation, the base of the trench shall be graded to eliminate stepping and minimum bedding and surround material will be maintained throughout.



### Figure 3-7: Typical Flatbed Formation Detail.

#### 3.4.17.5.5 Minor Watercourses and Drain Crossings (Access Tracks)

All minor watercourse and drain crossings within the site will be crossed using piped culverts. Piped culverts will only be used over very short stretches i.e. at track crossings. Pipe culverts will be sized to take the 1 in 100-year flood flow with a 20% allowance for Climate Change. Concrete or HDPE pipes may be used depending on the size of the watercourse to be crossed. Pipe culverts will be installed in accordance with the typical design shown in Figure 3-8 below.



Figure 3-8: Typical Piped Culvert Crossing Long Section.

For a minor watercourse/drain crossing using a piped culvert, the following methodology will be used:

- The access track construction will finish at least 10m from the nearside bank of the minor watercourse/drain.
- All environmental mitigation measures will be implemented locally in advance of the works, . in accordance with the measures outlined in the CEMP in Appendix A.
- Pipe culvert installation will only take place during dry periods. •
- The bed of the watercourse will be prepared using a mechanical digger and hand tools to the • required levels in accordance with the design.
- A bedding layer will be laid in the base of the minor watercourse/drain using Class 6 aggregate • material and blinding to the desired levels in accordance with the design.
- The pipe is laid in one lift or in sections using a crane in accordance with an approved lift plan.

- Bedding material is placed and compacted around the pipe to the desired levels in accordance • with the design.
- Where appropriate 500mm of suitable bedding material in the form of clean round gravel between 10-100mm diameter, shall be laid in the base of the pipe in accordance with the recommendations set out in Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Watercourses from Inland Fisheries Ireland.
- The pipe is covered using compacted Class 6N fill material in accordance with the design up to the levels required by the access track sub formation.
- Rock armour headwalls will be constructed where necessary to protect pipe ends and the base of slope embankments on either side of the track.
- For small drain crossings, pipes of suitable diameter will be laid directly into the bed of the drain.

In some cases, where existing internal forest tracks need to be widened, it will be necessary to widen, replace or extend existing pipe drains. In such cases, the above measures shall also be employed.

#### 3.4.17.6 **Turbine Hardstands**

A turbine hardstanding area will be constructed at the base of each turbine to provide a solid area for the main installation crane that will be used to erect the turbine and for the assembly of the turbine.

It is anticipated that the stone required for the construction of the internal access roads will be sourced from quarries in the vicinity and 3no. on-site borrow pits at locations shown in Figure 3.2 and in the Chapter 3 of the EIAR.

The surrounding quarries currently in operation and indicative haul routes to the site from each of these have been identified. See Chapter 9 and Chapter 13 for more information on guarries and haul routes from same. The list of quarries is as follows:

- Danesfort, Co. Cork. Located 16km from Bottlehill and 35km from Knockdoorty entrance. •
- Mallow, Co Cork. Located 20km from Bottlehill and 20km from Knockdoorty.
- Lyravarrig, Co. Cork. Located between the two site entrances, 13km to the Bottlehill entrance and 9km to the Knockdoorty site entrance.

Hard standing formation will consist of a minimum 500mm hardcore on geo-textile membrane. The likely construction methodology for newly constructed tracks will be as follows:

- The formation will be prepared to receive the geotextile membrane.
- Stone will be placed and compacted in layers to minimum 500mm depth.
- A drainage ditch will be formed, within the excavated width and along the sides of the hard standing.
- Surplus topsoil will be placed along the side of the hard standing and dressed to blend in with surrounding landscaping.
- Surplus excavated subsoil will be used to reinstate borrow pits. •

#### 3.4.17.7 **Turbine Foundation**

The base of the foundations are excavated to competent bearing strata or where this depth is excessive piling may be required. However based on site investigations carried out to date, it is considered that all turbine foundations shall be shallow base types and founded on either rock or glacial till. This will be confirmed with further site investigations prior to construction.

Excavated soil will be placed in the temporary storage areas adjacent to the turbines. Formwork and reinforcement are placed, and the concrete poured. Once the concrete is set the earthing system is put in place and the foundation is backfilled with suitable material.

#### 3.4.17.8 **Turbine Erection**

Once the turbine components arrive on site they will be placed on the hardstand and lay down areas prior to assembly. The towers will be delivered in sections and each blade will be delivered in a separate delivery. Once there is a suitable weather window the turbine will be assembled.

It is anticipated that each turbine will take approximately 3 to 4 days to erect (depending on the weather), requiring two cranes. Finally, the turbines will be commissioned and tested.

It is expected that the construction phase, including civil, electrical and grid works, and turbine assembly will take between approximately 18-24 months.

#### 3.4.17.9 **Erection of Permanent Met Masts**

The works shall be carried out by a small crew and the following mobile plant:

- Low-loader;
- Flat bed trucks;
- Works Van;
- Telescopic Handler; and
- Mobile Crane

The sequence of works for the erection of the permanent met masts is as follows:

- The site of the mast location shall be marked out and the necessary area cleared of vegetation (in the period September to March (i.e. outside of the bird nesting season)).
- Mark out mast base and anchor positions in accordance with detailed design drawings. Mast • anchor positions are at approximately 30m and 50m radius from the mast in the direction of each corner of the mast's triangular base.
- A temporary access track shall be extended towards the mast location from the existing energy park and forest track network. The access track shall be up to 3.5m in width.
- Temporary and permanent drainage infrastructure shall be extended also.
- A small crane pad of approximately 10m x 10m in size shall be constructed in front of the proposed mast location.
- General construction methods for the above access track and hard standing shall match those • described in Sections 3.4.5.4. However, the dimensions and stone depth requirements of the access infrastructure will be considerably less than that required for that serving the wind turbine construction.
- The foundation shall be excavated followed by shuttering, steel fixing and finally concrete pouring by ready mix truck. Excavation and concrete operations shall be carried out in accordance with the CEMP (Appendix A).
- Excavate holes for anchors to required depth and install anchors. These shall not exceed a depth of 2m.

- Following crane setup, the mast sections shall be delivered and unloaded by truck.
- In accordance with an agreed lifting plan, mast sections shall be lifted by crane into place. Wind speeds shall be monitored at all times during lifting operations by the lead climber and crane operator.
- Mast sections shall be bolted together by climbers. •
- Before raising of the third mast section, 10mm stainless steel guy ropes are fitted at the lugs • on the top triangular section of the mast. These ropes are connected using shackles and are uncoiled to hang down when the section is erected.
- Following erection of main mast sections, lightning protection and other ancillary components shall be fixed to the mast.

The masts will be decommissioned using a similar methodology as the construction except in reverse.

#### 3.4.17.10 Waste Management

The Developer, in conjunction with appointed contractor, will prevent, reduce, reuse and recover as much of the waste generated on site as practicable and to ensure the appropriate transport and disposal of residual waste off site. This is in line with the relevant National Waste Management Guidelines and the European Waste Management Hierarchy, as enshrined in the Waste Management Act 1996, as amended.

Any waste generated during the development construction phase will be collected, source separated and stored in dedicated receptacles at the temporary compound during construction. It will be the responsibility of the contractor for the main construction works (when appointed) to nominate a suitable site representative, such as a Project Manager, Site Manager or Site Engineer as Waste Manager, who will have overall responsibility for the management of waste. The waste manager will have overall responsibility to instruct all site personnel including sub-contractors to comply with onsite requirements. They will ensure, at an operational level, that each crew foreman is assigned direct responsibility.

#### 3.4.17.10.1 Waste Generated

It is envisaged that the following categories of waste will be generated during the construction of the CGEP Project:

- Municipal solid waste (MSW) from the office and canteen.
- Construction and demolition waste.
- Waste oil/hydrocarbons.
- Paper/cardboard.
- Timber.
- Steel.

Sanitary waste will be removed from site by a licensed waste disposal contractor. All portaloo units located on site during the construction phase will be operated and maintained in accordance with the manufacturer's instructions and will be serviced under contract with the supplier. All such units will be removed off-site following completion of the construction phase.

A fully authorised waste management contractor will be appointed prior to construction works commencing. This contractor will provide appropriate receptacles for the collection of the various waste streams and will ensure the regular emptying/and or collection of these receptacles.

The following **Table 3.5** lists licensed waste facilities in the surrounding area:

Facility	Type of wasted accepted	Location		
McGill-Glenville	Compostable waste	Glenville		
Red Fox	Recyclables, non-recyclables, wood, metal, rubble, junk removal	Churchfield Industrial Estate		
Ashgrove recycling	Construction waste, metal, wood, soil, rubble, plastic	Churchfield Industrial Estate		
Munster waste management	Domestic, commercial, industrial, agricultural	Mallow		
Enva	Construction waste, general waste, hazardous waste	Ringaskiddy		
Raffeen civic amenity site dump	Paper, cardboard, metal, green waste, plastic, waste oil, glass, timber	Monkstown		

Table 3.5:	Licensed Waste Facilities
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#### 3.4.17.10.2 Waste Minimisation/Reduction

All efforts will be made by site management to minimise the creation of waste throughout the project. This will be done by:

- ٠ material ordering will be optimised to ensure only the necessary quantities of materials are delivered to site;
- material storage areas will be of a suitable design and construction to adequately protect all sorted materials to ensure no unnecessary spoilage of materials occurs which would generate additional waste.
- all plant will be serviced before arriving on site. This will reduce the risk of breakdown and the ٠ possible generation of waste oil/hydrocarbons on site.
- all operators will be instructed in measures to cut back on the amount of wastage for trimming of materials etc. for example cutting of plywood, built into the amount ordered.
- educating foremen and others to cut/use materials such as ply wisely for shutters etc.
- prefabrication of design elements will be used where suitable to eliminate waste generation ٠ on site.
- where materials such as concrete are being ordered, great care will be practiced in the calculation of quantities to reduce wastage.

#### 3.4.17.10.3 Waste Reuse

When possible, materials shall be re used onsite for other suitable purposes, e.g.:

• re-use of shuttering etc. where it is safe to do so.

- re-use of rebar cut-offs where suitable.
- re-use of excavated materials for screening, berms etc.
- re-use of excavated material, etc. where possible will be used as suitable fill elsewhere on site for site tracks, the hardstanding areas and embankments where possible.
- excess subsoils from excavations shall be used to reinstate borrow pits on site. ٠

It is important to clarify that any excess excavated material that will be used for fill, re-instatement, or similar activities, within the development site boundary, is not technically categorised as a waste material under relevant waste legislation, rather this material is exempt from waste classification.

Article 2 (1) (c) of Directive 2008/98/EC on waste, transposed through Article 26 (1) (c) of the European Communities (Waste Directive) Regulations (S.I. 126 of 2011) identifies the following as being an exemption from waste regulation:

"uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated".

Surplus material will be re-instated in its natural condition on the site from which it was excavated, this material is not considered as waste.

#### 3.4.17.10.4 Waste Recycling, Recovery & Disposal

In accordance with national waste policy, source separation of recyclable material will take place. This will include the provision of receptacles for the separation and collection of dry recyclables (paper, cardboard, plastics etc.), biological waste (canteen waste) and residual waste.

Receptacles will be clearly labelled, signposted and stored in dedicated areas.

The following source segregated materials containers will be made available on site at a suitable location:

- timber.
- ferrous metals.
- aluminium.
- dry mixed recyclables.
- packaging waste.
- food waste.

The materials will be transported off-site by an authorised contractor to a permitted recovery centre and these materials will be processed through various recovery operations.

Residual waste generated on-site may require disposal. This waste will be deposited in dedicated receptacles and collected by the permitted waste management contractor and transported to an appropriate facility. All waste movements will be recorded, of which records will be held by the waste manager on-site.

#### 3.4.17.11 **Turbine Delivery Route**

While the TDRs contain more nodes than those examined in this report, only those nodes with potential to affect Natura 2000 sites (due to nature of works) are covered in this report. These nodes are described below and summarised in Table 3.6.

Route 1 contains 4 relevant nodes; nodes 1.3 and 1.4 are at the slip road junction linking the R635 to the N8. The first of these (Node 1.3) will require street furniture removal, hedge/tree trimming, and ramping of an existing traffic splitter island. The next (Node 1.4) requires removal of a street light and may require extra load bearing along a section of road verge. Node 1.6 at the N20/L2950 junction requires scrub trimming for oversail. Node 1.7 is at the existing Bottlehill landfill site; this will require scrub clearance and hedgerow trimming for both oversail and load-bearing.

Route 2 contains 15 nodes; these are at M8 Junction 14, R639/N72 Junction (Fermoy Town), immediately east of Fermoy Town, at Ballyhooly, near Bloomfield Crossroads to the south of Ballyhooly Bridge, and along the local road approaching the proposed windfarm site.

Node 2.0 at M8 Junction 14 will require removal of street furniture, hedge trimming, and extra load bearing on sections of grassed verges. Node 2.1 in Fermoy Town will require removal of street furniture and ramping of two splitter islands. Node 2.2 east of Fermoy will require tree trimming. Node 2.3 east of Fermoy will require removal of a low bank, and possibly also load bearing along the road verge. Node 2.4 which is in the same area will require removal of road signs, and load bearing along the road verge. Node 2.5 at Ballyhooly will require lowering of sections of hedgerow, removal of a section of wall, and load bearing in sections of verges. Node 2.6 at Ballyhooly will require lowering of a stone wall to ground level and regrading of the hillside behind the wall. Node 2.7 at Ballyhooly will require lowering of a section of wall and load bearing along the road verge. Node 2.8 to the south of Bloomfield Crossroads will require road widening and tree felling.

Nodes 2.9 and 2.10, will require road widening and tree felling. Road widening, lowering of hedge/bank and tree trimming is required at Node 2.11; tree trimming at Node 2.12; scrub trimming at Node 2.13, and road widening & scrub felling at Node 2.14.

The construction works in the nodes associated with the TDR are expected to last 3 weeks.

Tuble 51	
Nod e	Works/actions
Route	1 Tivoli-Bottlehill
1.3	Street furniture removal;
	hedge/tree trimming;
	<ul> <li>ramping of existing traffic splitter island.</li> </ul>
1.4	Removal of street light and possibly extra load bearing along a section of road verge
1.6	Scrub clearance and furniture removal
1.7	Scrub clearance and hedgerow trimming
Route	2 Dunkettle – Nagle's Mountains
2.0	• Removal of street furniture, hedge trimming, extra load bearing on sections of grassed verges
2.1	Removal of street furniture, ramping of two splitter islands (using asphalt wedges)
2.2	Hedge trimming; reduce to 3m over road level & 2.5m depth
2.3	Removal of roadside bank and possibly also load bearing along the road verge
2.4	Removal of road signs and load bearing along the road verge
2.5	Removal of pole and road signs, lowering of wall (south side) and bank (north (side)
2.6	Lowering of [retaining] wall and re-grading of slope
2.7	Lowering of a section of wall and may require load bearing along road verge
2.8	Road widening and tree felling
2.9	Road widening and tree felling
2.10	Road widening and tree felling
2.11	Road widening and hedge trimming
2.12	Tree trimming
2.13	Hedge/scrub trimming
2.14	Road widening and scrub trimming

### Table 3.6. Works at each Node in preparation for the TDR (Appendix B)

# 3.4.18 Operation and Lifespan

#### 3.4.18.1 **Proposed CGEP**

During the operational period, the turbines will operate automatically on a day to day basis, responding by means of anemometry equipment and control systems to changes in wind speed and direction. The turbine manufacturer or a service company will carry out regular maintenance of the turbines.

Scheduled services will typically occur twice a year. The operation of the wind turbines will be monitored remotely, and a caretaker will oversee the day to day running of the proposed wind farm.

The expected physical lifetime of the turbine is approximately 30 years, and permission is sought for a 30-year operation period commencing from full operational commissioning of the wind farm. It should be noted that Section 7.2 of the Planning Guidelines 2006 includes for the following:

"The inclusion of a condition which limits the life span of a wind energy development should be avoided, except in exceptional circumstances"

In this respect, the applicant requests the grant of permission is on the basis of a 30-year operational period from the date of full operational commissioning of the wind farm.

# 3.4.19 Decommissioning

#### **Proposed CGEP Development and Grid Connection Route** 3.4.19.1

Following the end of their useful life, the wind turbines may, subject to planning permission, be replaced with a new set of turbines or the site may be decommissioned. On decommissioning, cranes will disassemble the above ground turbine components which would be removed off site for recycling. All the major component parts are bolted together, so this is a relatively straightforward process. The foundations will be covered over and allowed to re-vegetate naturally if required. Leaving the turbine foundations in situ is considered a more environmentally sensible option as to remove the reinforced concrete associated with each turbine would result in environmental nuisances such as noise and vibration and dust. It is proposed that the internal site access tracks will be left in place, subject to agreement with Cork County Council and the relevant landowners.

The proposed on-site substations shall be taken in charge by ESBN/Eirgrid upon completion and shall be left in place forming part of the national electricity network.

Underground cables will be cut back and left in place.

A detailed decommissioning plan will be agreed in advance of construction with Cork County Council. A decommissioning plan is contained in the CEMP in Appendix A.

#### 3.5 Application of Protection Measures in the Screening Evaluation

The Screening evaluation to inform the AA process is carried out in the absence of any protective measures for the proposed CGEP Project, which may be required or prescribed to avoid or reduce harmful effects on designated European Sites.

### 3.6 Other Projects included in Screening assessment in relation to incombination effects

Projects and land use activities identified with potential to result in in-combination effects with the proposed CGEP Project are presented in Table 3.7.

Development	Planning Reference	Potential for significant in-combination/ cumulative effects
Windfarm Developments	Several as detailed	The closest windfarm development is a single wind turbine at Moneygorm, Glenville, Co Cork (1.4km distant from the site). The following windfarm developments are the closest windfarm developments to the site which have been granted planning; Castlepook Wind farm (14 turbines, c. 21.8km from site); Knocknatallig Wind Farm (6 turbines, c. 24km from the site); Boggeragh Wind Farm (38 turbines, c. 23km from the site); Esk Windfarm (12 turbines, c. 21km from the site). These projects having been granted planning and were subject to Appropriate Assessment that ruled out significant adverse effects. No significant in-combination effects between the proposed CGEP Project and European sites are anticipated.
M20 Cork-Limerick Motorway	None	The likely route will be west of the N20. Currently at feasibility, at likely be <5km from the proposed CGEP project. Expected completion 2027. This project wiol;l be subject to full impact assessment, including Appropriate Assessment. No significant in-combination effects between the proposed CGEP Project and European sites are anticipated.
Alteration of Mallow Sewerage Scheme	195078	A NIS and EIS have been submitted and has concluded that it has been concluded that the proposed development will not have an adverse effect on the integrity of the Blackwater River (Cork/Waterford) SAC or any other European sites. Furthermore, the environmental reports also state that, during construction, there will be a short- term impact on the River Blackwater which will be effectively minimised by the implementation of mitigation measures. Given the separation distance of over 10km from the proposed CGEP development, no potential in-combination impacts on European Sites are likely, with the exception of possible in-combination effects to identified short term adverse effects on the River Blackwater SAC. <u>Further</u> <u>consideration (AA) of in combination effects is required for this European site.</u>

## Table 3.7: Evaluation of potential in-combination effects on European sites.

Development	Planning Reference	Potential for significant in-combination/ cumulative effects
Agricultural Development, Ballyhooly Mallow, Co. Cork	186848	An EIS has been submitted and has concluded the following: "As the proposed development would take place primarily within habitats of low ecological value and given the small development footprint, the potential impacts upon bird and mammals species would be greatly reduced. Assuming all mitigation measures are put in place, there would be no significant residual impacts to the aquatic environment from the proposed development. It is considered that due to the drainage system design and the distance of the proposed development to the Blackwater River SAC and Blackwater Callows SPA, there would be no significant impact upon a designated site due to drainage." <b>Considering the above and given the separation distance from the proposed CGEP development, no potential in- combination effects on European sites are anticipated.</b>
Redevelopment of Former Central Hotel	186167	A NIS has been submitted which concluded that "the habitats to be affected are highly modified and of minimal ecological value. Thus, no potential impact from loss of habitat have been identified. Given the scale and nature of the project and proposed construction mitigation measures, it can be objectively concluded that the proposed development on its own, and in combination with other plans and projects, will not have a significant impact on qualifying interests and conservation objectives for Natura 2000 sites, and the integrity of these sites will not be adversely affected". Considering the above and given the separation distance from the proposed CGEP development, no potential in-
Residential development and associated works, Navigation Road Annabella Mallow Co. Cork	185112	<ul> <li>A NIS has been submitted which concludes: "As none of the Natura 2000 sites overlap the proposed development site, direct impacts via habitat loss or disturbance/ displacement are not relevant. The development proposes to manage and control surface-water run off during both construction and operational phases prior to release into the environment by implementing standard environmental controls. Surface water run-off from other new proposed or permitted unbuilt developments that will also connect into the same public stormwater sewer network could result in a cumulative and in-combination effect. However, assuming that all developments closely adhere to best practice regarding water quality protection during construction and operational phases, then no significant negative cumulative impacts are expected to occur".</li> <li>Considering the above and given the separation distance from the proposed CGEP development, no potential in-combination effects on European sites are anticipated.</li> </ul>

Development	Planning Reference	Potential for significant in-combination/ cumulative effects
Dairygold Co-operative Society Ltd: Construction works. Annabella West End Mallow Co. Cork	184946	A NIS and EIS have been submitted which concludes that "No significant ecological residual impacts are expected as a result of the construction and operational phase of the proposed development. Provided the recommended mitigation measures are implemented in full it is not expected that the construction and operational phases will result in an adverse residual impact on the integrity of Natura 2000 sites considered in this NIS, namely Blackwater River (Cork/Waterford) SAC". Considering the above and given the separation distance from the proposed CGEP development, no potential in-
		combination effects on European sites are anticipated.
Development of residential units, Clyda Court Quartertown Lower Mallow Co. Cork	176722	An AA Screening Report has been submitted which concludes that, potentially, the proposed development could impact on aquatic species due to increased silt run- off or chemical contamination of groundwater or surface during construction. Overall, given the limited nature of the development and the distance from European sites and the precautionary measures described, impacts on water quality and aquatic ecology are predicted to be negligible. The development will not have a significant impact on qualifying interests and conservation objectives for Natura 2000 sites, and that the integrity of these sites will not be adversely affected. No significant direct, indirect or cumulative effects on Natura 2000 sites have been identified. The impacts on water quality and aquatic ecology are predicted to be negligible and no potential in-combination effects on European sites are expected in-combination with the CGEP Project.
The development of 14 no. serviced sites for future employment uses. Ballydahin and Gooldshill Mallow Co. Cork	167121	Potential in-combination impacts with the proposed CGEP Project can be inferred from the Screening Assessment for the Proposed Quarry Industrial Estate Site at Ballydahin, Mallow, Co. Cork. These are based on the identified potential to spread invasive alien plant species (Japanese knotweed and Himalayan balsam) and downstream habitat degradation through increased siltation. However, the project includes a number of best-practice and mitigation measures. In this case, no potential in- combination effects with the proposed CGEP Project are expected.

Development	Planning Reference	Potential for significant in-combination/ cumulative effects
The construction of 108 no. dwelling houses, "Clonmore" Ballyviniter Lower Mallow Co. Cork	166949	An EIS an AA Screening Report have been submitted concluding that: "Due to the small scale of the run-off and additional discharges from the Glasha Stream that will be generated by the proposed development relative to the flows in the River Blackwater, and the distance of the site from the SAC, it can be concluded that the proposed development will not have a measurable impact on water quality or flow rates in the SAC. Construction work is not likely to cause significant disturbance to the local otter population, due to distance from suitable habitat." Considering the above and given the separation distance from the proposed CGEP development, no potential in- combination effects on European sites are expected.
A residential development comprising the construction of 88 no. dwelling houses, Annabella Mallow Co. Cork	156970	An AA Screening Report has been submitted which concludes that adopting the environmental design features as outlined for the proposed development will ensure no significant effects to any species for which the Blackwater SAC is designated will occur as a result of the development. <b>Considering that the environmental design measures</b> <b>described in the report are complied with, no potential in- combination impacts on biodiversity receptors are</b> <b>expected.</b>
Construction of 61 no. dwelling houses, Annabella Mallow Co. Cork.	156119	An AA Screening Report has been submitted which concludes that due to the location and nature of the proposed works, and with the implementation of standard appropriate environmental actions and best practice, negative effects on the qualifying interests of the Blackwater River SAC will be avoided. Assuming the implementation of standard appropriate environmental actions and best practice, as described in the report are complied with, no potential in-combination impacts on biodiversity receptors are expected.
Construction of fabricating workshop, office block, ESB substation and other associated works, Mallow Business & Technology Park Quartertown Lower Mallow	154690	An Appropriate Assessment Report has been submitted which concludes that there is no evidence to indicate that works will cause, either directly or indirectly, significant deterioration of important habitats, of the habitats of the qualifying species and species of special conservation interest or significant disturbance to these species, thus ensuring the integrity of the Blackwater SAC is protected. The AA screening references standard construction mitigation measures to be implemented, documenting details that no surface water, soils or contaminants will be permitted to the nearby Quarterstown stream, precluding hydrological connectivity with European sites. No in- combination effects with the proposed CGEP Project are therefore expected.

Development	Planning Reference	Potential for significant in-combination/ cumulative effects	
The construction of 10 no. dwelling houses to replace 8 no. residential serviced sites, An Gleann Ull Ballyhooly North Fermoy Co. Cork	196597	An EIAR and AA Screening Report have been submitted for this development which conclude that, following a comprehensive evaluation of the proposed direct, indirect and cumulative impacts on the qualifying interests and conservation objectives for the Blackwater River SAC, the proposed development will not have an adverse effect on the integrity of the Blackwater River SAC or any other Europeans site.	
	The AA Report includes a number of generic and specific mitigation measures in relation to the management of wastewater, construction waste, noise and prevention of invasive species that would be expected to prevent any in- combination effects with the proposed CGEP Project.		
Construction of 20 no. semi-detached 2-storey houses and associated site works, Lios Ard Ballyhooly South Fermoy Co. Cork	195486	An Appropriate Assessment Screening Report has been submitted which concludes that there is no evidence to indicate that works will cause, either directly or indirect significant deterioration of important habitats, of the habitats of the qualifying species and species of special conservation interest or significant disturbance to these species, thus ensuring the integrity of the Blackwater SA protected.	
		The AA Report includes the reference to a number of standard environmental controls to be followed during construction and operation phases, in relation to the management of wastewater, construction waste, noise and prevention of invasive species that would prevent any in-combination effects with the proposed CGEP Project.	
		An Appropriate Assessment Screening Report has been submitted which concludes there will be no significant effects on the Blackwater River SAC and Blackwater Callows SPA.	
The construction of 31 no. dwelling houses and all associated works, Glanworth (Townland) Fermoy Co. Cork	195486	The Appropriate Assessment Screening indicates the implementation of standard environmental controls, during construction phase, and SuDS infrastructure, during operation phase, to eliminate the potential impacts affecting habitats or species due to increased silt-laden or contaminated surface water runoff. Disturbance/displacement effects are also considered insignificant due to the absence of habitats of ecological interest or value within the vicinity of the development. No in-combination effects with the proposed CGEP Project are expected.	

Development	Planning Reference	Potential for significant in-combination/ cumulative effects
		An Appropriate Assessment Report has been submitted which concludes there will be no significant effects on the Blackwater River SAC and Blackwater Callows SPA.
6 no semi-detached 3 storey houses and 8 no residential serviced sites and associated site works. An Gleann Ull Ballyhooly North Fermoy Co. Cork	175734	The Assessment concluded that the development is located at a distanced enough from a designated site to preclude any disturbance or displacement effects on habitats and mobile species. The Assessment also mentions the management of surface and wastewater emissions, ensuring the water quality of hydrologically connected receptors. No in-combination effects with the proposed CGEP Project are expected.
Permit extension for the construction of 102 no. dwelling houses, creche and associated site works, Ballynamona Pike Road Fermoy	155973	No environmental information available.
Construction of a creche facility to serve the adjacent permitted residential development (Cork County Council Ref. 18/6579), the construction of 19 no. dwelling houses and other site works, Lisnagar Demesne (Townland) Rathcormac Co. Cork	196892	A NIS has been submitted which concludes that there will be no significant effects, either alone or in combination with other plans and projects, on the integrity of the Blackwater SAC as a result of the proposed development The mitigation measures/best practice measures proposed in the NIS report are meant to prevent pollution to receiving water bodies. With the implementation of such measures, no significant effects are anticipated to European sites and no in-combination effects with the proposed CGEP Project are expected.
Residential Development - Construction of 96 no. dwelling houses and all associated ancillary site development works, Lisnagar Demesne Rathcormac, Co. Cork	186579	A NIS has been submitted which concludes that there will be no adverse impacts, either alone or in combination with other plans and projects, on the integrity of the Blackwater SAC as a result of the proposed development. The mitigation measures/best practice measures proposed in the NIS report are meant to prevent pollution to receiving water bodies. With the implementation of such measures, no significant effects are anticipated to European sites and no in-combination effects with the proposed CGEP Project are expected.
Existing Forestry Activity on the site	None	Forest management is subject to licencing that include protection measures for safeguarding water quality. No significant in-combination effects with the proposed CGEP Project are expected.
Replant lands in Moneygorm, Co. Cork		These lands have already been planted. Forest management is subject to separate licencing that include protection measures for safeguarding water quality. Therefore, no significant in-combination effects with the proposed CGEP Project are expected.
Replant lands in Ballard, Co. Wicklow		The separation distance between these land in Co. Wicklow and the proposed CGEP project is c.145km. Therefore, no significant in-combination effects with the proposed CGEP Project are expected.

The rationale provided in Table 3.7 above, regarding each of the listed projects, awards a high degree of confidence that there is no potential for significant in-combination/cumulative effects with the proposed development, with the possible exception of Mallow Sewerage Scheme which is considered in more detail in Section 4.5 below.

#### 3.7 **European sites under consideration**

#### 3.7.1 Distance of the Development to European sites

A precautionary distance of 15km from each of the proposed CGEP Project elements (i.e. CGEP, Grid Connection, TDR) was chosen to evaluate the potential for significant effects on European sites. The potential zone of influence was also considered to extend to European sites located outside the 15 km buffer, where downstream hydrological links exist. No additional European sites beyond the 15 km buffer were identified as being within the zone of influence, based on the potential for likely significant effects associated with the proposed project. This assessment includes consideration of possible adverse effects (displacement, collision, disturbance) to birds associated with remote SPA's (refer to section 2.4.3).

There are eleven European sites within 15km of the proposed CGEP Project. Table 3.8 identifies the relevant European sites identified for the proposed CGEP Project and are projected in Figure 3-9, Figure 3-10 and Figure 3-11.

Element	Site	European Site	Distance from the nearest CGEP Element
ment		Blackwater Callows SPA (Site Code 004094)	11.7 km
CGE develop	Blackwater River (Cork/Waterford) SAC (Site Code 002170)	551 m	
	te	Blackwater River (Cork/Waterford) SAC (Site Code 002170)	1.3 km
Grid Conn Rout	Blackwater Callows SPA (Site Code 004094)	4.2 km	
		Cork Harbour SPA (Site Code 004030)	1.3 km
TDR Nodes	Great Island Channel SAC (Site Code 001058)	5.6 km	
	Lower River Suir SAC (Site Code 002137)	14 km	
	Blackwater River (Cork/Waterford) SAC (Site Code 002170)	10 m	
	Blackwater Callows SPA (Site Code 004094)	1.3 km	

Table 3.8: Proximity of European Sites to the proposed CGEP Project elements.

Element	Site	European Site	Distance from the nearest CGEP Element
	Met Masts	Blackwater River (Cork/Waterford) SAC (Site Code 002170)	2.3 km

### 3.7.2 Description of the European sites under consideration

Table 3.9 synthetises the description of the European sites considered under this Screening. Full site Synopsis and Conservation Objectives for each of the European sites are available at the National Parks & Wildlife Service website<sup>6</sup> and are listed in **Appendix C**.

European site Name and Code	Qualifying Interest /Special Conservation Interest and Code *denotes a priority habitat	Locational Context of European site (extracted from site Synopsis)
Blackwater River (Cork/Waterford) SAC (002170)	<ul> <li>Freshwater Pearl Mussel Margaritifera margaritifera [1029]</li> <li>White-clawed Crayfish Austropotamobius pallipes [1092]</li> <li>Sea Lamprey Petromyzon marinus [1095]</li> <li>Brook Lamprey Lampetra planeri [1096]</li> <li>River Lamprey Lampetra fluviatilis [1099]</li> <li>Twaite Shad Alosa fallax [1103]</li> <li>Atlantic Salmon Salmo salar (only in fresh water) [1106]</li> <li>Estuaries [1130]</li> <li>Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>Perennial vegetation of stony banks [1220]</li> <li>Salicornia and other annuals colonizing mud and sand [1310]</li> <li>Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]</li> <li>Otter Lutra lutra [1355]</li> <li>Mediterranean salt meadows (Juncetalia maritimi) [1410]</li> <li>Killarney Fern Trichomanes speciosum [1421]</li> <li>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]</li> <li>Old sessile oak woods with <i>llex</i> and Blechnum in the British Isles [91A0]</li> <li>*Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</li> <li>*Taxus baccata woods of the British Isles [91J0]</li> </ul>	The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and five ranges of mountains. In times of heavy rain fall the levels can fluctuate widely by more than 12 feet on the gauge at Careysville. The peaty nature of the terrain in the upper reaches and of some of the tributaries gives the water a pronounced dark colour. The site consists of the freshwater as far upstream as Ballydesmond, the tidal stretches as far as Youghal Harbour and many tributaries, the larger of which include the Licky, Bride, Flesk, Chimneyfield, Finisk, Araglin, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, Owentaraglin and Awnaskirtaun. the River Blackwater is of considerable conservation significance for the occurrence of good examples of habitats and populations of plant and animal species that are listed on Annexes I and II of the EU Habitats Directive, respectively. Additionally, the importance of the site is enhanced by the presence of a suite of uncommon plant species.

Table 3.9: Description of European sites within a 15km radius of the proposed CGEP Project.

<sup>&</sup>lt;sup>6</sup> Available at <u>https://www.npws.ie/protected-sites</u>. Accessed in November 2020.
European site Name and Code	Qualifying Interest /Special Conservation Interest and Code *denotes a priority habitat	Locational Context of European site (extracted from site Synopsis)
Blackwater Callows SPA (004094)	<ul> <li>Whooper Swan Cygnus cygnus [A038]</li> <li>Wigeon Anas Penelope [A050]</li> <li>Teal Anas crecca [A052]</li> <li>Black-tailed Godwit Limosa limosa [A156]</li> <li>Wetland and Waterbirds [A999]</li> </ul>	The Blackwater Callows SPA comprises the stretch of the River Blackwater that runs in a west to east direction between Fermoy and Lismore in Counties Cork and Waterford, a distance of almost 25 km. The site includes the river channel and strips of seasonally-flooded grassland within the flood plain. The Blackwater Callows SPA is of importance for its populations of wintering waterfowl, including an internationally important population of Whooper Swan and nationally important populations of Wigeon, Teal and Black-tailed Godwit. The presence of Whooper Swan, as well as Little Egret, is of particular note as these species are listed on Annex I of the E.U. Birds Directive. Part of the Blackwater Callows SPA is a Wildfowl Sanctuary.
Cork Harbour SPA (004030)	<ul> <li>Little Grebe (<i>Tachybaptus ruficollis</i>) [A004]</li> <li>Great Crested Grebe (<i>Podiceps cristatus</i>) [A005]</li> <li>Cormorant (<i>Phalacrocorax carbo</i>) [A017]</li> <li>Grey Heron (<i>Ardea cinerea</i>) [A028]</li> <li>Shelduck (<i>Tadorna tadorna</i>) [A048]</li> <li>Wigeon (<i>Anas penelope</i>) [A050]</li> <li>Teal (<i>Anas crecca</i>) [A052]</li> <li>Pintail (<i>Anas acuta</i>) [A054]</li> <li>Shoveler (<i>Anas clypeata</i>) [A056]</li> <li>Red-breasted Merganser (<i>Mergus serrator</i>) [A069]</li> <li>Oystercatcher (<i>Haematopus ostralegus</i>) [A130]</li> <li>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</li> <li>Grey Plover (<i>Pluvialis squatarola</i>) [A141]</li> <li>Lapwing (<i>Vanellus vanellus</i>) [A142]</li> <li>Dunlin (<i>Calidris alpina</i>) [A149]</li> <li>Black-tailed Godwit (<i>Limosa limosa</i>) [A156]</li> <li>Bar-tailed Godwit (<i>Limosa limosa</i>) [A157]</li> <li>Curlew (<i>Numenius arquata</i>) [A160]</li> <li>Redshank (<i>Tringa totanus</i>) [A162]</li> <li>Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]</li> <li>Common Gull (<i>Larus canus</i>) [A182]</li> <li>Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183]</li> <li>Common Tern (<i>Sterna hirundo</i>) [A193]</li> <li>Wetlands &amp; Waterbirds</li> </ul>	Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, as the site provides both feeding and roosting sites for the various bird species that use it. Cork Harbour is also a Ramsar Convention site and part of Cork Harbour SPA is a Wildfowl Sanctuary.
Great Island Channel SAC (001058)	<ul> <li>Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>Atlantic salt meadows* (<i>Glauco-Puccinellietalia</i> maritimae) [1330]</li> </ul>	The Great Island Channel stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. The site is of major importance for the two habitats listed on Annex I of the E.U. Habitats Directive, as well as for its important numbers of wintering waders and wildfowl. It also supports a good invertebrate fauna.

European site Name and Code	Qualifying Interest /Special Conservation Interest and Code *denotes a priority habitat	Locational Context of European site (extracted from site Synopsis)
Lower River Suir SAC (002137)	<ul> <li>Freshwater pearl mussel (Margaritifera margaritifera) [1029]</li> <li>White-clawed crayfish (Austropotamobius pallipes) [1092]</li> <li>Sea lamprey (Petromyzon marinus) [1095]</li> <li>Brook lamprey (Lampetra planeri) [1096]</li> <li>River lamprey (Lampetra fluviatilis) [1099]</li> <li>Allis shad (Alosa alosa) [1102]</li> <li>Twaite shad (Alosa fallax fallax) [1103]</li> <li>Salmon (Salmo salar) [1106]</li> <li>Atlantic salt meadows (Glauco- Puccinellietalia maritimae) [1330]</li> <li>Otter (Lutra lutra) [1355]</li> <li>Mediterranean salt meadows (Juncetalia maritimi) [1410]</li> <li>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]</li> </ul>	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 in Co. Waterford, and many tributaries. The Lower River Suir contains excellent examples of a number of Annex I habitats, including the priority habitats alluvial forest and Yew woodland. The site also supports populations of several important animals species, some listed on Annex II of the Habitats Directive or listed in the Irish Red Data Book. The presence of two legally protected plants (Flora (Protection) Order, 1999) and the ornithological importance of the site adds further to the ecological interest and importance

\* indicates a priority habitat under the Habitats Directive













# **Sources of Information and Consultation** 3.8

# 3.8.1 Consultation

Consultation (including in relation to scoping) with the Developments Application Unit (the Manager), National Parks & Wildlife Services has been attempted, refer to Table 3-10. However, no information has been provided at the time of this report.

Date	Consultees	Action	Response
07/09/2020	Development Applications Unit (DAU)	Detail on project issued to Manager DAU.	No response received to date.
13/01/2020	Development Applications Unit (DAU)	An email requesting any observations regarding biodiversity on the project was sent to Manager DAU.	No response received to date.
21/08/2019	Inland Fisheries Ireland (IFI)	A meeting was held on site with Inland Fisheries Ireland	Inspections took place of water crossing points, both on the public road and within the development site associated with the proposed grid connection cable route and the proposed internal access road network. Crossing points were inspected, and preferred design solutions and construction methodologies were agreed for both the examined crossing points and generally throughout the site.
26/03/2019	Development Applications Unit (DAU)	An email requesting any observations regarding biodiversity on the project was sent to Manager DAU.	No response received to date.
14/02/2019	NPWS	An email requesting a consultation in March/ April was issued to NPWS Divisional Ecologist	An email was received on 14/02/2019 stating a meeting could not be guaranteed:
08/01/2010	Development	An email requesting a pre planning consultation, with a meeting agenda and	A receipt of consultation was received on 09/01/2018 from Sinéad O' Brien, advising a turnaround for consultation of six weeks from date of receipt: <i>"Our Ref: G Pre00256/2017 (Please quote</i> <i>in all related correspondence)</i> A Chara On behalf of the Department of Culture, Heritage and the Gaeltacht, I acknowledge

Table 3.10: Consultatio	n with relevant	consultees in	relation to	the proj	ect.

			preferred design solutions and construction methodologies were agreed for both the examined crossing points and generally throughout the site.
26/03/2019	Development Applications Unit (DAU)	An email requesting any observations regarding biodiversity on the project was sent to Manager DAU.	No response received to date.
14/02/2019	NPWS	An email requesting a consultation in March/ April was issued to NPWS Divisional Ecologist	An email was received on 14/02/2019 stating a meeting could not be guaranteed:
08/01/2018	Development Applications Unit (DAU)	An email requesting a pre planning consultation, with a meeting agenda and proposed attendees attached, was sent to Manager DAU.	A receipt of consultation was received on 09/01/2018 from Sinéad O' Brien, advising a turnaround for consultation of six weeks from date of receipt: "Our Ref: G Pre00256/2017 (Please quote in all related correspondence) A Chara On behalf of the Department of Culture, Heritage and the Gaeltacht, I acknowledge receipt of your below email. In the event that the NPWS is in a position to facilitate your meeting request, you will receive a co-ordinated heritage-related response by email from Development Applications Unit (DAU) on behalf of the Department. The normal target turnaround for pre- planning and other general consultations is six weeks from date of receipt. In relation

Date	Consultees	Action	Response
			to general consultations from public bodies under the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 to 2011, the Department endeavours to meet deadline dates, where requested. If you have not heard from DAU and wish to receive an update, please telephone the direct line number below or email manager.dau@ahg.gov.ie . Le meas Sinéad O' Brien"
13/11/2017	Development Applications Unit (DAU)	A consultation letter containing the project description and map of the proposed CGEP/ grid connection was sent to Manager DAU.	A receipt of consultation was received on 18/12/2017 from Sinéad O' Brien, advising a turnaround for consultation of six weeks from date of receipt: "Your Ref: INIS DAU Bottlehill Consultation Our Ref: G Pre00256/2017 (Please quote in all related correspondence) A Chara On behalf of the Department of Culture, Heritage and the Gaeltacht, I acknowledge receipt of your below consultation. I apologise for the delay in reply but unfortunately, I have been out of the office for the past couple of months on sick leave. In the event of observations, you will receive a co-ordinated heritage-related response by email from Development Applications Unit (DAU) on behalf of the Department. The normal target turnaround for pre-planning and other general consultations is six weeks from date of receipt. In relation to general consultations from public bodies under the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 to 2011, the Department endeavours to meet deadline dates, where requested. If you have not heard from DAU and wish to receive an update, please telephone the direct line number below or email manager.dau@ahg.gov.ie . Le meas Sinéad O' Brien"

# 3.8.2 Sources of Information

In addition to consultation with NPWS and IFI, other sources of Information, which were considered during this 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 CGEP project.
- Detailed description of the CGEP and a review of the descriptions of the other elements of the whole CGEP Project, as provided in Chapter 3, Description of the Development, of the accompanying EIAR.
- EPA online mapping for watercourse features (https://gis.epa.ie/EPAMaps/).
- Supporting ecological receptor information described in full in the accompanying EIAR **Biodiversity Chapter 8.**
- Site visits and field surveys for the CGEP AND Turbine Delivery Route. •
- Provided reporting in respect of TDR and Replant elements.
- Review of planning documentation and environmental reports for other unrelated projects available on relevant County Council and An Bord Pleanála websites.

## 3.9 Potential Sources, Pathways and Timing of Impacts to European Sites

The Screening for Appropriate Assessment evaluation is based on a conceptual model sourcepathway-receptor, which identifies potential significant effects between a proposed development and European sites.

The conceptual model for the case of the proposed CGEP Project is described in the Sections below. The model contemplates the activities in the construction and operation phases of the proposed CGEP Project, identifies sources and pathways that could potentially generate significant effects to receiving European sites. These sources and pathways are then evaluated for each European site (SACs and SPAs) and a rationale for inclusion or exclusion for further appraisal is also included in the conceptual model.

# **3.9.1** Construction Phase: Source-Pathway-Receptor Model of Potential Effects from the **Proposed CGEP Project**

# 3.9.1.1 Proposed CGEP development

Activities such as earthworks, vegetation clearance and other construction works, the use of machinery, the occurrence of construction noise and the presence of personnel are associated with the potential for likely significant effects on European sites during the proposed CGEP development Construction Phase (see Section 3.4). Error! Reference source not found. describes the Source-P athway-Receptor model for the case of the Construction Phase of the proposed CGEP development and the screening rational for the Appropriate Assessment.

# Table 3.11: Source-Pathway-Receptor model for the Construction Phase of the proposed CGEP Project.

 Screening rationale	<ol> <li>2. Screened <u>In</u> for further assessment (Site Code 002170) as the potential for significant effects cannot be excluded.</li> <li>Although the proposed CGEP Project is not located within the boundary of the SAC, its construction phase could potentially affect hydrologically connected aquatic QIs of this European site (see Table 3.9), generating significant effects to the species, their habitats and food sources.</li> <li>The construction phase of the proposed CGEP could also spread IAPS to European sites. Movement of soils and machinery and surface water runoff can potentially transport vegetative material (e.g. spores, fragments, seeds) to the SAC, causing IAPS to become established and reproduce there. This will potentially cause a degradation of the receiving habitats and, indirectly, cause a degradation of the receiving habitats and, indirectly, cause a degradation of the SAC, have the potential to give rise to significant effects to the SAC, and</li> <li>Accidents with hydrocarbons and cement-based materials at the proposed CEGP Development, given the hydrological connectivity with the SAC, have the potential to give rise to significant effects to the SAC (als).</li> <li>Mobile QIs (e.g. otter) have the potential to give rise to significant effects to the SAC (als).</li> <li>Mobile QIs (e.g. otter) have the potential to give rise to significant effects to the SAC (als).</li> </ol>
European sites	
Potential Effects to Receptors	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct mortality of mobile QIs or SCIs;</li> <li>Disturbance of mobile QIs or SCIs;</li> <li>Indirect effects to downstream protected habitats.</li> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct mortality of mobile QIs or SCIs;</li> <li>Direct mortality of mobile QIs or SCIs;</li> <li>Direct mortality of mobile QIs or SCIs;</li> <li>Indirect effects to downstream protected habitats.</li> </ul>
Description of Pathway	<ul> <li>Direct water contamination;</li> <li>Soils;</li> <li>Surface water runoff;</li> <li>River water bodies;</li> <li>Habitat removal/disturbanc e;</li> <li>Movement of soils and machinery;</li> <li>Direct contact.</li> <li>Direct water contamination;</li> <li>Soils;</li> <li>Surface water contact.</li> <li>River water bodies;</li> <li>Habitat removal/disturbanc e;</li> <li>Movement of soils and</li> <li>Movement of soils and</li> </ul>
Source of Potential Effect	<ul> <li>Instream works;</li> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Reinstatement works;</li> <li>Water abstraction.</li> <li>Instream works;</li> <li>Water abstraction.</li> <li>Use of machinery;</li> <li>Excavation works;</li> <li>Water abstraction.</li> <li>Instream works;</li> <li>Water abstraction.</li> <li>Novement of soils and machinery;</li> <li>Excavation works;</li> <li>Water abstraction.</li> <li>Nater abstraction.</li> <li>Water abstraction.</li> <li>Water abstraction.</li> <li>Water abstraction.</li> <li>Water abstraction.</li> <li>Water abstraction.</li> </ul>
Works Activity	Piped Culvert Crossings Box Culvert Crossings

-	pean sites Screening rationale			
	Potential Effects to Eur	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct mortality of mobile Qls or SCIs;</li> <li>Disturbance of mobile Qls or SCIs.</li> </ul>	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct mortality of mobile QIs or SCIs.</li> </ul>	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct mortality of mobile Qls or SCIs;</li> <li>Disturbance of mobile Qls or SCIs.</li> </ul>
	Description of	<ul> <li>Soils;</li> <li>Surface water runoff (contamination and volume increase);</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Habitat removal;</li> </ul>	<ul> <li>Soils;</li> <li>Surface water runoff (contamination and volume increase);</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Habitat removal.</li> </ul>	<ul> <li>Soils;</li> <li>Surface water runoff</li> <li>Contamination and (contamination and volume increase);</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Habitat removal.</li> </ul>
	Source of Potential	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works and piling;</li> <li>Tree felling;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Soil Stockpiling;</li> <li>Reinstatement works.</li> </ul>	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Tree felling;</li> <li>Tree felling;</li> <li>Reinstatement works;</li> <li>Wastewater.</li> </ul>	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Tree felling;</li> <li>Reinstatement works.</li> </ul>
	Works	Turbine Construction works	Onsite Electric Substations	məttery Energy Storage System

Works Activity	Source of Potential Effect	Description of Pathway	Potential Efi Receptors	fects to	European sites	Screening rationale
Temporary Site Facilities	<ul> <li>Movement of soils and machinery; machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Tree felling;</li> <li>Reinstatement works.</li> </ul>	<ul> <li>Soils;</li> <li>Surface water runoff;</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Habitat removal.</li> </ul>	<ul> <li>Effects on rive quality (silting a contamination)</li> <li>Spread of IAP</li> <li>Direct mortal mobile QIs or SCIs.</li> <li>Disturbance c QIs or SCIs.</li> </ul>	er water ind/or ; S; tity of Cls; of mobile		
СНМР	No sou	rce of potential effect	s is identified.			
Access tracks	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Tree felling;</li> <li>Reinstatement</li> </ul>	<ul> <li>Soils;</li> <li>Surface water runoff;</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Habitat removal.</li> </ul>	<ul> <li>Effects on rive quality (silting a contamination)</li> <li>Spread of IAP</li> <li>Direct mortal mobile QIs or S( OIs or SCIs.</li> </ul>	er water ind/or 5; ity of CIs; of mobile	Cork Harbour SPA (Site Code: 004030)) Great Island Channel SAC (Site Code: 001058)	Screened <u>Out</u> for further assessment (Site Code 004030 and 001058) as no potential for significant effects. These European coastal sites are linked to the CGFP site as the south westernmost point of the site is located in the northernmost extent of the Manin_SC_010 sub-catchment. This river is high in the River Lee catchment and drainage from here ultimately drains into Cork Harbour and Great Channel SAC, representing extremely remote and the very minor portion of the overall these European Sites. Given the very minor portion of the overall

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Works	Source of Potential	Description of	Potential Effects to		
Activity	Effect	Pathway	Receptors	European sites	Screening rationale
	<ul> <li>Movement of</li> </ul>	<ul> <li>Soils;</li> </ul>			windfarm site (c.a. <1% of spatial area) and distance to these
s	soils and	<ul> <li>Surface water</li> </ul>	<ul> <li>Effects on river water</li> </ul>		European sites (connectivity) via river drainage exceeding 25km,
pue	machinery;	runoff;	quality (silting and/or		there are no risks of likely significant effects in the absence of
stel	<ul> <li>Excavation</li> </ul>	<ul> <li>River water</li> </ul>	contamination);		mitigation.
ard	works;	bodies;	<ul> <li>Spread of IAPS;</li> </ul>		
Нa	<ul> <li>Use of</li> </ul>	<ul> <li>Movement of</li> </ul>	<ul> <li>Direct mortality of</li> </ul>		
ouic	hydrocarbons &	soils and	mobile QIs or SCIs;		
ու	cement-based	machinery;	<ul> <li>Disturbance of mobile</li> </ul>		
L	compounds;	<ul> <li>Direct contact;</li> </ul>	Qls or SCls.		
	<ul> <li>Tree felling;</li> </ul>	<ul> <li>Habitat removal.</li> </ul>			
	<ul> <li>Instream works;</li> </ul>	<ul> <li>Direct water</li> </ul>			
	<ul> <li>Movement of</li> </ul>	contamination;	Lttorto an in an otrogo		
	soils and	<ul> <li>Soils;</li> </ul>			
S	machinery;	<ul> <li>Surface water</li> </ul>	quality (sliting and/or		
8ui:	<ul> <li>Excavation</li> </ul>	runoff;	contamination);		
sso.	works;	<ul> <li>River water</li> </ul>	Spread of IAPS;     Since a stress;     S		
t Cr	Use of	bodies;	Direct mortality of		
ver	hydrocarbons &	<ul> <li>Habitat</li> </ul>			
Ing	cement-based	removal/disturbanc	Disturbance of mobile		
) xo	compounds;	e;	UIS OF SUIS;		
в	<ul> <li>Reinstatement</li> </ul>	<ul> <li>Movement of</li> </ul>			
	works;	soils and	downstream protected		
	<ul> <li>Water</li> </ul>	machinery;			
	abstraction.	<ul> <li>Direct contact.</li> </ul>			

Screening rationale		
European sites		
Effects to	n river water ing and/or ion); i lAPS; ortality of or SCIs; ice of mobile ffects to n protected	h river water ing and/or ion); i APS; ortality of or SCIs; ice of mobile
Potential Receptors	<ul> <li>Effects or quality (silt contaminal</li> <li>Spread of</li> <li>Direct mo mobile QIs</li> <li>Disturbar</li> <li>QIs or SCIs;</li> <li>Indirect é downstreal</li> </ul>	<ul> <li>Effects of quality (silt contaminat</li> <li>Spread of</li> <li>Direct mo mobile Qls Mos or SCIs.</li> </ul>
Description of Pathway	<ul> <li>Direct water contamination;</li> <li>Soils;</li> <li>Surface water runoff;</li> <li>River water bodies;</li> <li>Habitat removal/disturbanc e;</li> <li>Movement of soils and machinery;</li> <li>Direct contact.</li> </ul>	<ul> <li>Soils;</li> <li>Surface water runoff (contamination and volume increase);</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Habitat removal;</li> </ul>
Source of Potential Effect	<ul> <li>Instream works;</li> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Reinstatement works;</li> <li>Water abstraction.</li> </ul>	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works and piling;</li> <li>Tree felling;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Soil Stockpiling;</li> <li>Reinstatement works.</li> </ul>
Works Activity	Piped Culvert Crossings	Turbine Construction works

ning rationale		
ropean sites Scree		
Potential Effects to Eu Receptors	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct mortality of mobile QIs or SCIs;</li> <li>Disturbance of mobile QIs or SCIs.</li> </ul>	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct mortality of mobile QIs or SCIs;</li> <li>Disturbance of mobile QIs or SCIs.</li> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct mortality of mobile QIs or SCIs;</li> <li>Disturbance of mobile QIs or SCIs.</li> </ul>
Description of Pathway	<ul> <li>Soils;</li> <li>Surface water runoff (contamination and volume increase);</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Habitat removal.</li> </ul>	<ul> <li>Soils;</li> <li>Surface water runoff</li> <li>Contamination and volume increase);</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Direct contact;</li> <li>Surface water runoff;</li> <li>Surface water bodies;</li> <li>Movement of soils and machinery;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Habitat removal.</li> </ul>
Source of Potential Effect	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Tree felling;</li> <li>Reinstatement works;</li> </ul>	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Tree felling;</li> <li>Reinstatement works.</li> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Tree felling;</li> <li>Tree felling;</li> <li>Reinstatement works.</li> </ul>
Works Activity	Onsite Electric Substations	Temporary Site Facilities Battery Energy Storage System

Screening rationale		<ol> <li>Screened In for further assessment (Site Code 004094) as the potential for significant effects cannot be excluded.</li> <li>Although the proposed Grid Connection Route is not located within the boundary of the SPA, its construction phase could potentially affect hydrologically connected riverine habitats that support the European site's SCIs (see Table 3.9), through the decrease of river water quality. This potential decrease could develop an indirect disturbance throughout the food chain and, ultimately, develop significant effects on the European site;</li> </ol>	<ul> <li>also spread type to curopean sites. Movement of soils and machinery and surface water runoff can potentially transport vegetative material (e.g. spores, fragments, seeds) to the SPA, causing IAPS to become established and reproduce there. This will potentially cause a degradation of the receiving habitats and, indirectly, cause significant effects to the SCIs of the SPA.</li> <li>Accidents with hydrocarbons and cement-based materials at the proposed CEGP Development, given the hydrological connectivity with the SPA, have the potential to give rise to significant effects to the SPA.</li> <li>Although the proposed Grid Connection Route is not located</li> </ul>	within the boundary of the SAC, its construction phase could potentially affect hydrologically connected aquatic QIs of this European site (see Table 3.9), generating significant effects to the species, their habitats and food sources. • The construction phase of the proposed Grid Connection Route could also spread IAPS to European sites. Movement of soils and machinery and surface water runoff can potentially transport vegetative material (e.g. spores, fragments, seeds) to the SAC, causing IAPS to become established and reproduce there. This will potentially cause a degradation of the receiving habitats and, indirectly, cause significant effects to the QIs of the SAC.
European sites	t application boundary)	1. Blackwater Callows SPA (Site Code 004094) 2. Blackwater River (Cork/Waterford) SAC (Site Code 002170)		
Potential Effects to Receptors	the proposed developmen	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct kill of mobile QIs or SCIs;</li> </ul>	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct kill of mobile QIs or SCIs;</li> <li>Disturbance of mobile QIs or SCIs;</li> <li>Indirect effects to downstream protected habitats.</li> </ul>	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct kill of mobile QIs or SCIs;</li> <li>Disturbance of mobile QIs or SCIs;</li> <li>Indirect effects to downstream protected habitats.</li> </ul>
Description of Pathway	ere it occurs outside	<ul> <li>Soils;</li> <li>Surface water runoff;</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> </ul>	<ul> <li>Direct water contamination;</li> <li>Soils;</li> <li>Surface water runoff;</li> <li>River water bodies;</li> <li>Habitat removal/disturbanc e;</li> <li>Movement of soils and machinery;</li> <li>Direct contact.</li> </ul>	<ul> <li>Soils;</li> <li>Surface water runoff;</li> <li>Habitat disturbance;</li> <li>Movement of soils and machinery;</li> <li>Direct contact.</li> </ul>
Source of Potential Effect	nnection Route (whe	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Reinstatement works.</li> </ul>	<ul> <li>Instream works;</li> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Reinstatement works;</li> <li>Water</li> </ul>	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> </ul>
Works Activity	Grid Co	cable trenches	Box Culvert Crossings	HDD water crossings

eening rationale	Accidents with hydrocarbons and cement-based materials at a proposed Grid Connection Route, given the hydrological nnectivity with the SAC, have the potential to give rise to nificant effects to the SAC Qis. Mobile QIs (e.g. otter) have the potential to be affected by the rks of the proposed Grid Connection Route. Direct deaths and bitat disturbance (e.g. holts) could represent significant effects these QIs.			<b>creened In for further assessment (Site Code 002170) as the tential for significant effects cannot be excluded.</b> While the number (17) and extensive distribution of the nodes cans the project is of a moderate-medium scale, the nodes emselves are of a small size, being limited to tight corners and nds along both routes. The distances of nodes from European sites range from 10m to km; with a number of nodes are in close proximity;
ean sites Scr	to have - see			ickwater River (Waterford) SAC (Site Code 0) rk Harbour SPA (Site Code rk Harbour SPA (Site Code met 0) met 0) code 001058) be be cokwater Callows SPA (Site 004094)
otential Effects to Europ eceptors	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct kill of mobile QIs or SCIs;</li> </ul>	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct kill of mobile QIs or SCIs;</li> <li>Disturbance of mobile QIs or SCIs;</li> <li>Indirect effects to downstream protected nabitats.</li> </ul>		<ul> <li>Effects on river water auguality (silting and/or (cork contamination);</li> <li>Spread of IAPS;</li> <li>Spread of IAPS;</li> <li>Direct kill of mobile QIs 00403</li> <li>Disturbance of mobile QIs 00403</li> <li>Ols or SCIs;</li> <li>Disturbance of mobile QIs 00403</li> <li>A Bit downstream protected code nabitats.</li> </ul>
Description of P Pathway R	<ul> <li>Soils;</li> <li>Surface water runoff;</li> <li>River water</li> <li>River water</li> <li>River water</li> <li>River water</li> <li>Soils and</li> <li>Direct contact;</li> </ul>	<ul> <li>Direct water</li> <li>Contamination;</li> <li>Soils;</li> <li>Surface water</li> <li>Surface water</li> <li>River water</li> <li>River water</li> <li>Habitat</li> <li>Habitat</li> <li>Movement of</li> <li>Soils and</li> <li>machinery;</li> <li>Direct contact.</li> </ul>		<ul> <li>Soils;</li> <li>Surface water</li> <li>Surface water</li> <li>Habitat</li> <li>Habitat</li> <li>Powement of</li> <li>Movement of</li> <li>Soils and</li> <li>Machinery;</li> <li>Direct contact.</li> </ul>
Source of Potential Effect	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Reinstatement works</li> </ul>	<ul> <li>Instream works;</li> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Reinstatement works;</li> <li>Water abstraction.</li> </ul>	Delivery Route	<ul> <li>Movement of soils and machinery;</li> <li>Reinstatement works.</li> </ul>
Works Activity	Concrete Beam in road deck sgnizzon on existings	sgniszon crossings	Turbine	.g.ə) əənəncə (ə.g. scrub)

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Works Activity	Source of Potential Effect	Description of Pathway	Potential Effects to Receptors	European sites	Screening rationale
voitstəgəV Şnimmirt	<ul> <li>Trimming/cuttin</li> </ul>	<ul> <li>Habitat disturbance;</li> <li>Movement of soils and machinery;</li> <li>Direct contact.</li> </ul>	<ul> <li>Spread of IAPS;</li> <li>Direct kill of mobile QIs or SCIs;</li> <li>Disturbance of mobile QIs or SCIs;</li> </ul>	5. Lower River Suir SAC (Site Code 002137)	<ul> <li>Japanese Knotweed occurs approximately 7m from works area at Node 1.4. The fact that Japanese knotweed is restricted under Regulation 49 of the EC (Birds &amp; Natural Habitats) Regulations (2011) makes it an offence to cause it's spread, and as such any works are subject to compliance with this restriction. Therefore,</li> </ul>
gnilləf əərT	<ul> <li>Movement of soils and machinery;</li> <li>Habitat removal;</li> </ul>	<ul> <li>Soils;</li> <li>Surface water runoff;</li> <li>Habitat disturbance;</li> <li>Movement of soils and machinery;</li> <li>Direct contact.</li> </ul>	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Spread of IAPS;</li> <li>Direct kill of mobile Qls or SCIs;</li> <li>Disturbance of mobile Qls or SCIs;</li> <li>Indirect effects to downstream protected habitats.</li> </ul>		write adverse errects are unikely, a burrer zone is required (mitigation). There is a possibility that works could result in the spread of Japanese knotweed to a European site, in particular River Blackwater SAC. • The presence of other (low-medium impact) invasive alien plant species at a number of nodes (cherry laurel at Nodes 1.4 & 1.7; snowberry & montbretia at Node 1.7; winter heliotrope at Nodes 2.0 & 2.4; Himalayan honeysuckle at Node 2.2 and old man's beard at Nodes 1.3, 1.4 & 2.3) means that works at these nodes could potentially result in the localised spread of these

<ul> <li>species. However, the spread of these species is extremely unlikely and impacts would likely be imperceptible.</li> <li>While a limited amount of sediment arising from ground disturbance, wall demolition and washout of fines from aggregate may be transported towards the SPA, these would not have the potential to result in significant effects, due to negligible quantity potentially released.</li> </ul>	<ul> <li>In addition, it should be noted that most case studies (e.g., Mahler et. al, 2015; Scoggins et. al, 2007) demonstrating toxic effects of coal-tar on aquatic life relate to the use of concentrated coal-tar based pavement sealants which contain high levels of PAHs; asphalt "concrete" which would be used at Node 2.1 contains c. 5 % petroleum based binder material, with the remainder being made up of aggregates, in comparison to pavement sealants which are concentrated. As such, no significant effects in terms of sediment input or toxicity are envisaged.</li> </ul>	<ul> <li>The use of vehicles and machinery during upgrade works and turbine deliveries shall result in some minimal emissions to air via exhausts, etc. There will be no significant emissions from the proposed works to any European site.</li> <li>Screened In for further assessment (Site Code 004030) as the potential for significant effects cannot be excluded.</li> </ul>	<ul> <li>While the number (17) and extensive distribution of the nodes means the project is of a moderate-medium scale, the nodes themselves are of a small size, being limited to tight corners and bends along both routes.</li> <li>The distances of nodes from European sites range from 10m to 14 km; with a number of nodes are in close proximity.</li> </ul>	<ul> <li>Japanese Knotweed occurs approximately 7m from works area at Node 1.4. The fact that Japanese knotweed is restricted under Regulation 49 of the EC (Birds &amp; Natural Habitats) Regulations (2011), makes it an offence to cause its spread, and as such, any works are subject to compliance with this restriction. Therefore, while adverse effects are unlikely, a buffer zone is required</li> </ul>			
	<ul> <li>Effects on river water</li> </ul>	quality (silting and/or contamination); • Spread of IAPS;					
<ul> <li>Soils;</li> <li>Surface water runoff;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> </ul>							
	<ul> <li>Movement of soils and machinery;</li> <li>Excavation worke:</li> </ul>	<ul> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Reinstatement works.</li> </ul>					
	eet furniture, structures)	rts fo levomər .8.9) s¥	iow beoß				

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Works Activity	Source Effect	of Potential	Description	of Po Re	otential sceptors	Effects to	European sites	Screening rationale
								<ul> <li>(mitigation). There is a possibility that works could result in the spread of Japanese knotweed to a European site, in particular River Blackwater SAC.</li> <li>• The presence of other (low-medium impact) invasive alien plant species at a number of nodes (cherry laurel at Nodes 1.4 &amp; 1.7; snowberry &amp; montbretia at Node 1.7; winter heliotrope at Nodes 2.0 and old man's beard at Nodes 1.3, 1.4 &amp; 2.3) means that works at these nodes could potentially result in the localised spread of these species. However, the spread of these species is extremely unlikely and impacts would likely be imperceptible.</li> <li>• While a limited amount of sediment arising from ground disturbance, wall demolition and washout of fines from aggregate may be transported towards the SPA, these would not have the potential to result in significant effects, due to negligible quantity potentially released.</li> <li>• In addition, it should be noted that most case studies (e.g. Mahler et. al, 2015; Scoggins et. al, 2007) demonstrating toxic effects of coal-tar on aquatic life relate to the use of concentrated coal-tar based panets which would be used at Node 2.1 contain high levels of PAHS; asphalt "concrete" which would be used at Node 2.1 contains c. 5 % petroleum based binder material, with the remainder being made up of aggregates, in comparison to pavement sealants which are concentrated. As such, no significant effects in terms of sediment input or toxicity are envisaged.</li> </ul>
Met Ma	ists			_				

Works	Source of Potential	Description of	Potential Effects to		Corronations and income in the second s
Activity	Effect	Pathway	Receptors		ou eening rauonale
	<ul> <li>Movement of</li> </ul>				1. Screened In for further assessment (Site Code 002170) as the
	soils and	<ul> <li>Soils;</li> </ul>			potential for significant effects cannot be excluded.
uo	machinery;	<ul> <li>Surface water</li> </ul>	<ul> <li>Effects on river water</li> </ul>		Although the second CCTD Decision is not located within the
isua	<ul> <li>Excavation</li> </ul>	runoff;	quality (silting and/or		<ul> <li>Autought the proposed cost Project is not located within the boundary of the SAC its construction above could activitie the</li> </ul>
ətx	works;	<ul> <li>River water</li> </ul>	contamination);		oduitanty of the SAC, its construction priase could potentially affact hydrologically commarted activitie Ale of this European site
ə sx	Use of	bodies;	<ul> <li>Spread of IAPS;</li> </ul>		difect inyurologically connected aquatic Qis of this European site (coo Tobho 2 0) monorating cignificant officets to the concise their
łse	hydrocarbons &	<ul> <li>Movement of</li> </ul>	Direct kill of mobile Qls		(אבר <b>ומטוב אבי)</b> , צפוופו מנווע אוצוווונמוון בוופרנא נט נווב אפטרפא, נוופון האלודידי את להמל במוודמה
nt e	cement-based	soils and	or SCIs;		- The construction share of the account CCFD could also
səc	compounds;	machinery;	<ul> <li>Disturbance of mobile</li> </ul>		
эλ	<ul> <li>Tree felling;</li> </ul>	<ul> <li>Direct contact;</li> </ul>	Qls or SCIs.	1.Blackwater River	spreau IAPS to European sites. Inovernent of sons and machinery
	<ul> <li>Reinstatement</li> </ul>	<ul> <li>Habitat removal.</li> </ul>		(Cork/Waterford) SAC (Site Code	alla surrace water runon can potentiany transport vegetative matarial (a a sooras fragmants saads) to the SAC samsing IADS
	works.			(0/1700	to become established and reproduce there. This will notentially
	<ul> <li>Movement of</li> </ul>				to become established and reproduce there. This will potentially cause a degradation of the receiving babitate and indirectly.
	soils and	<ul> <li>Soils;</li> </ul>		Z.Blackwater Callows SPA (Site	cause a degradation of the receiving habitats and, man ectry, cause significant effects to the SCIs of the SDA: and
	machinery;	<ul> <li>Surface water</li> </ul>	<ul> <li>Effects on river water</li> </ul>	Code 004094)	<ul> <li>Accidents with hydrocarbox and cament-based materials at</li> </ul>
	<ul> <li>Excavation</li> </ul>	runoff;	quality (silting and/or		the Met Masts locations given the hydrological connectivity with
pe	works;	<ul> <li>River water</li> </ul>	contamination);		the SAC have the notential to give rise to significant effects to
ed a	Use of	bodies;	<ul> <li>Spread of IAPS;</li> </ul>		the SAC Dis:
oue	hydrocarbons &	<ul> <li>Movement of</li> </ul>	Direct kill of mobile Qls		<ul> <li>Mobile OIs (e g otter) have the notential to be affected by the</li> </ul>
Cr	cement-based	soils and	or SCIs;		works Direct deaths and habitat disturbance (e.g. holts) could
	compounds;	machinery;	Disturbance of mobile		
	<ul> <li>Tree felling;</li> </ul>	<ul> <li>Direct contact;</li> </ul>	Qls or SCls.		
	<ul> <li>Reinstatement</li> </ul>	<ul> <li>Habitat removal.</li> </ul>			
	works.				

Works	Source of Potential	Description of	<sup>f</sup> Potential	Effects to	Euronean citae	Creaning rationale
Activity	Effect	Pathway	Receptors			
bnstsbrsd stssM	<ul> <li>Movement of soils and machinery;</li> <li>Excavation works;</li> <li>Use of hydrocarbons &amp; cement-based compounds;</li> <li>Tree felling;</li> <li>Reinstatement works.</li> </ul>	<ul> <li>Soils;</li> <li>Surface water runoff;</li> <li>River water bodies;</li> <li>Movement of soils and machinery;</li> <li>Direct contact;</li> <li>Habitat removal.</li> </ul>	<ul> <li>Effects o quality (silt contamina:</li> <li>Spread o</li> <li>Direct kil or SCIs;</li> <li>Disturbai</li> <li>QIs or SCIs.</li> </ul>	n river water ing and/or tion); f IAPS; l of mobile QIs nce of mobile		represent significant effects to the European site. <b>2. Screened Out from further assessment (Site Code 004094) as no potential for significant effects.</b> • The distance between the SPA and the met masts, in addition to the particular sensitivities of the SCI species for which the SPA is designated mean no potential for significant effects are predicted. The Blackwater Callows SPA is of importance for its populations of wintering waterfowl. The proposed CGEP windfarm does not hold habitats with significant potential to harbour these SCIs species. No records of Whooper Swan, Wigeon, Teal or Black-tailed Godwit (SCI species) flightpaths were recorded through the development area in the 4 years of baseline ornithological studies which were conducted based on best practise SNH (2014, 2017) survey guidance. No evidence of migration was noted during these surveys. Known migratory flight paths of these SCIs are located significantly distanced from the windfarm, making the risk of collision with the turbines unlikely. Regarding the turbine operation noise, the distance to the river Blackwater valley where these species will concentrate (approximately 11km), is considered sufficient to preclude effects
						to the SUIS.

# 3.9.2 Operational Phase: Source-Pathway-Receptor Model of Potential Effects from the **Proposed CGEP Development**

Potential likely significant effects to European sites for the Operation phase of the proposed CGEP Project are only predicted in relation to the proposed CGEP windfarm. No significant activity is anticipated for the other elements of the proposed CGEP Development (i.e. Grid Connection Route, TDR). Table 3.12 describes the source-pathway-receptor model for the operation phase of the proposed CGEP windfarm and the respective screening rationale for the Appropriate Assessment.

- :	Screening rationale	<ul> <li>Screened <u>Out</u> from further assessment. No potential for significant effects to any European site.</li> <li>It is likely that the overall water runoff from the proposed CGEP windfarm area will increase as a result of the placement of built structures. However, the increased water runoff from the windfarm is not likely to significantly interfere with the hydrological regime and sedimentation processes of the whole area and affect the river systems located downstream.</li> <li>The Blackwater Callows SPA is of importance for its populations of wintering waterfow. The proposed CGEP windfarm does not hold habitats with significant potential to harbour these SCIs species. No records of Whooper Swan, Wigeon, Teal or Black-tailed Godwit (SCI species) flightpaths were recorded through the development area in the 4 years of baseline ornithological studies which were conducted based on best practise SNH (2014, 2017) survey guidance. No evidence of migration was noted during these surveys. Known migratory flight paths of these SCIs are located significantly distanced from the windfarm, making the risk of collision with the turbines unlikely. Regarding the turbine operation noise, the distance to the river Blackwater valley where these species will concentrate (approximately 11km), is considered sufficient to preclude effects to the SCIs.</li> <li>Structures. However. No potential for the increase as a result of the placement of built structures. However, the increase as a result of the placement of built structures. However, the increase are species will increase as a result of the placement of structures.</li> </ul>
	European sites	Blackwater Callows SPA (Site Code 004094) 004094) Blackwater River (Cork/Waterford) SAC (Site Code 002170)
Potential Effects to	Receptors	<ul> <li>Effects on river water quality (silting and/or contamination);</li> <li>Noise disturbance;</li> <li>Visual intrusion.</li> <li>Visual intrusion.</li> <li>Ollision: with turbines, blades and guy ropes, leading to guy ropes, leading to</li> <li>death or injury;</li> <li>Displacement from habitats;</li> <li>Habitat loss or change: fragmentation of landscape, or site- specific damage;</li> </ul>
Description of	Pathway	<ul> <li>Surface water runoff; and</li> <li>Noise.</li> </ul>
Source of Potential	Effect	<ul> <li>Rotating Turbine Blades;</li> <li>Physical blocking structure;</li> <li>Movement of maintenance vehicles and personnel; and</li> <li>Turbine hardstandings.</li> </ul>
CGEP	Element	mıətbniW

# Table 3.12: Source-Pathway-Receptor model for the Operation Phase of the proposed CGEP Project

	windfarm is unlikely to significantly interfere with the hydrological regime and sedimentation processes of the whole area and affect the river systems located downstream.			
	windfarm is unlike hydrological regime a area and affect the ri			
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## 3.10 **Stage One Screening Conclusion**

The Screening Evaluation provided herein has examined potential effects via source pathway linkages on the designated SACs and SPAs within 15km of the proposed development.

There is a total of five European sites within the considered Zone of Influence of the proposed CGEP Project, three 3no. SAC's and two 2no. SPAs. Following screening, it can reasonably be concluded that there is no likelihood of significant effects to three European sites within the Zone of Influence as a result of the proposed development, either alone or in-combination. The European sites screened out from further appraisal are:

- Great Island Channel SAC (Site Code 001058)
- Lower River Suir SAC (Site Code 002137) ٠
- Cork Harbour SPA (Site Code 004030) ٠

The works and activities within the construction and/or operation phase of the CGEP Project are potentially associated with likely significant effects to the two European sites through hydrological pathways. These European sites are:

- Blackwater River (Cork/Waterford) SAC (Site Code 002170)
- Blackwater Callows SPA (Site Code 004094) •

A risk of spread of Japanese Knotweed is identified in relation to works and activities involved with the TDR nodes. In this regard mitigation measures are required during the construction and operation phases of the proposed CGEP Project, specifically with regards to the proposed CGEP development, Grid Connection Route (for protection of water quality in the Blackwater River (Cork/Waterford) SAC and Blackwater Callows SPA). The recommendation of the screening process is, then, to proceed to Stage 2 - Appropriate Assessment (Section 4) for the European sites Blackwater River (Cork/Waterford) SAC (Site Code 002170) and Blackwater Callows SPA (Site Code 004094).

# 4. Stage 2 Appropriate Assessment Report

This Stage 2 Appropriate Assessment Report (Natura Impact Statement) examines the likely significant effects of the proposed development on the Blackwater River (Cork/Waterford) SAC (Site Code 002170) and the Blackwater Callows SPA (Site Code 004094) as identified within the Stage 1 Screening (see Section 3). This report will specifically appraise the significance of any effects on the features of Qualifying Interest of these European Sites and their associated conservation objectives. A description of the development' components, the relevant European sites within the study area and the zone of influence of the proposal is presented in Section 3.7.

# 4.1 **Existing Environment**

As detailed in Section 2, a number of ecological surveys have been conducted and the findings have informed the description of the receiving environment. A detailed description of ecological features of the area, including information on habitats, avifauna, aquatic ecology, bats, invasive alien plant species and other protected mammals has also been presented.

As stated in Stage 1: Screening for Appropriate Assessment (Section 3), possible significant effects may arise from the construction and/or operation of the proposed CGEP Project through hydrological pathways. The following section describes the existing hydrology and water quality of the local environment that could be affected by the activities associated with the proposed CGEP Development, TDR and Grid Connection Route.

## 4.1.1 Hydrology

The hydrological context of the proposed CGEP Development area was studied (Chapter 10) as part of the Environmental Impact Assessment Report (EIAR). Beyond describing the area in terms of hydrological catchments, river water bodies, Water Framework Directive (WFD) water quality status of the river water bodies, the study also describes the site's existing and proposed drainage configuration, mitigation measures and residual impacts. Relevant findings in terms of potential effects to European sites are described below.

# 4.1.1.1 Proposed CGEP Development

Coom Energy Green Park is located within Hydrometric Area No. HA 18, Blackwater (Munster), of the Irish River Network System. It is situated in the South Western River Basin District (SWRBD). The average annual rainfall in period 1981-2010 in the area of development is 1,437 mm.

M5-60<sup>7</sup> at development location is 17.3 mm according to the Met Éireann rainfall data. This is the predicted rainfall depth in a sixty minute storm that will occur with a frequency of once every five years.

The site is situated within four sub-catchments as defined by the WFD. These waterbodies are known as:

- Bride (Waterford)\_SC\_010 (18\_11) ٠
- Blackwater (Munster)\_SC\_110 (18\_14) •
- Bride (Waterford)\_SC\_020 (18\_25) •
- Blackwater (Munster) SC 080 (18 23)

Coom Green Energy Park is situated within eight sub-basins as defined by the WFD. These waterbodies are known as:

Clyda\_030 - IE\_SW\_18C020300 •

<sup>&</sup>lt;sup>7</sup> This is for a 5-year return period, with a 60-minute duration rainfall.

- Coom\_010 IE\_SW\_18C030400
- Bride (Blackwater) 010 IE SW 18B050050 •
- Bride (Blackwater) 020 IE SW 18B050320 •
- Ross (Killavullen)\_010 IE\_SW\_18R020500 ٠
- Bride (Munster)\_180 IE\_SW\_18B022100 •
- Blackwater (Munster)\_190 IE\_SW\_18B022300 •
- Bride (Blackwater)\_030 IE\_SW\_18B050400

The hydrological context relative to the development including turbine locations and grid connection is outlined in Figure 4.1 below. Turbines T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13 and T14 are within Coom\_010 -IE\_SW\_18C030400 waterbody catchment. Turbines T15, T16, T17, T18, T19, T20, T21 and T22 are within Bride (Blackwater) 010 – IE SW 18B050050 sub-basin and turbine T23 is within Bride (Blackwater) 020 – IE\_SW\_18B050320 sub-basin.

The cable route between the proposed on-site 110 kV substation at Knockacullata and proposed on-site 110 kV substation at Lackendarragh North is within four waterbodies (river sub-basins) catchments as defined by the WFD. These are:

- Bride (Blackwater)\_010 IE\_SW\_18B050050, •
- Ross (Killavullen) 010 IE SW 18R020500, ٠
- Bride (Blackwater)\_020 IE\_SW\_18B050320, •
- Bride (Munster)\_180 IE\_SW\_18B022100 sub-basin. •

The cable route between proposed 110 kV substation at Lackendarragh North and existing 110 kV substation at Barrymore is within four waterbodies (river sub-basins) catchments as defined by the WFD. These are:

- Bride (Blackwater)\_020 IE\_SW\_18B050320,
- Bride (Munster)\_180 IE\_SW\_18B022100, •
- Blackwater (Munster)\_190 - IE\_SW\_18B022300,
- Bride (Blackwater)\_030 IE\_SW\_18B050400 sub-basin.

Surface runoff from turbines T2, T3, T4 and T5 drains to the Coom River. The Coom River rises to an elevation of 270 m OD approximately 90 m west of the turbine T4. The river flows in an easterly direction for approximately 6.4 km, where it joins the Bride River.

Surface runoff from turbines T6, T7, T8, T9, T10, T11, T12, T13 and T14 drains to the Toor River. The Toor River rises to an elevation of 245 m OD approximately 110 m east of the turbine T11. From there it flows to the south for approximately 0.85 km before Mullenaboree stream joins, it then flows south-easterly for approximately 3.4 km, where it joins the Coom River.

The runoff from turbines T15 and T16 drain to the Lyravarrig stream which is a tributary of the Bride River. The Lyravarrig stream rises to an elevation of 190 m OD approximately 0.70 km south east of the turbine T16. The Lyravarrig stream flows in an easterly direction for 1.3 km, before joining Bride River.

The surface runoff from turbines T17, T18, T19, T20, T21 and T22 drain to the Bride River which is a tributary of the Blackwater River. The Bride River rises to an elevation of 240 m OD approximately 2.60 km west of the turbine T21. The river flows in a south-easterly direction for 5.1 km before Coom river joins it. Bride River continues to flow in easterly direction for approximately 41.7 km where it joins Blackwater River.

The runoff from turbine T23 drains to the Bunnaglanna River which is also a tributary of the Bride River. The river rises to an elevation of 260 m OD approximately 0.4 km south east of the turbine T23. The river flows in a southerly direction for 4.1 km before joining the Bride River.

The site entrance for TDR-West is in the sub-basin Clyda 030. The existing access road connecting the site entrance and CGEP will be widened. Approximately 465m of a new road will be constructed in the sub-basin Clyda\_030. A temporary compound and a met-masts are planned in this sub-basin.

### Proposed Drainage including Mitigation 4.1.1.1.1

An appropriate drainage design will be the primary mitigation measure for the proposed CGEP development. It will incorporate silt protection control measures and reduce the rate of surface water runoff from the site. The proposed drainage for the proposed CGEP development is set out below. The mitigation measures refer to the drainage design and also include other best practice measures to mitigate any potential significant effects from the development.

The proposed layout of the drainage for the development is shown in the Surface Water Management Plan (SWMP) (Appendix A). Where possible, existing access roads and tracks have been utilised in the layout design for the proposed CGEP development to minimise the disturbance to soils.

The following types of surfaces are considered on this site in addressing the drainage for the proposed CGEP development:

- 1) existing hardcore tracks and surfaced access roads which might be widened.
- 2) proposed new site access tracks and hard standings associated with the construction of turbine.
- 3) proposed on-site substations.
- 4) temporary site compounds.
- 5) borrow pits.

### Interceptor Drains 4.1.1.1.1.1

It is not expected that overland flows will be obstructed to any great extent by the drainage layout. However, where required, interceptor drains will collect overland flows on the upslope side of the access tracks and hardstanding areas. The overland flow will then discharge diffusely on the downslope side over vegetated areas within the site boundary.

Existing forest track drainage is extensive throughout the site and shall be maintained wherever possible and upgraded as required to meet the requirements of the proposed CGEP drainage design. SuDS design approach shall ensure that existing drainage patterns shall be maintained throughout the site.

### Existing Hardcore Tracks and Surfaced Access Roads 4.1.1.1.1.2

The drainage system for the existing tracks and roads will largely be retained. During the site walkovers to inform the Hydrology Chapter of the EIAR it was observed that most of the existing tracks were approximately 4 m wide. It is proposed to widen approximately 7.0 km of existing roads by approximately 1 m, with some additional widening at bends. All track widening will be undertaken using clean uncrushable stone with a minimum of fines. This will involve slight relocation of existing roadside swales to allow widening. Still traps will be placed in the new roadside swales.

### New Site Access Tracks and Hard Surfaces 4.1.1.1.1.3

It is proposed to construct approximately 15.1 km of completely new access track. Proposed new tracks and turbine hard standing areas will be drained as per the existing drainage system via roadside swales with stilling ponds at the end of the swale. These grassed swales will serve to detain flow and reduce the velocities of surface water flows. The swales will be 0.30 m deep with a bottom width of 0.9 m and side slope of 1 in 3. The swales will be constructed in accordance with CIRIA C698 Site Handbook for the Construction of SuDS.

Where roadside drains are laid at slopes greater than 2%, check dams will be provided. This will reduce effective slope and runoff velocities and any consequent potential for erosion.

Site drainage, including silt traps and stilling ponds, will be put in place in parallel with or ahead of construction, such that excavation for new infrastructure will have functional drainage system in place.

The stilling ponds will remain in place during construction phase. The stilling ponds will drain diffusely overland, over existing vegetated areas, within the site boundary. The stilling ponds will be filled in and the swales that were connected to them will be re-connected to the outfall once construction is completed.

The number of stilling ponds, dimensions and locations is included in the SWMP (Appendix A).

Silt fencing will be provided at strategic locations to further protect watercourses during the construction phase.



Figure 4-1: Hydrological Features Overview.

## 4.1.1.1.1.4 Proposed Watercourse Crossings

The proposed development layout will have 9 stream crossings within the site boundary. These crossings are listed in Table 4-1 below.

Existing crossing WC028 will be replaced with box culvert of minimum 1200 mm width and 400 mm height, with additional height required for embedment and freeboard. There will be one new proposed watercourse crossing WC024 over the unnamed tributary of the Coom River and one new proposed crossing WC025 over the Coom River required as a result of the development. There will be one new proposed watercourse crossing WC027 over the Toor River required as a result of the development.

The size of the stream crossings is estimated as part of the flood risk assessment. The IFI were consulted at the planning stage and were satisfied with the proposed crossing structure.

Minor drains such as manmade agricultural and forest drains will be crossed using 450mm diameter pipes. Where cross drains are to be provided to convey the drainage across the track, the recommended sizes of these cross drains are 225 mm diameter pipes.

Silt Protection Controls (SPCs) are proposed at the location of the drain crossings. SPCs will consist of a minimum of silt traps containing filter stone and filter material staked across the width of the swales and upstream of the outfall to any watercourse.

Some drain clearing will be required at existing crossings, where they have become blocked, to maintain the continuity of flows. These existing pipes may need replacing if they are found to be in a collapsed state.

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# Table 4.1: Existing Internal Site Stream Crossings.

Proposed Method of Crossing	New Crossing. Box culvert 900mm x 900mm. Cable over the culvert	New Crossing. Box culvert 900mm x 900mm. Cable over the culvert	New Crossing. Box culvert 2000mmx1100mm + freeboard + embedment, cable over the culvert	Replace existing pipe with a box culvert of min 1200mmx400mm + freeboard + embedment, cable over the culvert	Standard trench crossing above or below existing culvert.	Standard trench crossing under existing service. Pipe to be extended to facilitate widening of existing access road or replaced with suitable pipe of same or greater diameter
Feature/Activity	Grid cable crossing and proposed new access track crossing over the unknown tributary of the Coom River	Grid cable crossing and proposed new access track crossing over the tributary of the Coom River	Grid cable crossing and proposed new access track crossing over the Toor River	Grid cable and proposed new access track crossing over the Toor River	Grid cable and existing forestry track crossing over the forestry ditch, tributary of the Inchinanagh stream	Grid cable and existing forestry track crossing over the forestry ditch, in the proximity of the turbine T20
Existing/ Proposed	Prop	Prop	Prop	Ext	Ext	Ext
ITM_Y	589720.58	589754.30	591667.40	591981.30	592029.20	593820.90
ITM_X	563175.65	563250.25	564133.20	564171.10	568492.90	568375.20
Feature ID	WC024	WC025	WC027	WC028	WC030	WC031

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Feature ID	ITM_X	ITM_Y	Existing/ Proposed	Feature/Activity	Proposed Method of Crossing
WC035	569019.61	593940.22	Ext	Grid cable and existing forestry track crossing over the forestry ditch, in the proximity of turbine T20	Standard trench crossing under existing service. Pipe to be extended to facilitate widening of existing access road or replaced with suitable pipe of same or greater diameter
WC049	568425.66	593132.46	Prop	Grid cable and proposed new access track crossing over drain east of turbine T19	New Crossing. Box culvert 900mm x 900mm. Cable over the culvert
WC050	570093.25	594420.14	Prop	Grid cable and proposed new access track crossing over drain north of turbine T23	New Crossing. Box culvert 900mm x 900mm. Cable over the culvert

### 4.1.1.1.1.5 Drainage of On-site Substation

The proposed locations of the two substations are shown on Figure 3-3. It is proposed to drain the substation using shallow swales, with a stilling pond at the end of the swale run. The stilling pond will remain in place following the construction period.

At the upslope side of the substation, interceptor drains will be installed.

The runoff from roofs will be collected to water harvesting tanks. Waste water will drain to a tank which will be regularly emptied and maintained.

A suitable permanent petrol and oil interceptor will be installed to deal with all substation surface water drainage. Details of drainage measures are provided in SWMP (Appendix A).

### 4.1.1.1.1.6 Drainage of Temporary Site Compound

The site layout consists of 3 temporary site compounds as shown on Figure 3-2. The compounds are set back from the drains. Drains around the hardstanding areas of the site compound will be in the form of shallow grassed swales to minimise the disturbance to sub-soils. Surface water runoff from the compound will be directed through a Class 1 Full Retention Oil Interceptor before discharge to the dirty water drainage system for the site. This dirty water drain flows to a stilling pond before final discharge over land.

During the construction phase, it will be necessary to provide bottled water for potable supply for the construction personnel. A water tanker will supply water used for other purposes. Portaloo and/or containerised toilets and welfare units with storage tanks will be used to provide toilet facilities for site personnel during construction. All portaloo units located on site during the construction phase will be operated and maintained in accordance with the manufacturer's instructions and will be serviced under contract with the supplier. All such units will be removed off-site following completion of the construction phase

### 4.1.1.1.1.7 Drainage of Borrow Pits

The proposed borrow pits are located as shown on Figure 3-2. The borrow pits will be set back a minimum 50 m from any streams. At the upslope of the borrow pit interceptor drains will be installed. It is proposed to drain the borrow pits to stilling ponds.

The site drainage system will be put in place prior to excavation. Therefore, the discharge routes from any temporary stockpiling will be via the site drainage system as detailed in the planning drawings. There will be no permanent stockpiling of material on the site.

# 4.1.1.2 Grid Connection Route

The grid connection route from the proposed 110kV substation at Knockacullata to the proposed 110kV substation at Lackendarragh North crosses watercourses at five locations, as shown on Figure 4-1. The grid route from the proposed 110 kV substation at Lackendarragh North to the existing Barrymore 110 kV substation crosses watercourses at eight locations (Figure 4-1).

The proposed grid route will have 13 stream crossings. These crossings are listed in Table 4-2 below.

Feature ID	ІТМ_Х	ITM_Y	Proposed grid cable method crossing
WC006	565856.78	594166.05	Horizontal directional drilling (HDD) under structure within public road corridor. Alternative: Concrete bridge beam in road deck with ducts in flat profile. Reinstate bridge surface to same level as existing.
WC007	566767.03	593590.72	HDD under structure within public road corridor.
WC008	566855.33	593463.30	Trench in road above structure and reinstate road surface to existing levels.
WC009	566953.13	593308.63	Standard trench crossing under existing service
WC013	571579.31	593438.66	Standard trench crossing under existing service
WC014	571953.73	593251.56	Standard trench crossing under existing service
WC015	574302.28	593592.15	Standard trench crossing under existing service
WC016	574563.28	593659.12	Standard trench crossing under existing service
WC017	578448.83	595314.38	Standard trench crossing under existing service
WC018	582024.33	594307.32	Replace existing stone culvert with a reinforced concrete box culvert and bring ducts underneath.
WC019	582076.81	594271.41	HDD under structure within public road corridor. Alternative: Concrete bridge beam in road deck with ducts in flat profile. Reinstate bridge surface to approximately 100mm above existing.
WC020	574506.00	593616.00	Standard trench crossing under existing service.
WC029	567015.50	593633.90	Standard trench crossing above or below existing culvert.

# Table 4.2: Grid Route Crossing Method.

The proposed grid route is situated within six sub-basins as defined by the WFD. These sub-basins are known as:

- Bridge (Blackwater)\_010 IE\_SW\_18B050050 •
- Ross (Killavullen)\_010 IE\_SW\_18R020500
- Bridge (Blackwater)\_020 IE\_SW\_18B050320 •
- Blackwater (Munster)\_180 IE\_SW\_18B022100 •
- Blackwater (Munster)\_190 IE\_SW\_18B022300 •
- Bridge (Blackwater)\_030 IE\_SW\_18B050400 •

Crossings for the cables in the internal access roads serving the proposed development, have been assessed as part of the proposed drainage for proposed CGEP development.

The grid connection trench will be approximately 850 mm wide and 1500 mm deep. Should any unidentified culvert be encountered, the grid cable will be installed above or below the culvert depending on its depth. The cable will be installed so as not to impact the culvert.
### 4.2 **Conservation Objectives**

A Stage Two AA is a focused and detailed examination, analysis and evaluation carried out by the competent authority (in this case, the Board) of the implications of the plan or project, alone or in-combination with other plans and projects, on the integrity of a European site in view of that site's conservation objectives. The European Commission guidance on Natura 2000 (European Commission, 2000) states that:

"The integrity of a site involves its ecological functions. The decision as to whether it is adversely affected should focus on, and be limited to the site's conservation objectives".

The maintenance of favourable condition of qualifying interests at the site level will contribute to the overall maintenance of favourable conservation status of those habitats and species at national level:

- Favourable conservation status of a habitat can be described as being achieved when: "its natural range, and the area it coves within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable".
- Favourable conservation status of a species can be described as being achieved when: "population ٠ data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, sufficiently large habitat to maintain its populations on a long term basis".

Where conservation objectives have not yet been set, a set of generic conservation objectives has been produced by NPWS. Generic Conservation Objectives for SACs are as follows:

To maintain Annex I habitats and Annex II species for which the SAC has been selected at favourable conservation condition.

Generic Conservation Objectives for SPAs are as follows:

• To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for the SPA.

### 4.2.1 Blackwater River (Cork/Waterford) SAC [002170]

The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and five ranges of mountains. The European site consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond, the tidal stretches as far as Youghal Harbour and many tributaries, the larger of which include the Licky, Bride, Flesk, Chimneyfield, Finisk, Araglin, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, Owentaraglin and Awnaskirtaun. The portions of the Blackwater and its tributaries that fall within this SAC flow through the counties of Kerry, Cork, Limerick, Tipperary and Waterford. Nearby towns include Rathmore, Millstreet, Kanturk, Banteer, Mallow, Buttevant, Doneraile, Castletownroche, Fermoy, Ballyduff, Rathcormac, Tallow, Lismore, Cappoquin and Youghal.

Overall, the River Blackwater is of considerable conservation significance for the occurrence of good examples of habitats and populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively. The importance of the site is enhanced by the presence of a suite of uncommon plant species.

The Conservation Objectives for Blackwater River (Cork/Waterford) SAC (Appendix C) are to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been designated, namely:

- Freshwater Pearl Mussel Margaritifera margaritifera [1029];
- White-clawed Crayfish Austropotamobius pallipes [1092]; •
- Sea Lamprey Petromyzon marinus [1095];
- Brook Lamprey Lampetra planeri [1096];
- River Lamprey Lampetra fluviatilis [1099];
- Twaite Shad Alosa fallax [1103]; •
- Atlantic Salmon Salmo salar (only in fresh water) [1106]; ٠
- Estuaries [1130]; .
- Mudflats and sandflats not covered by seawater at low tide [1140];
- Perennial vegetation of stony banks [1220];
- Salicornia and other annuals colonizing mud and sand [1310];
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330];
- Otter Lutra lutra [1355]; •
- Mediterranean salt meadows (Juncetalia maritimi) [1410];
- Killarney Fern Trichomanes speciosum [1421];
- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260];
- Old sessile oak woods with *llex* and *Blechnum* in the British Isles [91A0];
- Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) ٠ [91E0]<sup>\*</sup>; and
- Taxus *baccata* woods of the British Isles[91J0]<sup>\*</sup>.

The Conservation Objectives and site Synopsis documents for the Blackwater River (Cork/Waterford) (Appendix C) contain further information of the Qualifying Interests for this European site.

### 4.2.2 Blackwater Callows [004094]

The Blackwater Callows SPA comprises the stretch of the River Blackwater that runs in a west to east direction between Fermoy and Lismore in Counties Cork and Waterford, a distance of almost 25 km. The site includes the river channel and strips of seasonally-flooded grassland within the flood plain. Sandstone ridges, which run parallel to the river, confine the area of flooding to a relatively narrow corridor. The Blackwater Callows SPA is of importance for its populations of wintering waterfowl, including an internationally important population of Whooper Swan and nationally important populations of Wigeon, Teal and Black-tailed Godwit. Part of the Blackwater Callows SPA is a Wildfowl Sanctuary.

The Generic Conservation Objectives for Blackwater River (Cork/Waterford) SAC (Appendix C) are to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA, namely:

- Whooper Swan Cygnus cygnus [A038] •
- Wigeon Anas Penelope [A050] •
- Teal Anas crecca [A052]
- Black-tailed Godwit Limosa limosa [A156]

Furthermore, a second objective is included to acknowledge the importance of Ireland's wetlands to wintering waterbirds, a second Conservation Objective is included:

"To maintain or restore the favourable conservation condition of the wetland habitat at Blackwater Callows SPA as a resource for the regularly-occurring migratory waterbirds that utilise it."

### 4.3 **Likely Significant Effects**

# 4.3.1 Potential Effects on Surface Water Runoff

# 4.3.1.1 CGEP

The Hydrological assessment identifies tree felling, new access tracks and upgrade of existing tracks, turbine hardstanding areas, the on-site substations and other new hard surfaces as drivers that have the potential to contribute to the increase in runoff water from the proposed CGEP Development site.

The study estimates that surface water runoff from impermeable surfaces of the subject development within the Coom\_010 catchment will increase by 0.108 m<sup>3</sup>/s (or 0.45%). It will increase by 0.078 m<sup>3</sup>/s (or 0.28%) within Bride (Blackwater) 010 and by 0.039 m<sup>3</sup>/s (or 0.04%) within Bride (Blackwater) 020. It will also increase by 0.003 m<sup>3</sup>/s (or 0.01%) within Blackwater (Munster)\_180 and by 0.006 m<sup>3</sup>/s (or 0.01%) in Clyda\_030 sub-basin. Furthermore, the study also estimates that three sub-basins will have no change in the volume of runoff water as there will be no changes in these areas in hard surface cover.

The overall estimated increase in the runoff due to the proposed CGEP development is 0.234 m<sup>3</sup>/s (or 0.06 %). This potential increase due to the proposed CGEP development is not considered to be significant because of the differences in magnitude of the receiving waters. This estimated increase in runoff will reduce over time as vegetation is re-established on the site.

The Hydrology Chapter of the EIAR for the proposed CGEP Project identifies a number of indirect impacts from the construction phase of the proposed CGEP. Activities in the construction phase like tree felling will potentially:

- Increase sediment loading of streams from personnel and traffic activities.
- Standing water in excavations could contain an increased concentration of suspended solids as a result ٠ of the disturbance of the underlying soils.
- Haul roads passing close to watercourses could allow the migration of silt laden runoff into watercourses.
- Silt carried on the wheels of vehicles leaving the site could be carried onto the public road. ٠
- Tree felling could lead to an increase in sediment and nutrients in the surface water runoff, if the brash ٠ is left in place in the riparian buffer zones.
- Small diameter cross-drains could lead to blockages and consequent flooding and concentration of flows.
- Suspended solids could potentially lead to siltation and physical effects on flora and fauna in aquatic habitats.
- Re-fuelling activities could result in fuel spillages.
- There is the potential for fuel spill/leaks from storage tanks which will be stored on site for plant ٠ machinery.
- Sanitary waste could lead to contamination of receiving waters and groundwater. ٠
- The removal of the vegetated material will also lead to an increase in the rate of runoff along the route of the site access roads and hardstanding areas. This increase in the rate of runoff could lead to a minor increase in flooding downstream.
- Inappropriate site management of excavations could lead to loss of suspended solids to surface waters.
- Inappropriate management of the excavated material could lead to loss of suspended solids to surface waters.

- Inappropriate management of the drainage of material storage areas could lead to loss of suspended solids to surface waters.
- Blockage of cross-drains could lead to consequent flooding and concentration of flows.
- Overland flow entering excavations could increase the quantity of surface water to be treated for sediment removal.
- Overland flows entering roadside drains could result in a concentration of flows and subsequent erosion of drains.
- Grid connection and internal cable trenches could act as a conduit for surface water flows.
- The velocity of flows in roadside drainage could cause erosion in steeply sloping roadside drains.
- Runoff from the borrow pit area could be silt laden, with the risk of draining into receiving watercourses, given the exposed nature of the borrow pit areas due to the excavation and haulage of stone from the area.
- ٠ Flows from the new drainage system could be impeded, should blockages occur in the existing roadside drains.
- Open bodies of water and saturated ground present a risk to the safety of site personnel and the public.
- The construction of new infrastructure has the potential to obstruct existing overland flow. ٠
- A blockage in the proposed roadside drains could allow a break out of silt laden runoff to reach adjacent watercourses or streams.
- Wet concrete could lead to contamination of receiving waters and groundwaters.
- Inappropriate management of spoil heaps could result in accidental break outs of silt on site leading to the loss of suspended solids to surface waters.
- Proposed roadside drains on the uphill side of new roads will have to convey all of the contributing runoff from the land above resulting in large drains being required in certain areas and mixing of overland flow with runoff from construction works. This would reduce the efficiency of any proposed stilling ponds.

In respect of fisheries and aquatic fauna, works in proximity to watercourses could result in:

- Direct mortality of fauna, affecting in-situ or ex-situ populations of QI's. •
- Changes to watercourse morphology through sediment entrainment thus affecting distribution and abundance.
- Secondary effects on aquatic habitat quality and therefore prey abundance for QI species through ٠ sediment entrainment or release of deleterious materials.
- Modification of riparian habitat, resulting in effective habitat loss for QI species within or ex-situ to European Sites.

# 4.3.1.2 Grid Connection Route

Potential effects from the construction works and activities of the grid connection route and associated watercourse crossings are:

- Cable trench could act as a conduit for surface runoff.
- Excavated soil could be mobilised in the surface water runoff during an extreme rainfall event. •
- Inadequate storage of fuels and oils could lead to contamination of surface water.
- The excavation of trenches for cable laying and the launch and reception areas for directional drilling, could lead to silt laden surface water run-off.
- Silt carried on the wheels of vehicles could be carried onto the public roads.
- Refuelling activities could result in fuel spillage.

- Suspended solids drained to watercourse could potentially lead to siltation and physical effect on flora.
- Works leading to erosion of the river banks/bed could negatively impact on the fisheries habitat • (availability and quality).

# 4.3.1.3 TDR

Likely significant effects in relation to spread of Japanese Knotweed (high impact invasive plant species) have been identified in relation to the TDR.

### 4.3.2 **Qualifying Interests Sensitive to Likely Significant Effects**

The sensitivity of the QI and/or SCI of the European sites included for further appraisal in Section 3, is reviewed in Table 4.3. As the pathway for likely significant effects identified in Section 3 is hydrological, a QI/SCI was considered to be potentially affected by the proposed CGEP Project if its population is identified as being distributed along downstream reaches from the proposed CGEP Project. However, there are QIs/SCIs that, even though connected to the proposed CGEP Project through hydrological pathways (distribution is downstream of the proposed CGEP Project), they are not considered sensitive to the potential hydrological impacts identified e.g. Estuaries [1130]. In these cases, the QI/SCI are considered not sensitive.

If no information is available with regards to the QI/SCI distribution, the precautionary principle is adopted and the QI/SCI is understood to be present along the whole European site.

The QIs/SCIs identified as potentially affected are highlighted in Table 4.3.

SAC/ SPA	Species	Distribution (Appendix C)	Rationale
	Freshwater Pearl Mussel Margaritifera margaritifera [1029]	Upstream and downstream of the proposed CGEP Project	Species highly sensitive to siltation;
70]	White-clawed Crayfish Austropotamobius pallipes [1092]	Upstream and downstream of the proposed CGEP Project	Species sensitivity to changes in water quality;
AC [0021	Sea Lamprey <i>Petromyzon</i> marinus [1095]	Upstream and downstream of the proposed CGEP Project	Species sensitivity to changes in water quality and habitat degradation (e.g. siltation);
erford) S	Brook Lamprey <i>Lampetra</i> planeri [1096]	Upstream and downstream of the proposed CGEP Project	Species sensitivity to changes in water quality and habitat degradation (e.g. siltation);
Cork/Wat	River Lamprey <i>Lampetra</i> <i>fluviatilis</i> [1099]	Upstream and downstream of the proposed CGEP Project	Species sensitivity to changes in water quality and habitat degradation (e.g. siltation);
River (	Twaite Shad <i>Alosa fallax</i> [1103]	No information available	Species sensitivity to changes in water quality;
ckwater l	Atlantic Salmon <i>Salmo</i> <i>salar</i> (only in fresh water) [1106]	No information available	Species sensitivity to changes in water quality and habitat degradation (e.g. siltation);
Bla	Estuaries [1130]	Located downstream of the proposed CGEP Project	Habitat is susceptible to the presence of certain Invasive Alien Plant Species, which can lead to its degradation
	Mudflats and sandflats not covered by seawater at low tide [1140]	Located downstream of the proposed CGEP Project	Habitat is susceptible to the presence of certain Invasive Alien Plant Species, which can lead to its degradation

Table 4.3: Qualifying Interests and/or Special Conservation Interests of the European sites potentially affected by the proposed CGEP Project through hydrological pathways (highlighted).

SAC/ SPA	Species	Distribution (Appendix C)	Rationale
	Mudflats and sandflats not covered by seawater at low tide [1140]	Located downstream of the proposed CGEP Project	Habitat is susceptible to the presence of certain Invasive Alien Plant Species.
	Salicornia and other annuals colonizing mud and sand [1310]	Located downstream of the proposed CGEP Project	Habitat is susceptible to the presence of certain Invasive Alien Plant Species.
	Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Located downstream of the proposed CGEP Project	Habitat is susceptible to the presence of certain Invasive Alien Plant Species.
	Otter Lutra lutra [1355]	No information available	Species sensitivity to changes in water quality and habitat disturbance;
	Mediterranean salt meadows (Juncetalia maritimi) [1410]	Located downstream of the proposed CGEP Project	Habitat is susceptible to the presence of certain Invasive Alien Plant Species.
	Killarney Fern Trichomanes speciosum [1421]	Identified in 2 locations of the Blackwater River valley, in a relative upstream location to the proposed CGEP Development	No effects can be reasonably anticipated
	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]	No information available	Habitat is susceptible to the presence of certain Invasive Alien Plant Species
	Old sessile oak woods with <i>llex</i> and <i>Blechnum</i> in the British Isles [91A0]	Terrestrial habitat located upstream and downstream of the proposed CGEP Project	No effects can be reasonably anticipated
	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <sup>*</sup>	Upstream and downstream of the proposed CGEP Project	Habitat is susceptible to the presence of Invasive Alien Plant Species
	Taxus <i>baccata</i> woods of the British Isles[91J0] <sup>*</sup>	Terrestrial habitat located downstream of the proposed CGEP Project	No effects can be reasonably anticipated
	Whooper Swan <i>Cygnus</i> <i>cygnus</i> [A038]	No information available	No direct effects are anticipated but the species is sensitive to habitat deterioration and decrease of food sources from decreased water quality
er Callows [004094]	Wigeon <i>Anas Penelope</i> [A050]	No information available	No direct effects are anticipated but the species is sensitive to habitat deterioration and decrease of food sources from decreased water quality
	Teal Anas crecca [A052]	No information available	No direct effects are anticipated but the species is sensitive to habitat deterioration and decrease of food sources from decreased water quality
Blackwat	Black-tailed Godwit <i>Limosa limosa</i> [A156]	No information available	No direct effects are anticipated but the species is sensitive to habitat deterioration and decrease of food sources from decreased water quality
	Wetland and Waterbirds [A999]	All the SPA Boundary	Habitat is susceptible to the presence of certain Invasive Alien Plant Species; Species are sensitive to decrease of food sources from decreased water quality

#### 4.4 Mitigation

# 4.4.1 Construction Phase

The conclusion of Stage 1: Screening for Appropriate Assessment (Section 3.10) upon the source-pathwayreceptor model for the likely significant identifies to European sites from the Construction Phase of the proposed CGEP Project, described in Error! Reference source not found., identifies hydrology as the pathway c onnecting European sites to the source of potential likely significant effects. To that effect, all mitigation measures described herein intend to minimize or, if possible, eliminate any potential for a pathway between the proposed CGEP Project and European sites to be established.

# 4.4.1.1 CGEP and GCR

The proposed drainage design will be the primary mitigation measure for the subject development which will incorporate silt protection control measures and reduce the rate of surface water runoff from the proposed development. The mitigation measures for aquatic ecology potential impacts are reliant on CIRIA Best Practice guidance for SuDS (Woods-Ballard, et al., 2015). The mitigation measures for protection of water quality is outlined below.

- The increase in the rate of runoff along the route of the site access roads and hardstanding areas will be mitigated by the proposed drainage system which includes provision of stilling ponds to reduce concentration of suspended solids in the runoff from these areas. This has been further mitigated by avoidance through design, in the utilisation of existing tracks and existing drainage systems where possible. A minimum buffer of 50m from watercourses has been adopted, where possible, for all new site tracks that run parallel to a watercourse, with the existing tracks being widened in their existing locations.
- There is one location where proposed access and drainage infrastructure (in the vicinity of T17) are • located within 50m of an existing drain. This flows into the Chimneyfield Stream which subsequently joins the River Bride. Due to the proximity of this infrastructure to a waterbody which flows into a downstream SAC, Blackwater River (Cork/Waterford), specific details of silt management mitigation measures for this area have been detailed in the CEMP (Appendix A). This includes proposed locations of temporary construction stage silt management infrastructure.
- Stilling ponds with a diffuse outflow detail will be put in place in advance as construction progresses • across the site. Erosion control and retention facilities, including stilling ponds will be regularly maintained during the construction phase. The three-stage treatment train (swale - stilling pond diffuse outflow) proposed to retain and treat the discharges from hard surface areas as a result of the development will reduce any risk of significantly increased flows downstream.
- Where haul roads pass close to watercourses, silt fencing will be used to protect the streams. •
- Silt traps will also be provided at outfalls from roadside swales to stilling ponds. •
- Standing water, which could arise in excavations, has the potential to contain an increased concentration of suspended solids as a result of the disturbance to soils. The excavations for turbines will be pumped into the site drainage system (including stilling ponds), which will be constructed at site clearance stage, in advance of excavations for the turbine bases.
- Drains around hardstanding areas will be shallow to minimise the disturbance of sub soil.
- The developer will ensure that erosion control, namely silt-traps, silt fencing, swales, stilling ponds and • diffuse outflow areas are regularly maintained during the construction phase.
- Interceptor cut-off drains will be provided on the upslope side of the access roads to prevent the mixing of overland flows with the drainage for the proposed development. These interceptor drains will discharge diffusely over land to avoid concentration of runoff. The roadside drains will therefore only carry the site access road runoff and so avoid carrying large volumes of water and concentrating flows.

- Interceptor cut-off drains will be provided around borrow pits to divert overland flow to the nearest watercourse and prevent it from entering the borrow pits.
- Cross drains of 450 mm will be provided to prevent a risk of clogging for drainage crossings and • conveying flow from agricultural drains and forestry drains under access track roads.
- Where new cross-drains are proposed on this site to convey surface water from roadside swales to • stilling ponds, these will be sized at a minimum of 225 mm diameter to avoid blockages.
- Roadside swales will serve to attenuate any increase in surface water runoff.
- Silt fencing will be erected at the locations of the drain crossings for the duration of the construction period.
- All open water bodies adjacent to proposed construction areas will be protected by fencing including • the proposed stilling ponds.
- Excavated subsoil material not required for in-site reinstatement will be removed to the designated material storage areas at the borrow pit locations.
- Site access tracks have been laid out to reduce longitudinal slope of roadside drains where possible. Where roadside drains are laid at slopes greater than 2%, check dams will be provided. This will reduce effective slope and runoff velocities and any consequent potential for erosion.
- Where agricultural tracks and forestry roads will be used to access the development, the roadside drains alongside these roads will be cleared of obstructions, should it be found that debris and vegetation are impeding flows.
- Any diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks the bund area will have a volume of at least 110 % of the volume of such materials stored.
- Refueling of plant during construction will only be carried out at designated refueling station locations • on site.
- Prior to leaving the site, every truck delivering concrete to the site must wash the chute only to a lined pit provided at each turbine location.
- Silt fencing will be erected at the location of stream crossings along the cable route.
- Cables will be installed in trenches adjacent to the site access roads, or laid within the access road line, where required. Trenches will be excavated during dry periods in short sections and left open for minimal periods, to avoid acting as a conduit for surface water flows.
- The temporary storage of excavated material on site will be placed at least 50 m from watercourses.
- Wet concrete operations are not required for this site within or adjacent to watercourses.
- Portaloos and/or containerised toilets and welfare units will be used to provide toilet facilities for site personnel. Sanitary waste will be removed from site via a licenced waste disposal contractor.
- Emergency drip trays and spill kits will be kept available on site, to ensure that any spills from vehicles are contained and removed off site. The emergency response procedure is provided in section 1.8 of SWMP.
- All open water bodies adjacent to proposed construction areas will be protected by fencing.
- Weather warnings will be monitored, and no construction will take place during extreme events to mitigate against potential flooding.
- Excavated subsoil material not required for in-site reinstatement will be removed to the designated material storage areas at the borrow pit locations.
- Any diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks the bund area will have a volume of at least 110 % of the volume of such materials stored.
- Refueling of plant during construction will only be carried out at designated refueling station locations • on site.

- Additional protection will be provided in the form of silt fencing downslope during construction, to • further ensure that there is no impact from the development to streams and rivers downslope of the site.
- Daily visual inspections of drains and streams will be performed during the construction period to ensure suspended solids are not entering the streams and rivers alongside the work area, to identify any obstructions to channels, and to allow for appropriate maintenance of the existing roadside drainage regime.

A water quality monitoring programme will be established to ensure that water quality is maintained throughout the construction phase. This programme will ensure that designed measures are working, and water quality is not affected.

Water samples will be taken monthly during ground disturbance works and will include measurement of the parameters provided in Table 4.4

Parameter	Maximum Value	Regulation
Turbidity	-	-
рН	6.0 < pH < 9.0	Surface Water Regulations. S.I. No. 272/2009 – European Communities Environmental Objectives (Surface Waters) Regulations, 2009
BOD	High Status < 1.3 (mean) or <2.2 (95%ile) Good Status <1.5 (mean) or < 2.6 (95%ile)	Surface Water Regulations. S.I. No. 272/2009 – European Communities Environmental Objectives (Surface Waters) Regulations, 2009
Total Suspended Solids (mg/l)	<25	Salmonid Water Regulations. S.I. No. 293/1988 – European Communities (Quality of Salmonid Waters) Regulations, 1988
Total Ammonia (mg/l N)	High Status < 0.04 (mean) or <0.09 (95%ile) Good Status <0.14 (mean) or < 0.065 (95%ile)	Surface Water Regulations 2009. S.I. No. 272/2009 – European Communities Environmental Objectives (Surface Waters) Regulations, 2009
Nitrite (NO <sub>2</sub> ) (mg/l)	<0.05	Salmonid Water Regulations. S.I. No. 293/1988 – European Communities (Quality of

**Table 4.4: Surface Water Quality Monitoring Parameters** 

Parameter	Maximum Value	Regulation
		Salmonid Waters) Regulations, 1988
Molybdate Reactive Phosphorus (mg/l P)	High Status < 0.025 (mean) or <0.045 (95%ile) Good Status <0.035 (mean) or < 0.075 (95%ile)	Surface Water Regulations. S.I. No. 272/2009 – European Communities Environmental Objectives (Surface Waters) Regulations, 2009

An Environmental Manager will be on-site during construction to monitor water quality. Turbidity meters will be installed prior to construction downstream of the site. Levels of turbidity were monitored pre-construction to determine existing levels in the waterbodies. Should the turbidity levels measured during construction be higher than the existing levels, construction will be stopped, and measures including additional silt fences, will be put in place immediately.

In addition, the following measures will be enforced during the construction stage and overseen through the appointment of an appropriately qualified and experienced Project Ecologist(s)/ Hydrologist(s)/ Ecological Clerk of Works (ECoW):

# **Project Ecologist – Pre-construction/ Construction Phase**

An ecologist(s) / EcOW(s) will be appointed and will be responsible for:

- Advising the Environmental Manager, Project Manager, Construction Manager and Project Owner.
- Advise on relevant wildlife/environmental legislation to aid in the development of practical Solutions.
- Carrying out confirmatory habitat and species surveys during the appropriate periods.
- Aiding with the implementation of biodiversity related planning conditions.
- Monitoring and aiding with the implementation of biodiversity related Project Design Environmental measures.
- Monitoring the implementation of the biodiversity related Best Practice Measures. -
- Monitoring the implementation of the Invasive Plant Species Management Plan.
- Monitoring vegetation clearance, tree root protection.
- Monitoring the success of the re-vegetation work.
- Monitoring instream works at Class 1 and Class 2 watercourses including water quality monitoring.
- Monitoring the reinstatement of these watercourses following works..
- Advising the Environmental Manager and the Construction Manager on techniques to be implemented.

### **Proposed Mitigation Measures for Tree Felling**

Tree felling will be undertaken prior to the construction of site access tracks and hardstanding areas. • The area of proposed felling is small relative to the overall area and is expected to develop a vegetation ground cover relatively quickly on areas which are not built upon. Thus, no significant increase in the rate of runoff is anticipated as a result of felling nor is there a risk of downstream flooding or sedimentation due to increased erosion.

- Tree felling will be the subject of a felling license from the Forest Service and to the conditions of such a license. A Limited Felling License will be in place prior to works commencing on site.
- To ensure a tree clearance method that reduces the potential for sediment and nutrient runoff, the • construction methodology will follow the specifications set out in the Forest Service Forestry and Water Quality Guidelines (2000) and Forest Harvesting and Environmental Guidelines (2000).
- Trees will be felled away from aquatic zones. Brash mats will be used as necessary on any off-road harvesting routes, removed and replenished if they become worn. Branches, logs or debris will not be allowed to accumulate in aquatic zones and will be removed as soon as possible.

### **Proposed Mitigation Measures for Instream Works**

- Instream works in minor water courses shall only take place during the period July to September (as required by IFI for instream works). However, as stated above, all instream works shall take place in written agreement with the IFI;
- Operation of machinery in-stream will be kept to an absolute minimum. All construction machinery operating in-stream will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery will be checked prior to commencement of in-stream works. Furthermore, machinery will be steam cleaned and appropriate measures for the spread of, amongst others, the crayfish plague shall be carried:
  - Before contact with water is made, any equipment or machinery that will be used in the water, including Personal Protective Equipment (e.g. footwear, gloves), will be sprayed and cleaned with a 1% solution of Virkon® Aquatic (or other proprietary disinfectant);
  - Upon completion of the work or moving the equipment or machinery from the water, these will be visually inspected for any possible sources of contamination and any attached plant or animal material or debris will be removed. The equipment and machinery will be further sprayed and cleaned with a 1% solution of Virkon® Aquatic (or other proprietary disinfectant); and
  - Any observations of aquatic species mortality will be reported to the relevant authorities within 1 hour of evidence being found.
- As the river water bodies hold fish species protected under the EU Habitats Directive (e.g. Atlantic salmon, Brown trout, European eel), a pre-construction electrofishing survey will be conducted, in agreement with IFI, in the water bodies affected by the proposed CGEP Development watercourse crossings. This survey results, in addition with the results presented will confirm the significance of the fish abundances in relation to the local populations. If deemed significant by the IFI, dewatering of these water bodies will not be employed. If IFI considers the fish abundances not significant and authorises dewatering of the water body reach as part of the instream works, a fish salvage operation shall be undertaken. The fish salvage operation shall be authorised and licensed by the IFI and carried out by either the IFI or by fully qualified, licensed and authorised freshwater ecologists.
- If temporary diversion channels are necessary as part of the instream works, they will provide for fish passage, be non-eroding, and be of similar width to the natural stream channel. The channel diversion will be compliant with the following 1) to 29) measures:
  - 1) Diversion of water to and from temporary channels will only take place during the period July to September (as required by IFI for instream works) and in accordance with the IFI.

- 2) Consultation with the NPWS will also be carried out as species protected under the Wildlife Act, EU Habitats Directive and the EU Freshwater Fish Directive occur within the river water bodies affected by the instream works.
- 3) The works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance of vegetation.
- 4) A minimum 10 meter vegetative buffer zone will be maintained between disturbed areas and the water body. There will be no storage of material/equipment, excavated material or overnight parking of machinery inside the 10m buffer zone.
- 5) Double silt fencing will be placed upslope of the buffer zone on each side of the water body. The silt fencing will have removable "gates" as required to allow access of excavator while maintaining ease of replacement for overnight or during periods of heavy rainfall. The silt fencing will be extended at least 10m upstream and downstream of the crossing location.
- Bog mats will be used underneath the excavator inside the 10 meter vegetative buffer zone to prevent soil erosion and potential water quality impacts from localised surface water runoff.
- 7) Temporary storage of excavated overburden from the diversion channel will be undertaken outside of the 10m buffer on flat ground or within a local hollow. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the water body.
- 8) The water body dam (in the stream to be diverted) will be made of sand (clean) bags, cobbles or clean well-graded coarse gravel fill. Poorly sorted material will not be used as it would be a potential source of fine sediment (the dam will be installed once the diversion channel is in place).
- 9) The banks and bottom of the diversion channel will be lined with impermeable geotextile to prevent erosion and surface water quality impacts. A layer of clean course gravel will be placed over the geotextile on the bed of the channel to keep it in place.
- 10) An energy dissipater (such as clean rock fill or splash plates) will be placed on the water body bed and opposing bank of the receiving water body downstream of the diversion channel. This will prevent scouring and erosion of the water body bed and bank at the outfall during diversion.
- 11) Water body bed trench excavation works will commence once stream flow is fully diverted from the crossing excavation area.
- 12) Temporary storage of excavated material from the crossing trench will be undertaken separately to the material from the diversion channel. All storage areas will be outside the 10m buffer zone. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the water body.
- 13) Sediment laden water from trench dewatering will be discharged onto a well vegetated, dry, flat area at least 50m from a water body via a straw bale dewatering structure or geotextile filter bag. The outfall will also be surrounding by silt fencing.
- 14) If there is no suitable area for discharge onto ground, mobile unit settlement ponds will be used where necessary and will be put in place prior to commencement of preparation works.
- 15) Any water from trench dewatering will not be discharged directly to a water body.

- 16) Clay bunds will be placed within the trench backfill on either side of the water body to prevent the trench acting as a drain towards the stream, thus preventing potential water quality impacts.
- 17) Once the lean mix concrete is in place in the trench, a layer of fine sand (5–10cm) will be laid over the cement prior to backfilling. This will prevent release of cement into the water body when flow is restored.
- 18) Upon completion of the in-stream works, the stream crossing will be restored to its original configuration and stabilised to prevent bank erosion by means of timber stakes, timber planks and geotextiles as required.
- 19) The diversion channel will be backfilled and reinstated to its original level and rock armour will be placed at the stream banks where the inflow and outflow of the diversion channel previously existed.
- 20) The ground surface along the reinstated diversion channel will be re-seeded at the soonest opportunity to prevent soil erosion.
- 21) The silt fencing on either side of the stream buffer will be left in place and maintained until the disturbed ground has re-vegetated.
- 22) Operation of machinery and use of equipment within the 10m buffer will be kept to a minimum to avoid any unnecessary disturbance.
- 23) Disturbance of bankside soils and stream sediments will be restricted to the minimum required for the cable laying process to avoid unnecessary impact on the stream morphology.
- 24) There will be no batching or storage of cement allowed at any stream crossing.
- 25) There will be no refuelling allowed within 100m of any stream crossing.
- 26) All plant will be checked for purpose of use prior to mobilisation at the stream crossing;
- 27) Works will not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted.
- 28) Once construction is completed, reconnection to the existing water body can be made and this should only occur within the approved operational window for in-stream works.
- 29) All works will be overseen by a suitably qualified Aquatic Ecologist, member of CIEEM.

### **Proposed Mitigation Measures for Culverts**

- Construction/Replacing of culverts will only be done over a dry period between July and September (as required by IFI).
- Use of weather forecasts will be made, and works will be planned when a dry spell of weather is forecasted.
- Work will not be undertaken during periods of high rainfall. This will minimise the risk of entrainment of suspended sediment in surface water runoff and transport via this pathway to surface water bodies.
- Where there is a requirement to disturb either the bed or bank as a result of the construction/replacement works, the watercourse will be dammed upstream and pumped prior to work commencing.
- A temporary berm (i.e. sandbags and/or rectangular straw bales) will placed along the edge of the track/road to prevent loose material being dislodged or washed into the water body.

- All culverts to be installed as part of the works, new and replacements, shall be of the openbottomed type. These should be oversized, so that they can be set a minimum of 500 mm below bed-level, with a minimum diameter of 900mm regardless of the anticipated flood flow.
- The culverts will be of similar width to that of the natural low-flow channel. The use of multiple units of lesser width is unacceptable.
- The culverts will be laid at a level and grade which allows the upstream invert to remain drowned (by back-watering) under low-flow conditions, to a depth suitable for the easy passage of the largest species frequenting the stream (150mm for salmon).
- The effective slope of the culvert will not exceed 5%. -
- Pools will be formed at each end of the culvert to provide for transition from the shape of the culvert to the shape of the river downstream.
- Culvert screening shall not be adopted in any circumstance.
- Where culvert widening has been completed, only clean, well-sorted fill or hardcore will be used to widen the road/track at the crossing location. Poorly sorted material will not be used as it would be a potential source of fine sediment.
- Before the road/track surface layer is put in place, a layer of geotextile will be placed over the fill to prevent wash down of fines into the fill and potentially into the water body.
- In the unlikely event that high levels of silt or other contamination is noted in any local watercourse, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied.
- All disturbed ground will be re-seeded at the soonest opportunity to prevent erosion.
- There will be no batching or storage of cement allowed at the watercourse crossing. -
- There will be no refuelling allowed within 100m of the watercourse crossing.
- All plant will be checked for purpose of use prior to mobilisation at the water body crossing.
- All culverts will be passable by fish and Otter.
- All works will be overseen by a suitably qualified Aquatic Ecologist, member of CIEEM. -

### Proposed Mitigation Measures for Excavation works within close proximity (<50m) of surface water bodies

To prevent river water quality impacts from sediment runoff during excavation works within the proximity of surface water bodies (<50m), the following measures shall be put in place:

- Weather forecasting resources will be used, and works will be planned when a dry spell of weather is forecasted.
- All works will be overseen by a suitably gualified Ecologist, member of CIEEM.
- Where the cable trench/access track/road/ works area is running within the 50m of a surface water body, a minimum 5m buffer will be maintained between the works area and the water body wetted width limit.
- Silt fencing will be placed down-gradient of the works during construction at all locations within the 50m water body buffer.
- Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered; -
- In a case where only a 5 10m buffer is being maintained, double silt fencing will be put in place on the downslope side.
- Additional silt fencing or temporary straw bales (rectangular bales, pinned down firmly with stakes) will be placed across any natural surface depressions/channels that slope towards a local water body.

- Where the cable trench/access track/road route slopes down perpendicular towards a water body (i.e. base of stream valley), regularly spaced, temporary bunds or shallow swales will also be put in place perpendicular across the route corridor to dissipate surface water runoff from the works area and onto adjacent vegetated ground. Additional silt fencing will be put at the outfall location of the bunds/swales.
- Temporary check dams/silt fencing arrangements will be placed in any drainage ditches within 30m of the works corridor (this will also include existing road drains along the haul route works);
- The check dams/silt fencing arrangements will be placed every 10m.
- Bog mats will be used in wet/boggy areas to prevent ground rutting and soil erosion which could lead to potential water quality impacts. All ground rutted by vehicles/machinery will be levelled or backfilled to prevent their progression as preferential pathways for surface water runoff.
- If high levels of silt or other contaminants are noted in any local water body, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied.
- Excavation work will not be undertaken during periods of high rainfall. This will minimise the risk of entrainment of suspended sediment in surface water runoff and transport via this pathway to surface water bodies.
- All disturbed ground will be re-seeded at the soonest, practicable opportunity to prevent erosion.
- All temporary surface water control/protection measures, such as silt fencing and check dams, will be kept in place until disturbed ground has vegetated and stabilised. Regular daily checks will be undertaken.
- Where the cable trench route runs downslope for long distances (>50m) towards a water body or drainage ditch, regular spaced impermeable bunds will be placed within the trench backfill to prevent the trench acting as a drain towards the stream, thus preventing potential water quality impacts from surface water drainage within the trench.
- There will be no refuelling allowed within 100m of a water body/drainage ditch.
- All plants will be checked for purpose of use prior to mobilisation.

# Proposed Mitigation Measures for Management of invasive alien species

To avoid the introduction, establishment and spread of invasive species in and around the proposed CGEP Development during the construction phase, the following measures shall be attended to:

- An updated confirmatory survey of proposed works areas will be conducted prior to works commencing. Areas of high impact invasives such as Japanese Knotweed (at Node 1.4 of the TDR) will be identified and suitable buffer zones established for monitoring by the site ecologist. This information will be provided to the works contractor and the site ecologist will monitor for invasives during the works phase to ensure it is not disturbed.
- Prior to arrival of vehicles that will be kept on the site for extended periods e.g. earth moving machinery the contractor's vehicles and equipment will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water >65 °C, in addition to the removal of all vegetative material. Items difficult to soak/spray will be wiped down with a suitable disinfectant (e.g. solution of 1% Virkon<sup>®</sup> Aquatic);
- Evidence that all machinery has been cleaned will be required to be on file for review by the statutory authorities. The level of evidence required of the Contractor will be actual registration

plates of vehicles onsite and a register of when, how and where each of these were cleaned before they arrived on site.

- The flagmen, which will be present at each active site access points, will be responsible for inspecting and cleaning delivery vehicles both entering and exiting the site, and will receive training in the correct techniques.
- Each flagman will be equipped with a 'disinfection box'. This will contain Virkon® Aquatic or another proprietary disinfectant, a spraying mechanism, cloths or sponges, a scrubbing brush and protective gloves. Protective gloves will be worn when using any disinfectant solution.
- Visual inspections will be carried out on all machinery and equipment (particularly for machinery and equipment exiting the site and which has come into contact with water or soils) for evidence of attached plant or animal material, or adherent mud or debris. Any attached or adherent material will be removed before entering or leaving the site, securely stored away from traffic for removal to the waste storage area in the Temporary Compound at the end of the work day.
- No removed material or run-off will be allowed to enter a water body of any sort.
- Following cleaning, all equipment and vehicles will be visually inspected to ensure that all adherent material and debris has been removed manually.
- Records of supplies and cleaning of delivery vehicles will be kept by the flagmen and will be regularly inspected by the Environmental Clerk of Works.
- Spot checks on the adequacy of cleaning will be carried out by the Project Ecologist.
- The above measures may not apply for vehicles that require regular on and offsite movements e.g. deliveries of cement during construction. These vehicles are highly unlikely to be at risk of contamination/ contact with aquatic habitats or invasive species. Before deliveries start the site EcoW/ Environmental Manager will review quarries supplying cement to confirm if the above disinfectant measure applies.

# **Proposed Mitigation Measures for Grid Cable Installation**

The following mitigation measures are proposed during construction stage:

- Weather warnings will be monitored, and no construction will take place during extreme events to mitigate against potential flooding.
- Mitigation measures will be provided where surface water flows may be temporarily prevented from reaching gullies during trench excavation. Mitigation measures will include the provision of temporary over ground surface water channels using sand bagging for example to divert flows to downstream gullies.
- Trenches will be excavated during dry periods where possible in short sections and left open for minimal periods, to avoid acting as a conduit for surface water flows.
- Any excavated material will be used in the reinstatement of the cable trenches subject to approval. Surplus material will be removed from the site to an appropriate licenced facility. There will be no stockpiling of excavated material. For trenching within the domain of public roads, approved fill material will be imported in accordance with the method statement described in Section 3.
- All excavated soil material will be managed on site in accordance with the CEMP (Appendix A).
- Silt fencing will be provided around any exposed areas to prevent the ingress of suspended solids into adjacent watercourses. These mitigation measures will prevent surface water contamination and will prevent subsequent flows of contaminated water into watercourses.

Additional protection will be provided in the form of silt fencing downslope where required during construction, to further ensure that there is no impact from the development to streams and rivers downslope of the site.

Daily visual inspections of drains and streams will be performed during the construction period to ensure suspended solids are not entering the streams and rivers alongside the work area, to identify any obstructions to channels, and to allow for appropriate maintenance of the existing roadside drainage regime.

# Proposed Mitigation Measures for Horizontal Directional Drilling (HDD)

The proposed mitigation measures during HDD are listed below:

An Environmental Engineer with a "stop work" authority will be engaged to monitor the construction phase of the development when the water crossing is being undertaken.

- The working area around the bridge/culvert crossings will be fenced off prior to the commencement of works to avoid damage to bankside habitat.
- Watercourses will be visually inspected.
- Should increase levels of siltation be recorded within the watercourses during the course of the HDD • works, the environmental auditor will seek to halt construction works until the source of the pressure can be found and remediated.
- Surplus material will be removed from the site to an appropriate facility. There will be no stockpiling of excavated material. A setback distance of at least 20 m from watercourses will be adhered to when storing temporary spoil.
- Prior to any works taking place near water courses the Inland Fisheries Ireland will be consulted.
- Construction works onsite will be timed to occur outside periods where heavy rainfall would be ٠ expected.
- Silt traps will be regularly maintained during the construction phase. All personnel working onsite will • be trained in pollution incident control response.
- Appropriate signage will be placed along the proposed route outlining the spillage response procedure and a contingency plan to contain silt. A regular review of weather forecasts of heavy rainfall is required, and the contractor is required to prepare a contingency plan for before and after such events.
- Visual inspection to take place at all times along the bore path of the alignment.
- Silt fences will be constructed around proposed work areas prior to commencement of works.
- No refueling will take place within 50m of the stream zone or any sensitive habitats.
- During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid will be ٠ used.

# **Proposed Mitigation Measures for Installation of Meteorological Mast**

Drainage infrastructure shall be put in place prior to commencement of works. Dirty water from roads will be drained to swales which will be connected to a settlement pond with a diffused outfall.

- There will be small usage of concrete for foundations and anchoring. No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete product and where possible, emplacement of pre-cast elements, will take place.
- No discharge of cement contaminated waters to the construction phase drainage system or directly to • any artificial drain or watercourse will be allowed.

- Use weather forecasting to plan dry days for pouring concrete.
- Ensure pour site is free of standing water. Plastic covers will be ready in case of sudden rainfall event. •
- Concrete operations shall be carried out in accordance with the CEMP (Appendix A).

# 4.4.2 Operational Phase

# 4.4.2.1 CGEP and GCR

The main hydrological impact of the development is an increase in runoff. This is mitigated by the drainage layout. Due to the insignificant increase in potential runoff from the site (See Section 4.3.1), there should be negligible release of sediment to the watercourses post-construction. It is therefore not envisaged that the operation period of both the CGEP windfarm and the GCR will involve any significant effects to the hydrological regime of the area and, by association, to European sites hydrologically connected to the site.

When operational, the development will have a negligible effect on surface water quality as there will be no further disturbance of soils post-construction. During the operation stage, small quantities of oil will be used in cooling the transformers associated with the facility. There is therefore a potential for small oil spills. Risks of potential oil leakage and pollutions draining to the watercourse from the installed transformer is mitigated with transformer interceptor bund wall.

The operation of the development will incorporate effective maintenance of the drainage system and the permanent mitigation measures detailed in Section 4.4.1. The maintenance regime will include inspection and servicing of:

- Drains, cross-drains and culverts for any blockages. ٠
- Outfalls to existing field drains and watercourses. •
- Existing roadside swales for any obstructions. ٠
- Swales. ٠
- Progress of the re-establishment of vegetation. •

The maintenance regime will also include implementing appropriate remedial measures as required after the above inspections and testing the water quality at the outfalls at appropriate intervals. Visual inspections will be undertaken during the maintenance period in accordance with maintenance schedule following relevant recommendations outlined in The SuDS Manual (CIRIA C753).

Furthermore, and in order to prevent the spread of invasive alien species that are already established within the site, the following measures shall be implemented:

- Monitoring in the form of confirmatory surveys will be carried out by the appointed Project -Ecologist to accurately determine the current status of invasive species locations identified during baseline studies; and identify any other infestations close to the construction works areas or operational stage maintenance works areas.
- Surveying will be carried out each year of operation and this survey information will be used to inform any construction works/operational stage maintenance activities. Surveys will focus on the works area and up to 10m from here.
- The results of this will be made available to Project Team, and any bodies as required at the consenting stage.
- The measures included in the Invasive Species Management Plan will be implemented. -

#### 4.4.3 **Decommissioning Stage**

In the event of decommissioning of the Coom Green Energy Park, the access tracks may be used in the decommissioning process. Mitigation measures applied during decommissioning activities will be similar to those applied during construction.

It is proposed that turbine foundations and hardstanding area should be left in place and covered with local soil/topsoil at decommissioning stage. It is considered that leaving the turbine foundations, access tracks and hardstanding areas in-situ will cause less environmental damage than removing them.

Mitigation measures as outlined for construction phase protection of water quality will be implemented in full as required for the windfarm element of the project.

The grid connection cables will be left in the ground, therefore no potential impacts during decommissioning stage are likely to occur. Hence no mitigation measures are required for this element.

### 4.5 **Cumulative and In-Combination Effects**

Projects and land use activities with potential to result in cumulative impacts with the proposed CGEP Project were identified, the results of which are presented herein. Table 4.5 lists the projects within the zone of potential cumulative effects and highlights the project(s) which require further consideration with the proposed CGEP Project.

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Table 4.5: Plans or projects with potential cumulative, or in-combination, effects with the Proposed CGEP Project on European sites.	

Development evaluated for in combination effects	əənərəfəß gninnslq	Potential in-combination impacts identified
Windfarm Developments		The closest windfarm development is a single wind turbine at Moneygorm, Glenville, Co Cork (1.4km distant from the site). The following windfarm developments are the closest windfarm developments (>1 turbine each) to the site which have been granted planning; Castlepook Wind farm (14 turbines, c. 21.8km from site); Knocknatallig Wind Farm (6 turbines, c. 24km from the site); Boggeragh Wind Farm (38 turbines, c. 23km from the site); Boggeragh Wind Farm (38 turbines, c. 23km from the site); Boggeragh Wind Farm (38 turbines, c. 23km from the site); Boggeragh Wind Farm (38 turbines, c. 23km from the site); Boggeragh Wind Farm (38 turbines, c. 23km from the site); Boggeragh Wind Farm (38 turbines, c. 23km from the site); Boggeragh Wind Farm (38 turbines, c. 21km from the site). These projects having been granted planning and were subject to Appropriate Assessment that ruled out significant adverse effects including consideration of relevant QI aquatic receptors (as relevant) in River Blackwater SAC and Blackwater Callows SPA. <b>No significant in-combination effects with the proposed CGEP Project are identified.</b>
M20 Cork-Limerick Motorway		The likely route will be west of the N20. Currently at feasibility, at likely be <5km from the proposed CGEP project. Expected completion 2027. This project wiol;1 be subject to full impact assessment, including Appropriate Assessment. No significant in-combination effects between the proposed CGEP Project and European sites are anticipated.
Alteration of Mallow Sewerage Scheme	195078	A NIS and EIA Screening have been submitted and have concluded that the proposed development will not have an adverse effect on the integrity of the Blackwater River (Cork/Waterford) SAC or any other European sites. During construction, there will be a short-term impact on the River Blackwater which will be effectively minimised by the implementation of mitigation measures. The long-term impact is predicted to be negligible. During construction, there will be effectively minimised by the implementation of fittingation measures. The long-term impact is predicted to be negligible. During construction, there will be increased noise and disturbance which could potentially impact on birds and mammals including otter. However, such impacts will be temporary, and the long-term impact is predicted to be negligible. No impact from the spread of invasive species or impacts relating to biosecurity will occur.  A potential short-term impact on the River Blackwater SAC is predicted from this project alone. Given the separation distance of over 10km from the proposed CGEP development and identified mitigation for CGEP for protection of water quality; no potential in-combination impacts are identified as water quality for sensitive aquatic receptors will not change due to CGEP i.e. the baseline conditions for aquatic QI in relation to the Mallow Sewage Scheme will not be altered due to CGEP.
Agricultural Development, Ballyhooly Mallow, Co. Cork	186848	An EIS has been submitted and has concluded the following: As the proposed development would take place primarily within habitats of low ecological value and given the small development footprint, the potential impacts upon bird and mammals species would be greatly reduced. Assuming all mitigation measures are put in place, there would be no significant residual impacts to the aquatic environment from the proposed development. It is considered that due to the drainage system design and the distance of the proposed development to the Blackwater River SAC and Blackwater Callows SPA, there would be no significant impact upon a designated site due to drainage.

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Development evaluated for in combination effects	əənərəfəЯ gninnsl9	Potential in-combination impacts identified
		Considering the above and given the separation distance from the proposed CGEP development no potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
Redevelopment of Former Central Hotel	186167	An NIS has been submitted which concluded that " <i>the habitats to be affected are highly modified and of minimal ecological value. Thus, no potential impact from loss of habitat have been identified. Given the scale and nature of the project and proposed construction mitigation measures, it can be objectively concluded that the proposed development on its own, and in combination with other plans and projects, will not have a significant impact on qualifying interests and conservation objectives for Natura 2000 sites, and the integrity of these sites will not be adversely affected". <b>Considering the proposed CGEP development on its own</b>, and in combination with other plans and projects, will not have a significant impact on qualifying interests and conservation objectives for Natura 2000 sites, and the integrity of these sites will not be adversely affected". <b>Considering the above, and given the separation distance from the proposed CGEP development no potential in-combination impacts on</b></i>
		the River Blackwater SAC and Blackwater Callows SPA are identified.
Residential development and associated works, Navigation Road Annabella Mallow Co. Cork	185112	An NIS has been submitted which concludes; As none of the Natura 2000 sites overlap the proposed development site, direct impacts via habitat loss or disturbance/ displacement are not relevant. The development proposes to manage and control surface-water run off during both construction and operational phases prior to release into the environment by implementing standard environmental controls. Surface water run-off from other new proposed or permitted unbuilt developments that will also connect into the same public stormwater sewer network could result in a cumulative and in-combination effect. However, assuming that all developments closely adhere to best practice regarding water quality protection during construction and operational phases, then no significant negative cumulative impacts are expected to occur".
		Considering the above, and given the separation distance from the proposed CGEP development no potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
Dairygold Co-operative Society Ltd: Construction works. Annabella West End Mallow Co. Cork	184946	An NIS and EIS has been submitted which concludes that "No significant ecological residual impacts are expected as a result of the construction and operational phase of the proposed development. Provided the recommended mitigation measures are implemented in full it is not expected that the construction and operational phases will result in an adverse residual impact on the integrity of Natura 2000 sites considered in this NIS, namely Blackwater River (Cork/Waterford) SAC".
		Considering the above, and given the separation distance from the proposed CGEP development no potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
Development of residential units, Clyda Court Quartertown Lower Mallow Co. Cork	176722	An AA Screening Report has been submitted which concludes that Theoretically the proposed development could impact on aquatic species due to increased silt run-off or chemical contamination of groundwater or surface during construction. Overall given the limited nature of the the

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Development evaluated for in combination effects	əənərəfəß gninnslq	Potential in-combination impacts identified
		development and the distance from sensitive receptors, the precautionary measures described, the impacts on water quality and aquatic ecology is predicted to be negligible. The proposed development will not have a significant impact on qualifying interests and conservation objectives for Natura 2000 sites, and that the integrity of these sites will not be adversely affected. No significant direct, indirect or cumulative impacts on Natura 2000 sites have been identified. The impacts on Natura 2000 sites and ecology are predicted to be negligible, therefore no potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
The development of 14 no. serviced sites for future employment uses. Ballydahin and Gooldshill Mallow Co. Cork	167121	Potential in-combination impacts with the proposed CGEP Development can be inferred from the Screening Assessment for the Proposed Quarry Industrial Estate Site at Ballydahin, Mallow, Co. Cork. These are based on the identified potential to spread invasive alien plant species (Japanese knotweed and Himalayan balsam) and downstream habitat degradation through increased siltation. However, the project includes a number of best-practice and mitigation measures which would ensure impacts are avoided. Therefore, no potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
The construction of 108 no. dwelling houses, "Clonmore" Ballyviniter Lower Mallow Co. Cork	166949	An EIS an AA Screeng Report have been submitted concluding that: <i>Due to the small scale of the run-off and additional discharges from the Glasha Stream that will be generated by the proposed development relative to the flows in the River Blackwater, and the distance of the site from the SAC, it can be concluded that the proposed development will not have an measurable impact on water quality or flow rates in the SAC. Construction work is not likely to cause significant disturbance to the local otter population, due to distance from suitable habitat. <b>Considering the above and Blackwater SAC and Blackwater Callows SPA are identified.</b></i>
A residential development comprising the construction of 88 no. dwelling houses, Annabella Mallow Co. Cork	156970	An AA Screening Report has been submitted which concludes that adopting the environmental design features as outlined for the proposed development will ensure no significant impact to any species for which the Blackwater SAC is designated will occur as a result of the development. <b>Environmental design measures have been proposed. No potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.</b>
Construction of 61 no. dwelling houses, Annabella Mallow Co. Cork.	156119	An AA Screening Report has been submitted which concludes that due to the location and nature of the proposed works and with the implementation of standard appropriate environmental actions and best practice negative impacts on the qualifying interests of the Blackwater River SAC will be avoided. The report also concludes that the proposed development will not have any significant impact on the water quality of the Blackwater River.

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Development evaluated for in combination effects	Planning Reference	Potential in-combination impacts identified
		Assuming the implementation of standard appropriate environmental actions and best practice as described in the report are complied with, no potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
Construction of fabricating workshop, office block, ESB substation and other associated works, Mallow Business & Technology Park Quartertown Lower Mallow	154690	An Appropriate Assessment Report has been submitted which concludes that there is no evidence that works will cause deterioration of important habitats, or the habitats of the habitats of the qualifying species and species of special conservation interest or significant disturbance to these species thus ensuring the integrity of the Blackwater SAC is protected. The AA screening references standard construction mitigation measures to be implemented, documenting details that no surface water, and so is conservation interest or significant.
		soils or contaminants will be permitted to the hearpy quarterstown stream, precluding hydrological connectivity with sensitive receptors. No potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
The construction of 10 no. dwelling houses to replace 8 no. residential serviced sites, An Gleann Ull Ballyhooly	196597	An EIAR and AA Screening Report has been submitted for this development which concludes that following a comprehensive evaluation of the propsed direct, indirect and cumulative impacts on the qualifying interests and conservation objectives for the Blackwater River SAC, it has been concluded that the proposed development will not have an adverse effect on the integrity of the Blackwater River SAC or any other Europeans Site.
North Fermoy Co. Cork		The AA Report includes a number of generic and specific mitigation measures in relation to the management of wastewater, construction waste, noise and prevention of invasive species that would prevent any impacts to sensitive receptors. No potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
Construction of 20 no. semi-detached 2-storey houses		An Appropriate Assessment Screening Report has been submitted which concludes that there is no evidence to indicated that works will cause either directly or indirectly significant deterioration of important habitats, of the habitats of the habitats of the qualifying species and species of special conservation interest or significant disturbance to these species thus ensuring the integrity of the Blackwater SAC is protected.
and associated site works, Lios Ard Ballyhooly South Fermoy Co. Cork	100480	The AA Report includes the reference to a number of standard environmental controls to be followed during construction and operation phases, in relation to the management of wastewater, construction waste, noise and prevention of invasive species that will prevent any impacts to sensitive receptors. No potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
The construction of 31 no. dwelling houses and all	195486	An Appropriate Assessment Screening Report has been submitted which concludes there will be no significant effects on the Blackwater River SAC and Blackwater Callows SPA.
associated works, gianworth (Townand) retinoy co. Cork		The Appropriate Assessment Screening indicates the implementation of standard environmental controls, during construction phase, and SuDS infrastructure, during operation phase, to eliminate the potential impacts affecting habitats or species due to increased silt-laden or

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Development evaluated for in combination effects	əวnərəfəЯ gninnslq	Potential in-combination impacts identified
		contaminated surface water runoff. Disturbance/displacement impacts are also considered insignificant due to the absence of habitats of ecological interest or value within the vicinity of the development. No potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
6 no semi-detached 3 storey houses and 8 no residential serviced sites and associated site works. An Gleann Ull	175734	An Appropriate Assessment Report has been submitted which concludes there will be no significant effects on the Blackwater River SAC and Blackwater Callows SPA. Blackwater Callows SPA. The Assessment concluded that the development is located at far enough away to preclude any disturbance or displacement impacts on habitats and mobile species. The Assessment also mentions the management of surface and wastewater emissions, ensuring the water
Baliyhooly North Fermoy Co Cork		quality of hydrologically connected receptors. No potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
Construction of a creche facility to serve the adjacent permitted residential development (Cork County Council		An NIS has been submitted which concludes that there will be no adverse impacts either alone or in combination with other plans and projects on the integrity of the Blackwater SAC as a result of the proposed development
Ref. 18/6579), the construction of 19 no. dwelling houses and other site works, Lisnagar Demesne (Townland) Rathcormac Co. Cork	196892	The mitigation measures/best practice measures are proposed in the NIS report to prevent pollution to receiving water bodies. With the implementation of such measures, no impacts will occur to ecological receptors. No potential in-combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.
Residential Development - Construction of 96 no.		An NIS has been submitted which concludes that there will be no adverse impacts either alone or in combination with other plans and projects on the integrity of the Blackwater SAC as a result of the proposed development.
dwelling houses and all associated ancillary site development works, Lisnagar Demesne Rathcormac, Co. Cork	186579	Mitigation measures are proposed in the NIS to prevent pollution entering water bodies in the vicinity of the development. With the implementation of such measures, no impacts to aquatic ecological receptors in the River Blackwater SAC and Blackwater Callows SPA are identified.
29 no. one and two-storev detached and semi-detached		An AA Screening Report has been submitted which concludes there is no evidence that that the proposed development will cause significant deterioration in the habitat or features of the Blackwater SAC.
dwelling houses, including the alteration, extension and refurbishment of the former dispansary/fever hospital building, Shanowen Rathcormac Co. Cork	156359	Neither of the environmental reports assigns potential impacts to terrestrial ecological receptors. Furthermore, the EcIA outlines that the Construction Management Plan contains mitigation/best practice measure to ensure that no impacts to aquatic receptors will arise from the development. Local SuDS infrastructure is sufficient to prevent any potential impacts during operation phase. No potential in- combination impacts on the River Blackwater SAC and Blackwater Callows SPA are identified.

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Development evaluated for in combination effects	Planing Reference	Potential in-combination impacts identified
Replant lands in Moneygorm, Co. Cork		These lands have already been planted therefore there can be no in-combination effect with the proposed construction of CGEP. Adverse in- combination effects on QIs and SCIs can also be ruled out as forest management is subject to separate licencing that include protection measures for safeguarding water quality. Therefore, no potential in-combination impacts on the QIs for the River Blackwater SAC and SCIs for the Blackwater Callows SPA are identified.
Replant lands in Ballard, Co. Wicklow		The separation distance between these land in Co. Wicklow and the proposed GGEP project is c.145km and there is no hydrological linkages. Due to the separation distance, there are no disturbance or other impacts to give rise to adverse effects on any QIs or SCIs for the European sites being assessed. Therefore, no potential in-combination effects with the proposed CGEP Project are identified on the River Blackwater SAC and Blackwater Callows SPA.

#### 4.6 Conclusion

This Natura Impact Statement assesses the likely significance of all potential impacts arising from the proposed project on the integrity of the relevant European sites. It has been prepared taking into account the precautionary principle and is based on the best scientific knowledge in the field.

For the reasons set out in detail in the NIS, in the light of the best scientific knowledge in the field, all aspects of the proposed project which, by itself, or in combination with other plans or projects, which may affect the relevant European Sites have been considered. The NIS contains information which the An Bord Pleanála, as competent authority, may consider in making its own complete, precise and definitive findings and conclusions and upon which the Board is capable of determining that all reasonable scientific doubt has been removed as to the effects of the proposed development on the integrity of the relevant Natura 2000 sites.

There are no significant effects identified which would adversely affect the Qualifying Interests or conservation objectives of Natura 2000 sites within the project Zone of Influence with regard to the favourable conservation condition of the features of Qualifying Interest for which the Natura 2000 site has been selected.

The provisions of Article 6 of the 'Habitats' Directive 92/43/EC (2000) defines integrity as the 'coherence of the sites ecological structure and function, across its whole area, or the habitats, complex of habitats and/or population of species for which the site is classified'. It is clear that, given the application of prescribed protective measures for the avoidance of impacts and the implementation of the required mitigation measures, the proposed works will not give rise to adverse effects on the integrity of any of the identified Natura 2000 sites evaluated herein.

In the light of the conclusions of the assessment which it shall conduct on the implications for the European sites concerned, the Board is enabled to ascertain that the proposed development will not adversely affect the integrity of any of the European sites concerned.

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# Appendix A: Construction and Environmental Management Plan (CEMP)
# Appendix B: CGEP Turbine Delivery Route AA and NIS

Appendix C: Site Synopsis and Conservation Objectives of the European sites within a 15km radius from the proposed development



## Site Name: Blackwater River (Cork/Waterford) SAC

#### Site Code: 002170

The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and five ranges of mountains. In times of heavy rainfall the levels can fluctuate widely by more than 12 feet on the gauge at Careysville. The peaty nature of the terrain in the upper reaches and of some of the tributaries gives the water a pronounced dark colour. The site consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond, the tidal stretches as far as Youghal Harbour and many tributaries, the larger of which include the Licky, Bride, Flesk, Chimneyfield, Finisk, Araglin, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, Owentaraglin and Awnaskirtaun. The portions of the Blackwater and its tributaries that fall within this SAC flow through the counties of Kerry, Cork, Limerick, Tipperary and Waterford. Nearby towns include Rathmore, Millstreet, Kanturk, Banteer, Mallow, Buttevant, Doneraile, Castletownroche, Fermoy, Ballyduff, Rathcormac, Tallow, Lismore, Cappoquin and Youghal.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[1130] Estuaries [1140] Tidal Mudflats and Sandflats [1220] Perennial Vegetation of Stony Banks [1310] Salicornia Mud [1330] Atlantic Salt Meadows [1410] Mediterranean Salt Meadows [3260] Floating River Vegetation [91A0] Old Oak Woodlands [91E0] Alluvial Forests\* [1029] Freshwater Pearl Mussel (Margaritifera margaritifera) [1092] White-clawed Crayfish (Austropotamobius pallipes) [1095] Sea Lamprey (Petromyzon marinus) [1096] Brook Lamprey (Lampetra planeri) [1099] River Lamprey (Lampetra fluviatilis) [1103] Twaite Shad (Alosa fallax) [1106] Atlantic Salmon (Salmo salar) [1355] Otter (Lutra lutra) [1421] Killarney Fern (Trichomanes speciosum)

The Blackwater rises in boggy land in east Kerry, where Namurian grits and shales build the low heather-covered plateaux. Near Kanturk the plateaux enclose a basin of productive Coal Measures. On leaving the Namurian rocks the Blackwater turns eastwards along the northern slopes of the Boggeragh Mountains before entering the narrow limestone strike vale at Mallow. The valley deepens as first the Nagles Mountains and then the Knockmealdowns impinge upon it. Interesting geological features along this stretch of the Blackwater Valley include limestone cliffs and caves near the villages and small towns of Killavullen and Ballyhooly; the Killavullen caves contain fossil material from the end of the glacial period. The associated basic soils in this area support the growth of plant communities which are rare in Cork because in general the county's rocks are acidic. At Cappoquin the river suddenly turns south and cuts through high ridges of Old Red Sandstone. The Araglin valley is predominantly underlain by sandstone, with limestone occurring in the lower reaches near Fermoy.

Wet woodlands are found where river embankments have broken down and channel edges are subject to daily inundation. This is particularly evident in the steep-sided valley of the River Bride, between Cappoquin and Youghal. The river side of the embankments was often used for willow growing in the past (most recently at Cappoquin) so that the channel is lined by narrow woods of White and Almond-leaved Willow (*Salix alba* and *S. triandra*), with isolated Crack Willow (*S. fragilis*) and Osier (*S. viminalis*). Rusty Willow (*S. cinerea* subsp. *oleifolia*) spreads naturally into the sites and occasionally, as at Villierstown on the Blackwater and Sapperton on the Bride, forms woods with a distinctive mix of woodland and marsh plants, including Gypsywort (*Lycopus europaeus*), Guelder-rose (*Viburnum opulus*), Bittersweet (*Solanum dulcamara*) and various mosses and algae. These wet woodlands form one of the most extensive tracts of the wet woodland habitat in the country.

A small stand of Yew (*Taxus baccata*) woodland occurs within the site. This is on a limestone ridge at Dromana, near Villierstown. While there are some patches of the wood with a canopy of Yew and some very old trees, the quality is generally poor due to the dominance of non-native and invasive species such as Sycamore (*Acer pseudoplatanus*), Beech (*Fagus sylvatica*) and Douglas Fir (*Pseudotsuga menzsisii*). However, it does have the potential to develop into a Yew dominated stand in the long term and the site should continue to be monitored.

Marshes and reedbeds cover most of the flat areas beside the rivers and often occur in mosaic with the wet woodland. Common Reed (*Phragmites australis*) is ubiquitous and is harvested for thatching. There is also much Marsh-marigold (*Caltha palustris*) and, at the edges of the reeds, the Greater and Lesser Pond-sedge (*Carex riparia* and *C. acutiformis*). Hemlock Water-dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Reed Canary-grass (*Phalaris arundinacea*), Meadowsweet (*Filipendula ulmaria*), Common Nettle (*Urtica dioica*), Purple Loosestrife (*Lythrum salicaria*), Common Valerian (*Valeriana officinalis*), Water Mint (*Mentha aquatica*) and Water Forget-me-not (*Myosotis scorpioides*) are all also found. At Banteer there are a number of hollows in the sediments of the floodplain where subsidence and subterranean drainage have created isolated wetlands, sunk below the level of the surrounding fields. The water rises and falls in these holes depending on the water table and several different communities have developed on the acidic or neutral sediments. Many of the ponds are ringed with Rusty Willow, rooted in the mineral soils but sometimes collapsed into the water. Beneath the densest stands are woodland herbs like Yellow Pimpernel (*Lysimachia nemorum*), with locally abundant Common Water-starwort (*Callitriche stagnalis*) and Marsh Ragwort (*Senecio aquaticus*). One of the depressions has Silver Birch (*Betula pendula*), Ash (*Fraxinus excelsior*), Crab Apple (*Malus sylvestris*) and a little Pedunculate Oak (*Quercus robur*) in addition to the willows.

Floating river vegetation is found along much of the freshwater stretches within the site. The species list is quite extensive, with species such as water-crowfoots, including Pond Water-crowfoot (*Ranunculus peltatus*), Canadian Pondweed (*Elodea canadensis*), pondweed species, including Broad-leaved Pondweed (*Potamogeton natans*), water-milfoil species (*Myriophyllum* spp.), Common Club-rush (*Scirpus lacustris*), water-starwort species (*Callitriche* spp.), Lesser Water-parsnip (*Berula erecta*) particularly on the Awbeg, Water-cress (*Nasturtium officinale*), Hemlock Water-dropwort, Fine-leaved Water-dropwort (*O. aquatica*), Common Duckweed (*Lemna minor*), Yellow Water-lily (*Nuphar lutea*), Unbranched Bur-reed (*Sparganium emersum*) and the moss *Fontinalis antipyretica* all occurring.

The grasslands adjacent to the rivers of the site are generally heavily improved, although liable to flooding in many places. However, fields of more species-rich wet grassland with species such as Yellow Iris (*Iris pseudacorus*), Meadowsweet, Meadow Buttercup (*Ranunculus acris*) and rushes (*Juncus* spp.) occur occasionally. Extensive fields of wet grassland also occur at Annagh Bog on the Awbeg. These fields are dominated by Tufted Hair-grass (*Deschampsia cespitosa*) and rushes.

The Blackwater Valley has a number of dry woodlands; these have mostly been managed by the estates in which they occur, frequently with the introduction of Beech and a few conifers, and sometimes of the invasive species Rhododendron (Rhododendron ponticum) and Cherry Laurel (Prunus laurocerasus). Oak woodland is well developed on sandstone about Ballinatray, with the acid oak woodland community of Holly (*Ilex aquifolium*), Bilberry (*Vaccinium myrtillus*), Great Wood-rush (Luzula sylvatica) and the ferns Dryopteris affinis and D. aemula occurring in one place. Irish Spurge (Euphorbia hyberna) continues eastwards on acid rocks from its headquarters to the west, but there are also many plants of richer soils, for example Wood Violet (Viola reichenbachiana), Goldilocks Buttercup (Ranunculus auricomus), Broad-leaved Helleborine (Epipactis helleborine) and Red Campion (Silene dioica). Oak woodland is also found in Rincrew, Carrigane, Glendine, Newport and Dromana. The spread of Rhododendron is locally a problem, as is over-grazing. A few limestone rocks stand over the river in places showing traces of a less acidic woodland type with Ash, False Brome (Brachypodium sylvaticum) and Early-purple Orchid (Orchis mascula).

In the vicinity of Lismore, two deep valleys cut in Old Red Sandstone join to form the Owenashad River before flowing into the Blackwater at Lismore. These valleys retain something close to their original cover of oak with Downy Birch (*Betula pubescens*), Holly and Hazel (*Corylus avellana*) also occurring. There has been much planting of Beech (as well as some of coniferous species) among the oak on the shallower slopes and here both Rhododendron and Cherry Laurel have invaded the woodland.

The oak wood community in the Lismore and Glenmore valleys is of the classic upland type, in which some Rowan (*Sorbus aucuparia*) and Downy Birch occur. Honeysuckle (*Lonicera periclymenum*) and Ivy (*Hedera helix*) cover many of the trees while Great Wood-rush, Bluebell (*Hyacinthoides non-scripta*), Wood-sorrel (*Oxalis acetosella*) and, locally, Bilberry dominate the ground flora. Ferns present on the site include Hard Fern (*Blechnum spicant*), Male Fern (*Dryopteris filix-mas*), the bucklerferns *D. dilatata* and *D. aemula*, and Lady Fern (*Athyrium felix-femina*). There are many mosses present and large species such as *Rhytidiadelphus* spp., *Polytrichum formosum*, *Mnium hornum* and *Dicranum* spp. are noticeable. The lichen flora is important and includes 'old forest' species which imply a continuity of woodland here since ancient times. Tree Lungwort (*Lobaria* spp.) is the most conspicuous and is widespread.

The Araglin valley consists predominantly of broadleaved woodland. Oak and Beech are joined by Hazel, Wild Cherry (*Prunus avium*) and Goat Willow (*Salix caprea*). The ground flora is relatively rich, with Pignut (*Conopodium majus*), Ramsons (*Allium ursinum*), Garlic Mustard (*Alliaria petiolata*) and Wild Strawberry (*Fragaria vesca*). The presence of Ivy Broomrape (*Orobanche hederae*), a local species within Ireland, suggests that the woodland, along with its attendant Ivy, is long established.

Along the lower reaches of the Awbeg River, the valley sides are generally cloaked with mixed deciduous woodland of estate origin. The dominant species is Beech, although a range of other species are also present, e.g. Sycamore, Ash and Horse-chestnut (*Aesculus hippocastanum*). In places the alien invasive species Cherry Laurel dominates the understorey. Parts of the woodlands are more semi-natural in composition, being dominated by Ash, with Hawthorn (*Crataegus monogyna*) and Spindle (*Euonymus europaea*) also present. However, the most natural areas of woodland appear to be the wet areas dominated by Alder and willows (*Salix* spp.). The ground flora of the dry woodland areas features species such as Pignut, Wood Avens (*Geum urbanum*), Ivy and Soft Shield-fern (*Polystichum setiferum*), while the ground flora of the wet woodland areas contains characteristic species such as Remote Sedge (*Carex remota*) and Opposite-leaved Golden-saxifrage (*Chrysosplenium oppositifolium*).

In places along the upper Bride, scrubby, semi-natural deciduous woodland of willow, oak and Rowan occurs, with abundant Great Wood-rush in the ground flora.

The Bunaglanna River passes down a very steep valley, flowing in a north-south direction to meet the Bride River. It flows through blanket bog to heath and then scattered woodland. The higher levels of moisture here enable a vigorous moss and

fern community to flourish, along with a well-developed epiphyte community on the tree trunks and branches.

At Banteer a type of wetland occurs near the railway line which offers a complete contrast to the others. Old turf banks are colonised by Royal Fern (*Osmunda regalis*) and Eared Willow (*Salix aurita*), and between them there is a sheet of Bottle Sedge (*Carex rostrata*), Marsh Cinquefoil (*Potentilla palustris*), Bogbean (*Menyanthes trifoliata*), Marsh St. John's-wort (*Hypericum elodes*) and the mosses *Sphagnum auriculatum* and *Aulacomnium palustre*. The cover is a scraw (i.e. floating vegetation) with characteristic species like Marsh Willowherb (*Epilobium palustre*) and Early Marsh-orchid (*Dactylorhiza incarnata*).

The soil high up the Lismore valleys and in rocky places is poor in nutrients but it becomes richer where streams enter and also along the valley bottoms. In such sites Wood Speedwell (*Veronica montana*), Wood Anemone (*Anemone nemorosa*), Enchanter's-nightshade (*Circaea lutetiana*), Barren Strawberry (*Potentilla sterilis*) and shield-fern (*Polystichum* sp.) occur. There is some Ramsons, Three-nerved Sandwort (*Moehringia trinervia*) and Early-purple Orchid (*Orchis mascula*) locally, with Opposite-leaved Golden-saxifrage, Meadowsweet and Bugle (*Ajuga reptans*) in wet places. A stand of Hazel woodland at the base of the Glenakeeffe valley shows this community well.

The area has been subject to much tree felling in the recent past and re-sprouting stumps have given rise to areas of bushy Hazel, Holly, Rusty Willow and Downy Birch. The ground in the clearings is heathy with Heather (*Calluna vulgaris*), Slender St John's-wort (*Hypericum pulchrum*) and the occasional Broom (*Cytisus scoparius*) occurring.

The estuary and the habitats within and associated with it form a large component of the site. Very extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. The main expanses occur at the southern end of the site, with the best examples at Kinsalebeg in Co. Waterford, and between Youghal and the main bridge north of it across the river in Co. Cork. Other areas occur along the tributaries of the Licky in east Co. Waterford, and Glendine, Newport, Bride and Killahaly Rivers in Waterford west of the Blackwater. There are also large tracts along the Tourig River in Co. Cork. There are narrow bands of intertidal flats along the main river as far north as Camphire Island. Patches of green filamentous algae (*Ulva* sp. and *Enteromorpha* sp.) occur in places, while fucoid algae are common on the more stony flats, even as high upstream as Glenassy or Coneen.

The area of saltmarsh within the site is small. The best examples occur at the mouths of the tributaries and in the townlands of Foxhole and Blackbog. Those found are generally characteristic of Atlantic salt meadows. The species list at Foxhole consists of Common Saltmarsh-grass (*Puccinellia maritima*), small amounts of Greater Seaspurrey (*Spergularia media*), glasswort (*Salicornia* sp.), Sea Arrowgrass (*Triglochin maritima*), Annual Sea-blite (*Suaeda maritima*) and Sea Purslane (*Halimione* 

*portulacoides*) - the latter a very recent coloniser. Some Sea Aster (*Aster tripolium*) occurs, generally with Creeping Bent (*Agrostis stolonifera*). Sea Couch (*Elymus pycnanthus*) and small isolated clumps of Sea Club-rush (*Scirpus maritimus*) are also seen. On the Tourig River additional saltmarsh species found include sea-lavenders (*Limoniun spp.*), Thrift (*Armeria maritima*), Red Fescue (*Festuca rubra*), Common Scurvygrass (*Cochlearia officinalis*) and Sea Plantain (*Plantago maritima*). Oraches (*Atriplex spp.*) are found on channel edges. Species such as Saltmarsh Rush (*Juncus gerardi*) and Sea Rush (*J. maritimus*) are found in places in this site also, and are indicative of Mediterranean salt meadows. Areas of *Salicornia* mud are found at the eastern side of the townland of Foxbole above Youghal, at Blackbog, along the Tourig and Kinsalebeg esturaies.

The shingle spit at Ferrypoint supports a good example of perennial vegetation of stony banks. The spit is composed of small stones and cobbles and has a well developed and diverse flora. At the lowest part, Sea Beet (*Beta vulgaris* subsp. *maritima*), Curled Dock (*Rumex crispus*) and Yellow Horned-poppy (*Glaucium flavum*) occur, while at a slightly higher level Sea Mayweed (*Matricaria maritima*), Cleavers (*Galium aparine*), Rock Samphire (*Crithmum maritimum*), Sea Sandwort (*Honkenya peploides*), Spear-leaved Orache (*Atriplex prostrata*) and Babington's Orache (*A. glabriuscula*). Other species present include Sea Rocket (*Cakile maritima*), Herb-Robert (*Geranium robertianum*), Red Fescue and Kidney Vetch (*Anthyllis vulneraria*). The top of the spit is more vegetated and supports lichens and bryophytes, including *Tortula ruraliformis* and *Rhytidiadelphus squarrosus*.

The site supports several Red Data Book plant species, i.e. Starved Wood-sedge (*Carex depauperata*), Killarney Fern (*Trichomanes speciosum*), Pennyroyal (*Mentha pulegium*), Bird's-nest Orchid (*Neottia nidus-avis*), Golden Dock (*Rumex maritimus*) and Bird Cherry (*Prunus padus*). The first three of these are also protected under the Flora (Protection) Order, 2015, while the Killarney Fern is also listed on Annex II of the E.U. Habitats Directive. The following plants, relatively rare nationally, are also found within the site: Toothwort (*Lathraea squamaria*) - associated with woodlands on the Awbeg and Blackwater; Summer Snowflake (*Leucojum aestivum*) and Flowering Rush (*Butomus umbellatus*) on the Blackwater; Common Calamint (*Calamintha ascendens*), Red Campion, Sand Leek (*Allium scorodoprasum*) and Wood Club-rush (*Scirpus sylvaticus*) on the Awbeg.

The site is also important for the presence of several E.U. Habitats Directive Annex II animal species, including Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*L. fluviatilis*), Twaite Shad (*Alosa fallax fallax*), Freshwater Pearl Mussel (*Margaritifera margaritifera*), Otter (*Lutra lutra*) and Salmon (*Salmo salar*). The Awbeg supports a population of White-clawed Crayfish (*Austropotamobius pallipes*). This threatened species has been recorded from a number of locations and its remains are also frequently found in Otter spraints, particularly in the lower reaches of the river. The freshwater stretches of the Blackwater and Bride Rivers are designated salmonid rivers. The Blackwater is noted for its enormous run of salmon over the years. The river is characterised by significant pools, streams, glides, and generally, a good push of water coming through except in

very low water. Spring salmon fishing can be carried out as far upstream as Fermoy and is highly regarded especially at Careysville. The Bride, main Blackwater upstream of Fermoy, and some of the tributaries are more associated with grilse fishing.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger and Irish Hare. The bat species Natterer's Bat, Daubenton's Bat, Whiskered Bat, Brown Long-eared Bat and Pipistrelle, can be seen feeding along the river, roosting under the old bridges and in old buildings.

Common Frog, a Red Data Book species that is also legally protected (Wildlife Act, 1976), occurs throughout the site. The rare bush cricket *Metrioptera roselii* (Order Orthoptera) has been recorded in the reed/willow vegetation of the river embankment on the Lower Blackwater River. The Swan Mussel (*Anodonta cygnea*), a scarce species nationally, occurs at a few sites along the freshwater stretches of the Blackwater.

Several bird species listed on Annex I of the E.U. Birds Directive are found on the site. Some use it as a staging area, others are vagrants, while others use it more regularly. Internationally important numbers of Whooper Swan (average peak 174, 1994/95-95/96) and nationally important numbers Bewick's Swan (average peak 5, 1996/97-2000/01) use the Blackwater Callows. Golden Plover occur in regionally important numbers on the Blackwater estuary (average peak 885, 1984/85-86/87) and on the River Bride (absolute maximum 2,141, 1994/95). Staging Terns visit the site annually, with >300 Sandwich Tern and >200 Arctic/Common Tern (average peak 1974-1994). The site also supports populations of the following: Red Throated Diver, Great Northern Diver, Barnacle Goose, Ruff, Wood Sandpiper and Greenland Whitefronted Goose. Three breeding territories for Peregrine Falcon are known along the Blackwater Valley. This, the Awbeg and the Bride River are also thought to support at least 30 pairs of Kingfisher. Little Egret breed at the site (12 pairs in 1997, 19 pairs in 1998).

The site holds important numbers of wintering waterfowl. Both the Blackwater Callows and the Blackwater Estuary Special Protection Areas (SPAs) hold internationally important numbers of Black-tailed Godwit (average peak 847, 1994/95-95/96 on the callows, average peak 845, 1974/75-93/94 in the estuary). The Blackwater Callows also hold Wigeon (average peak 2,752), Teal (average peak 1,316), Mallard (average peak 427), Shoveler (average peak 28), Lapwing (average peak 880), Curlew (average peak 416) and Black-headed Gull (average peak 396) (counts from 1994/95-95/96). Numbers of birds using the Blackwater Estuary, given as the mean of the highest monthly maxima over 20 years (1974-94), are Shelduck (137 +10 breeding pairs), Wigeon (780), Teal (280), Mallard (320 + 10 breeding pairs), Goldeneye (11-97), Oystercatcher (340), Ringed Plover (50 + 4 breeding pairs), Grey Plover (36), Lapwing (1,680), Knot (150), Dunlin (2,293), Snipe (272), Black-tailed Godwit (845), Bar-tailed Godwit (130), Curlew (920), Redshank (340), Turnstone (130), Black-headed Gull (4,000) and Lesser Black-backed Gull (172). The greatest numbers (75%) of the wintering waterfowl of the estuary are located in the Kinsalebeg area on the east of the estuary in Co. Waterford. The remainder are concentrated along the Tourig estuary on the Co. Cork side.

The river and river margins also support many Heron, non-breeding Cormorant and Mute Swan (average peak 53, 1994/95-95/96 in the Blackwater Callows). Heron occurs all along the Bride and Blackwater Rivers: 2 or 3 pairs at Dromana Rock; approximately 25 pairs in the woodland opposite; 8 pairs at Ardsallagh Wood and around 20 pairs at Rincrew Wood have been recorded. Some of these are quite large and significant heronries. Significant numbers of Cormorant are found north of the bridge at Youghal and there are some important roosts present at Ardsallagh Wood, downstream of Strancally Castle and at the mouth of the Newport River. Of note are the high numbers of wintering Pochard (e.g. 275 individuals in 1997) found at Ballyhay quarry on the Awbeg, the best site for Pochard in Co. Cork.

Other important species found within the site include Long-eared Owl, which occurs all along the Blackwater River, and Barn Owl, a Red Data Book species, which is found in some old buildings and in Castlehyde, west of Fermoy. Reed Warbler, a scarce breeding species in Ireland, was found for the first time in the site in 1998 at two locations. It is not known whether or not this species breeds on the site, although it breeds nearby to the south of Youghal. Dipper occurs on the rivers.

Land use at the site is mainly centred on agricultural activities. The banks of much of the site and the callows, which extend almost from Fermoy to Cappoquin, are dominated by improved grasslands which are drained and heavily fertilised. These areas are grazed and used for silage production. Slurry is spread over much of this area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the populations of E.U. Habitats Directive Annex II animal species within it. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the Blackwater and its tributaries, and there are a number of angler associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. Other recreational activities such as boating, golfing and walking are also popular. Water skiing is carried out at Villierstown. Parts of Doneraile Park and Anne's Grove are included in the site: both areas are primarily managed for amenity purposes. There is some hunting of game birds and Mink within the site. Ballyhay quarry is still actively quarried for sand and gravel. Several industrial developments, which discharge into the river, border the site.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, dredging of the upper reaches of the Awbeg, over-grazing within the woodland areas, and invasion by non-native species, for example Rhododendron and Cherry Laurel. Overall, the River Blackwater is of considerable conservation significance for the occurrence of good examples of habitats and populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively. Furthermore it is of high conservation value for the populations of bird species that use it. Two Special Protection Areas, designated under the E.U. Birds Directive, are also located within the site - Blackwater Callows and Blackwater Estuary. Additionally, the importance of the site is enhanced by the presence of a suite of uncommon plant species.

#### SITE SYNOPSIS

### SITE NAME: BLACKWATER CALLOWS SPA

#### **SITE CODE: 004094**

The Blackwater Callows SPA comprises the stretch of the River Blackwater that runs in a west to east direction between Fermoy and Lismore in Counties Cork and Waterford, a distance of almost 25 km. The site includes the river channel and strips of seasonally-flooded grassland within the flood plain. Sandstone ridges, which run parallel to the river, confine the area of flooding to a relatively narrow corridor.

The river channel has a well-developed aquatic plant community, which includes such species as Pond Water-crowfoot (*Ranunculus peltatus*), Canadian Pondweed (*Elodea canadensis*) and a variety of pondweeds (*Potamogeton* spp.), water-milfoils (*Myriophyllum* spp.) and water-starworts (*Callitriche* spp.).

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Wigeon, Teal and Black-tailed Godwit. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site is of high ornithological interest on account of its wintering waterfowl populations. Whooper Swan occurs in numbers of international importance (212) - all figures are mean peaks for the five winters 1995/96 to 1999/2000. Bewick's Swan were regularly recorded at the site up to the mid-1990s; however, in the winters of 1997/98 and 1998/99 only four and two individuals respectively were recorded, and the species is no longer considered to be a regular visitor. This decline is in line with a national decrease and a marked contraction in range. The site supports nationally important populations of Wigeon (2,313), Teal (898) and Black-tailed Godwit (251). Other wintering species that occur include Mallard (398) Shoveler (26), Lapwing (191), Curlew (457) and Black-headed Gull (311).

Little Egret uses the site throughout the year as there is a nearby breeding colony downstream. The river system provides an important feeding area for these birds.

The Blackwater Callows SPA is of importance for its populations of wintering waterfowl, including an internationally important population of Whooper Swan and nationally important populations of Wigeon, Teal and Black-tailed Godwit. The presence of Whooper Swan, as well as Little Egret, is of particular note as these species are listed on Annex I of the E.U. Birds Directive. Part of the Blackwater Callows SPA is a Wildfowl Sanctuary.

31.10.2014



## Site Name: Great Island Channel SAC

## Site Code: 001058

The Great Island Channel stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. Geologically, Cork Harbour consists of two large areas of open water in a limestone basin, separated from each other and the open sea by ridges of Old Red Sandstone. Within this system, Great Island Channel forms the eastern stretch of the river basin and, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owennacurra and Dungourney Rivers. These rivers, which flow through Midleton, provide the main source of freshwater to the North Channel.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[1140] Tidal Mudflats and Sandflats[1330] Atlantic Salt Meadows

The main habitats of conservation interest in Great Island Channel SAC are the sheltered tidal sand and mudflats and the Atlantic salt meadows. Owing to the sheltered conditions, the intertidal flats are composed mainly of soft muds. These muds support a range of macro-invertebrates, notably *Macoma balthica, Scrobicularia plana, Hydrobia ulvae, Nepthys hombergi, Nereis diversicolor* and *Corophium volutator*. Green algal species occur on the flats, especially *Ulva lactua* and *Enteromorpha* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially at Rossleague and Belvelly.

The saltmarshes are scattered through the site and are all of the estuarine type on mud substrate. Species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Greater Sea-spurrey (*Spergularia media*), Lax-flowered Sea-lavender (*Limonium humile*), Sea Arrowgrass (*Triglochin maritimum*), Sea Mayweed (*Matricaria maritima*) and Red Fescue (*Festuca rubra*).

The site is extremely important for wintering waterfowl and is considered to contain three of the top five areas within Cork Harbour, namely North Channel, Harper's Island and Belvelly-Marino Point. Shelduck is the most frequent duck species with 800-1,000 birds centred on the Fota/Marino Point area. There are also large flocks of Teal and Wigeon, especially at the eastern end. Waders occur in the greatest density north of Rosslare, with Dunlin, Godwit, Curlew and Golden Plover the commonest species. A population of about 80 Grey Plover is a notable feature of the area. All the mudflats support feeding birds; the main roost sites are at Weir Island and Brown Island, and to the north of Fota at Killacloyne and Harper's Island. Ahanesk supports a roost also but is subject to disturbance. The numbers of Grey Plover and Shelduck, as given above, are of national importance.

The site is an integral part of Cork Harbour which is a wetland of international importance for the birds it supports. Overall, Cork Harbour regularly holds over 20,000 waterfowl and contains internationally important numbers of Black-tailed Godwit (1,181) and Redshank (1,896), along with nationally important numbers of nineteen other species. Furthermore, it contains large Dunlin (12,019) and Lapwing (12,528) flocks. All counts are average peaks, 1994/95 – 1996/97. Much of the site falls within Cork Harbour Special Protection Area, an important bird area designated under the E.U. Birds Directive.

While the main land use within the site is aquaculture (oyster farming), the greatest threats to its conservation significance come from road works, infilling, sewage outflows and possible marina developments.

The site is of major importance for the two habitats listed on Annex I of the E.U. Habitats Directive, as well as for its important numbers of wintering waders and wildfowl. It also supports a good invertebrate fauna.



## Site Name: Lower River Suir SAC

#### Site Code: 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. The Suir and its tributaries flow through the counties of Tipperary, Kilkenny and Waterford.

Upstream of Waterford city, the swinging meanders of the Suir criss-cross the Devonian sandstone rim of hard rocks no less than three times as they leave the limestone-floored downfold below Carrick-on-Suir. In the vicinity of Carrick-on-Suir the river follows the limestone floor of the Carrick Syncline. Upstream of Clonmel the river and its tributaries traverse Upper Palaeozoic Rocks, mainly the Lower Carboniferous Visean and Tournaisian. The freshwater stretches of the Clodiagh River in Co. Waterford traverse Silurian rocks, through narrow bands of Old Red Sandstone and Lower Avonian Shales, before reaching the carboniferous limestone close to its confluence with the Suir. The Aherlow River flows through a Carboniferous limestone valley, with outcrops of Old Red Sandstone forming the Galtee Mountains to the south and the Slievenamuck range to the north. Glacial deposits of sands and gravels are common along the valley bottom, flanking the present-day river course.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

[1330] Atlantic Salt Meadows
[1410] Mediterranean Salt Meadows
[3260] Floating River Vegetation
[6430] Hydrophilous Tall Herb Communities
[91A0] Old Oak Woodlands
[91E0] Alluvial Forests\*
[91J0] Yew Woodlands\*
[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
[1092] White-clawed Crayfish (*Austropotamobius pallipes*)
[1095] Sea Lamprey (*Petromyzon marinus*)
[1096] Brook Lamprey (*Lampetra planeri*)
[1099] River Lamprey (*Lampetra fluviatilis*)

[1103] Twaite Shad (*Alosa fallax*)[1106] Atlantic Salmon (*Salmo salar*)[1355] Otter (*Lutra lutra*)

Alluvial wet woodland is a declining habitat type in Europe as a result of drainage and reclamation. The best examples of this type of woodland in the site are found on the islands just below Carrick-on-Suir and at Fiddown Island. Species occurring here include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Rusty Willow (*S. cinerea* subsp. *oleifolia*), Osier (*S. viminalis*), with Yellow Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Pendulous Sedge (*Carex pendula*), Meadowsweet (*Filipendula ulmaria*) and Common Valerian (*Valeriana officinalis*). The terrain is littered with dead trunks and branches and intersected with small channels which carry small streams to the river. The bryophyte and lichen floras appear to be rich. A small plot is currently being coppiced and managed by the National Parks and Wildlife Service. In the drier areas species such as Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and Blackthorn (*Prunus spinosa*) occur.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the floodplain of the river is intact. Characteristic species of the habitat include Meadowsweet, Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed (*Calystegia sepium*).

Old oak woodlands are also of importance at the site. The best examples are seen in Portlaw Wood which lies on both sides of the Clodiagh River. On the south-facing side the stand is more open and the oaks (mainly Pedunculate Oak, *Quercus robur*) are well grown and spreading. Ivy (Hedera helix) and Bramble (Rubus fruticosus agg.) are common on the ground, indicating relatively high light conditions. Oak regeneration is dense, varying in age from 0-40 years and Holly (*Ilex aquifolium*) is fairly common but mostly quite young. Across the valley, by contrast, the trees are much more closely spaced and though taller, are poorly grown on average. There are no clearings; large oaks extend to the boundary wall. In the darker conditions, Ivy is much rarer and Holly much more frequent, forming a closed canopy in places. Oak regeneration is uncommon since there are as yet few natural clearings. The shallowness of the soil on the north-facing slope probably contributes to the poor tree growth there. The acid nature of the substrate has induced a 'mountain' type oakwood community to develop. The site is quite species-rich throughout, including an abundance of mosses, liverworts and lichens. The rare lichen Lobaria pulmonaria, an indicator of ancient woodlands, is found here.

Inchinsquillib Wood consists of three small separate sloping blocks of woodland in a valley cut by the young Multeen River and its tributaries through acidic Old Red Sandstone and Silurian rocks. Two blocks, both with an eastern aspect, located to the north of the road, are predominantly of Sessile Oak (*Quercus petraea*) and Hazel, with Downy Birch (*Betula pubescens*), Ash and Holly. The ground flora is quite mixed with,

for example, Wood-sedge (*Carex sylvatica*), Bluebell (*Hyacinthoides non-scripta*), Primrose (*Primula vulgaris*), Wood-sorrel (*Oxalis acetosella*), Pignut (*Conopodium majus*) and Hard Fern (*Blechnum spicant*). The base poor nature of the underlying rock is to some extent masked by the overlying drift. The third block, to the south of the road, and with a northern aspect, is a similar although less mature mixture of Sessile Oak, Birch and Holly. Here the influence of the drift is more marked, with the occurrence of Wood Anemone (*Anemone nemorosa*) amongst the ground flora.

Two stands of Yew (*Taxus baccata*) woods, a rare habitat in Ireland and the E.U., occur within the site. These are on limestone ridges at Shanbally and Cahir Park. Both are in woods planted with non-native species, including conifers. However, the area at Cahir Park is fairly substantial in size and includes some relatively undisturbed patches of wood and some very old trees. Regeneration of the Yew trees is mostly poor, due to competition from species such as Sycamore (*Acer pseudoplatanus*) and, at Shanbally, due to heavy grazing by goats. Other native species which occur with the Yew trees include Ash, Pedunculate Oak, Hazel and Spindle (*Euonymus europaeus*). Future prospects for these Yew woods are good as the sites are proposed for restoration under a Coillte E.U. LIFE programme.

Floating river vegetation is evident in the freshwater stretches of the River Suir and along many of its tributaries. Typical species found include Canadian Pondweed (*Elodea canadensis*), water-milfoils (*Myriophyllum* spp.), Fennel Pondweed (*Potamogeton pectinatus*), Curled Pondweed (*P. crispus*), Perfoliate Pondweed (*P. perfoliatus*), Pond Water-crowfoot (*Ranunculus peltatus*), other crowfoots (*Ranunculus spp.*) and the moss *Fontinalis antipyretica*. At a couple of locations along the river Opposite-leaved Pondweed (*Groenlandia densa*) occurs. This species is protected under the Flora (Protection) Order, 1999.

The Aherlow River is fast flowing and mostly follows a natural unmodified river channel. Submerged vegetation includes the aquatic moss *Fontinalis antipyretica* and Stream Water-crowfoot (*R. pencillatus*), while shallow areas support species such as Reed Canary-grass (*Phalaris arundinacea*), Brooklime (*Veronica beccabunga*) and Water Mint (*Mentha aquatica*). The river bank is fringed in places with Alder (*Alnus glutinosa*) and willows (*Salix* spp.).

The Multeen River is fast flowing, mostly gravel-bottomed and appears to follow a natural unmodified river channel. Water-crowfoots occur in abundance and the aquatic moss *Fontinalis antipyretica* is also common. In sheltered shallows, species such as Water-cress (*Nasturtium officinale*) and water-starworts (*Callitriche* spp.) occur. The river channel is fringed for most of its length with Alder, Willow and a narrow strip of marshy vegetation.

Salt meadows occur below Waterford City in old meadows where the embankment is absent, or has been breached, and along the tidal stretches of some of the inflowing rivers below Little Island. There are very narrow, non-continuous bands of this habitat along both banks. More extensive areas are also seen along the south bank at Ballynakill, the east side of Little Island, and in three large salt meadows between Ballynakill and Cheekpoint. The Atlantic and Mediterranean sub-types are generally intermixed. The species list is extensive and includes Red Fescue (*Festuca rubra*), oraches (*Atriplex* spp.), Sea Aster (*Aster tripolium*), Sea Couch (*Elymus pycnanthus*), frequent Sea Milkwort (*Glaux maritima*), occasional Wild Celery (*Apium graveolens*), Parsley Water-dropwort (*Oenanthe lachenalii*), English Scurvygrass (*Cochlearia anglica*) and Sea Arrowgrass (*Triglochin maritima*). These species are more representative of the Atlantic sub-type of the habitat. Common Cord-grass (*Spartina anglica*), is rather frequent along the main channel edge and up the internal channels. The legally protected (Flora (Protection) Order, 1999) Meadow Barley (*Hordeum secalinum*) grows at the landward transition of the saltmarsh. Sea Rush (*Juncus maritimus*), an indicator of the Mediterranean salt meadows, also occurs.

Other habitats at the site include wet and dry grassland, marsh, reedswamp, improved grassland, coniferous plantations, deciduous woodland, scrub, tidal river, stony shore and mudflats. The most dominant habitat adjoining the river is improved grassland, although there are wet fields with species such as Yellow Iris, Meadowsweet, rushes (*Juncus* spp.), Meadow Buttercup (*Ranunculus acris*) and Cuckooflower (*Cardamine pratensis*).

Cabragh marshes, just below Thurles, lie in a low-lying tributary valley into which the main river floods in winter. Here there is an extensive area of Common Reed (*Phragmites australis*) with associated marshland and peaty fen. The transition between vegetation types is often well displayed. A number of wetland plants of interest occur, in particular the Narrow-leaved Bulrush (*Typha angustifolia*), Bottle Sedge (*Carex rostrata*) and Blunt-flowered Rush (*Juncus subnodulosus*). The marsh is naturally eutrophic but it has also the nutritional legacy of the former sugar factory which discharged into it through a number of holding lagoons, now removed. Production is high, which is seen in the size of such species as Celery-leaved Buttercup (*Ranunculus sceleratus*), as well as in the reeds themselves.

Throughout the Lower River Suir site are small areas of woodland other than those described above. These tend to be a mixture of native and non-native species, although there are some areas of semi-natural wet woodland with species such as Ash and willow. Cahir Park Woodlands is a narrow tract of mixed deciduous woodland lying on the flat-lying floodplain of the River Suir. This estate woodland was planted over one hundred years ago and it contains a large component of exotic tree species. However, due to original planting and natural regeneration there is now a good mix of native and exotic species. About 5 km north-west of Cashel, Ardmayle pond is a long, possibly artificial water body running parallel to the River Suir. It is partly shaded by planted Lime (*Tilia* hybrids), Sycamore and the native Alder. Growing beneath the trees are shade tolerant species such as Remote sedge (*Carex remota*).

The site is of particular conservation interest for the presence of a number of Annex II animal species, including Freshwater Pearl Mussel (both *Margaritifera margaritifera* and *M. margaritifera* subsp. *durrovensis* occur), White-clawed Crayfish, Salmon, Twaite Shad (*Alosa fallax fallax*), three species of Lampreys - Sea Lamprey, Brook Lamprey and River Lamprey, and Otter. This is one of only three known spawning grounds in the country for Twaite Shad.

The site also supports populations of several other animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat, Nattererer's Bat, Pipistrelle Bat, Pine Marten, Badger, Irish Hare, Smelt and Common Frog. Breeding stocks of Carp are found in Kilsheelan Lake. This is one of only two lakes in the country which is known to have supported breeding Carp. Carp require unusually high summer water temperatures to breed in Ireland. As the site is therefore unusual in this regard, it may also support interesting invertebrate populations.

Parts of the site have also been identified as of ornithological importance for a number of Annex I (E.U. Birds Directive) bird species, including Greenland Whitefronted Goose (10), Golden Plover (1,490), Whooper Swan (7) and Kingfisher. Figures given in brackets are the average maximum counts from four count areas within the site for the three winters 1994-1997. Wintering populations of migratory birds use the site. Flocks are seen in Coolfinn Marsh and also along the reedbeds and saltmarsh areas of the Suir. Coolfinn supports nationally important numbers of Greylag Goose on a regular basis, with numbers between 600 and 700 recorded. Other species occurring include Mallard (21), Teal (159), Wigeon (26), Tufted Duck (60), Pintail (4), Pochard (2), Little Grebe (2), Black-tailed Godwit (20), Oystercatcher (16), Lapwing (993), Dunlin (101), Curlew (195), Redshank (28), Greenshank (4) and Green Sandpiper (1). Nationally important numbers of Lapwing (2,750) were recorded at Faithlegg in the winter of 1996/97. In Cabragh marshes there is abundant food for surface feeding wildfowl which total approximately 1,000 in winter. Widgeon, Teal and Mallard are numerous, and the latter has a large breeding population, with up to 400 in summer. In addition, less frequent species like Shoveler and Pintail occur and there are records for both Whooper and Bewick's swans. Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive, occurs along some of the many tributaries throughout the site.

Land use at the site consists mainly of agricultural activities including grazing, silage production, fertilising and land reclamation. The grassland is intensively managed and the rivers are therefore vulnerable to pollution from run-off of fertilisers and slurry. Arable crops are also grown. Fishing is a main tourist attraction on stretches of the Suir and some of its tributaries, and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. The Aherlow River is a designated Salmonid Water under the E.U. Freshwater Fish Directive. Other recreational activities such as boating, golfing and walking are also popular. Several industrial developments, which discharge into the river, border the site including three dairy related operations and a tannery.

The Lower River Suir contains excellent examples of a number of Annex I habitats, including the priority habitats alluvial forest and Yew woodland. The site also supports populations of several important animals species, some listed on Annex II of the Habitats Directive or listed in the Irish Red Data Book. The presence of two

legally protected plants (Flora (Protection) Order, 1999) and the ornithological importance of the site adds further to the ecological interest and importance.

#### SITE SYNOPSIS

#### SITE NAME: CORK HARBOUR SPA

#### **SITE CODE: 004030**

Cork Harbour is a large, sheltered bay system, with several river estuaries principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay, Ringabella Creek and the Rostellan and Poulnabibe inlets.

Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nepthys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algae species occur on the flats, especially *Ulva* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Some shallow bay water is included in the site. Rostellan Lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Little Grebe, Great Crested Grebe, Cormorant, Grey Heron, Shelduck, Wigeon, Teal, Mallard, Pintail, Shoveler, Redbreasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank, Blackheaded Gull, Common Gull, Lesser Black-backed Gull and Common Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl. Of particular note is that the site supports internationally important populations of Black-tailed Godwit (1,896) and Redshank (2,149) - all figures given are five year mean peaks for the period 1995/96 to 1999/2000. Nationally important populations of the following 19 species occur: Little Grebe (57), Great Crested Grebe (253), Cormorant (521), Grey Heron (80), Shelduck (2,009), Wigeon (1,791), Teal (1,065), Mallard (513), Pintail (57), Shoveler (103), Red-breasted Merganser (121), Oystercatcher (1,809), Golden Plover (3,342), Grey Plover (95), Lapwing (7,569), Dunlin (9,621), Bartailed Godwit (233), Curlew (2,237) and Greenshank (46). The Shelduck population is the largest in the country (over 10% of national total). Other species using the site include Mute Swan (38), Whooper Swan (5), Pochard (72), Gadwall

(6), Tufted Duck (64), Goldeneye (21), Coot (53), Ringed Plover (73), Knot (26) and Turnstone (113). Cork Harbour is an important site for gulls in winter and autumn, especially Black-headed Gull (3,640), Common Gull (1,562) and Lesser Black-backed Gull (783), all of which occur in numbers of national importance. Little Egret and Mediterranean Gull, two species which have recently colonised Ireland, also occur at this site.

A range of passage waders occurs regularly in autumn, including such species as Ruff (5-10), Spotted Redshank (1-5) and Green Sandpiper (1-5). Numbers vary between years and usually a few of each of these species over-winter.

Cork Harbour has a nationally important breeding colony of Common Tern (102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed.

Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Little Egret, Golden Plover, Bar-tailed Godwit, Ruff, Mediterranean Gull and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it. Cork Harbour is also a Ramsar Convention site and part of Cork Harbour SPA is a Wildfowl Sanctuary.

# Appendix D: CGEP Conservation and Habitat Management Plan (CHMP)

Appendix E: Aquatic Ecology, Fisheries and Freshwater Pearl Mussel (Margaritifera margaritifera) Surveys in Watercourses Downstream of CGEP.