White Hill Wind Farm Electricity Substation & Electricity Line

Environmental Impact Assessment Report

Annex 7.1: Flood Risk Assessment

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WHITE HILL WIND FARM ELECTRICITY SUBSTATION AND ELECTRICITY LINE

STAGE II – FLOOD RISK ASSESSMENT

FINAL REPORT

Prepared for:
WHITE HILL WIND LIMITED

Prepared by:
Hydro-Environmental Services

DOCUMENT INFORMATION

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Signed:	 _____ **Michael Gill B.A., B.A.I., M.Sc., MIEI** **Managing Director – Hydro-Environmental Services**

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This report has been prepared by HES with all reasonable skill, care and 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. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. The flood risk assessment undertaken as part of this study is site specific and the report findings cannot be applied to other sites outside of the survey area which is defined by the site boundary. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) were requested by Galetech Energy Services (GES), on behalf of White Hill Wind Limited, to undertake a site-specific Stage II Flood Risk Assessment (FRA) for the White Hill Wind Farm Electricity Substation & Electricity Line ('the project').

A site location map is shown as **Figure A** below.

This FRA is carried out in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (DoEHLG, 2009).

1.2 STATEMENT OF QUALIFICATIONS

Hydro-Environmental Services (HES) are a specialist geological, hydrological, hydrogeological and environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford.

Our core area of expertise and experience is hydrology and hydrogeology, including flooding risk assessment, flood modelling and drainage design.

Michael Gill (P.Geo, BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer with 22 years environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological assessments for various developments across Ireland. Michael has significant experience in surface water drainage issues, SUDs design, and flood risk assessment.

David Broderick (P.Geo, BSc, H. Dip Env Eng, MSc) is a Hydrogeologist with 17 years environmental consultancy experience in Ireland. David has significant experience in SUDs design, flood risk assessments and flood modelling.

1.3 REPORT LAYOUT

This FRA report has the following format:

- Section 2 describes the project site setting and details of the project;
- Section 3 outlines the hydrological and hydrogeological characteristics of the local surface water catchments in the vicinity of the project site;
- Section 4 deals with a site-specific FRA undertaken for the project which was carried out in accordance with the above-mentioned guidelines;
- Section 5 provides commentary in relation to flood policy contained in Kilkenny County Development Plan (2021-2027) and Carlow County Development Plan (2022 – 2028); and,
- Section 6 Presents the FRA report conclusions.

1.4 PROJECT DETAILS

In summary, the project comprises the following main components:

- A 110kV 'loop-in/loop-out' electricity substation;
- Approximately 320 metres (m) of 110kV underground electricity line between the electricity substation and the Kellis-Kilkenny overhead transmission line and the provision of 2 no. interface masts;
- An electrical control unit at the permitted White Hill Wind Farm site;

- Approximately 8.8km of underground electricity line between the electricity substation and the electrical control unit; and,
- All associated and ancillary site development, access, excavation, construction, landscaping and reinstatement works, including provision of site drainage infrastructure.

The project site traverses the administrative boundary between counties Kilkenny and Carlow; with the electricity substation and c. 3.3km of the underground electricity line located in Co. Kilkenny and c. 5.5km of the underground electricity line and the electrical control unit located in Co. Carlow

The underground electricity line will be located within both private lands (agricultural and forestry) and within the carriageways of locally classed public roads.

A Surface Water Management Plan (SWMP), incorporating the surface water drainage design has been prepared for the electricity substation and electrical control unit, see **Annex 3.5** (**Volume II of the EIAR**), and incorporates the principles of Sustainable Drainage Systems (SuDS) through an arrangement of surface water drainage infrastructure.

The full project description is provided at **Chapter 3** of this EIAR.

A site location map is shown as **Figure A** below.

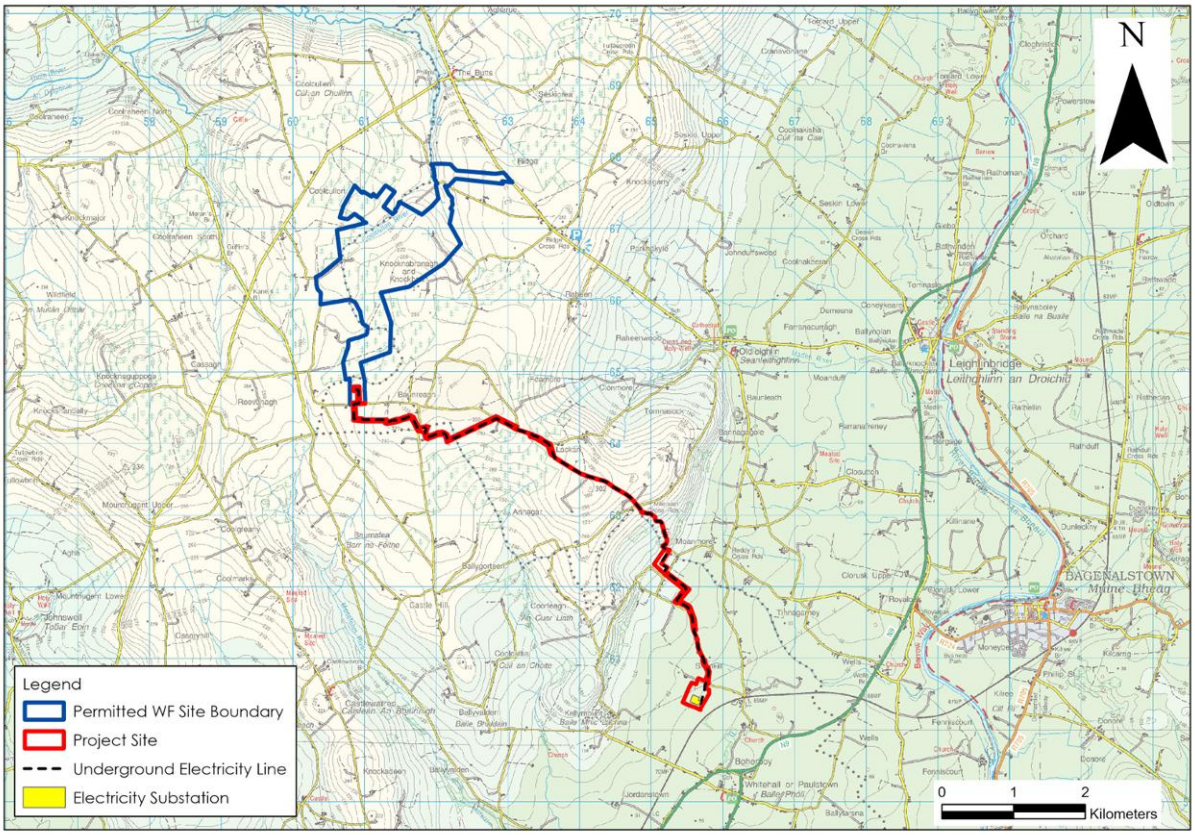

Figure A: Site Location Map

2. BACKGROUND INFORMATION

This section provides a site description and details on the topographical setting of the project site.

2.1 SITE DESCRIPTION AND TOPOGRAPHY

The project site is located at the southern fringes of the Castlecomer Plateau. The Castlecomer Plateau is an elevated plateau located in south County Laois, northwest County Carlow and northeast County Kilkenny. The Castlecomer Plateau is characterised by undulating hills and steep escarpments at its fringes.

The lowlands to the south of the Castlecomer Plateau are a mixture of pasture and tillage with fields typically bordered by mature broadleaf tree lines and hedgerows.

The electricity substation site is located in the townland of Shankill, Paulstown, Co. Kilkenny. The substation is situated within agricultural lands adjacent to the M9 motorway.

Topography at the substation location is mapped as relatively flat, with lands sloping slightly southeasterly. Overall site elevations range between approximately 68 and 73m OD (Ordnance Datum).

The electrical control unit is located to the south of the permitted White Hill Wind Farm, within the townland of Baunreagh, Co. Carlow. The location is also situated in agricultural lands. Forest and semi-natural areas surround the proposed location to the north and east. The electrical control unit is in an upland setting where topography in the area is hilly. The elevation of the electrical control unit is approximately 280m OD.

The underground electricity line will comprise c. 5,925m (c. 5.9km) located within private agricultural lands/forestry and c. 2,850m (c. 2.9km) with the carriageways of the L6673, L6738, L7117 and L71172 local roads.

The ground elevations along the electricity line generally decreases from c. 280m OD at the electrical control unit to c. 68m OD at the electricity substation. However, due to the hilly nature of the topography along the route, the highest elevation reaches c. 310m OD.

3. ENVIRONMENTAL SETTING AND CATCHMENT CHARACTERISTICS

This section gives an overview of the hydrological and geological characteristics of the project site and local area.

3.1 HYDROLOGY

3.1.1 Regional and Local Hydrology

On a regional scale, the electricity substation, electrical control unit and electricity line are located entirely within the River Barrow surface water catchment within Hydrometric Area 14. The River Barrow flows approximately 3.5km to the east of the electricity substation site.

On a more local scale, the substation is located in the Barrow_SC_120 sub-catchment and within the Moanmore_010 river waterbody sub-basin (Moanmore Stream catchment).

The electrical control unit is also mapped within the Barrow_SC_120 sub–catchment, whilst being situated more locally in the Monefelim_010 river sub-basin (Monefelim River catchment).

The majority of the electricity line is also located in the Barrow_SC_120 sub–catchment with the exception of 1.3km which is located in the Barrow_SC_110 sub-catchment and more locally within the Old Leighlin Stream_010 river waterbody sub-basin (Old Leighlin Stream catchment).

In all, the electricity line passes through 4 no. sub-basins; the Monefelim_010 (c. 1.4km), Monefelim_030/Paulstown Stream (c. 2.1km), Old Leighlin Stream_010 (c. 1.3km) and Moanmore_010 (c. 4.0km).

Refer to **Figure B** below for a local hydrology map.

The existing site drainage is described in more detail in **Section 4.4.1**.

3.1.2 Rainfall and Evaporation

The SAAR (Standard Average Annual Rainfall 1981 – 2010) recorded at Coon (approximately 6km northwest of the project site), the closest rainfall station to the site with long-term SAAR data, is 1,056mm (**www.met.ie**).

The closest synoptic[1] station where the average potential evapotranspiration (PE) is recorded is also at Kilkenny City. The long-term average PE for this station is 448mm/year. This value is used as a best estimate of the site PE. Actual Evaporation (AE) at the site is estimated as 425mm/year (which is 0.95 × PE).

The effective rainfall (ER) represents the water available for runoff and groundwater recharge. The ER for the site is calculated as follows:

Effective rainfall (ER) = AAR – AE
=1,056mm/yr – 425mm/yr
ER = 631mm/yr

Based on recharge coefficient estimates from the GSI (www.gsi.ie), an average estimate of 25% recharge is taken for the overall project site. This value is for "Till overlain by poorly drained (gley) soil".

1 Meteorological station at which observations are made for synoptic meteorology and at the standard synoptic hours of 00:00, 06:00, 12:00, and 18:00.

The recharge coefficient of 25% was used to calculate values for key hydrological properties. Therefore, annual recharge (25%) and runoff rates (75%) for the project site area are estimated to be c. 158mm/year and c. 473mm/year respectively.

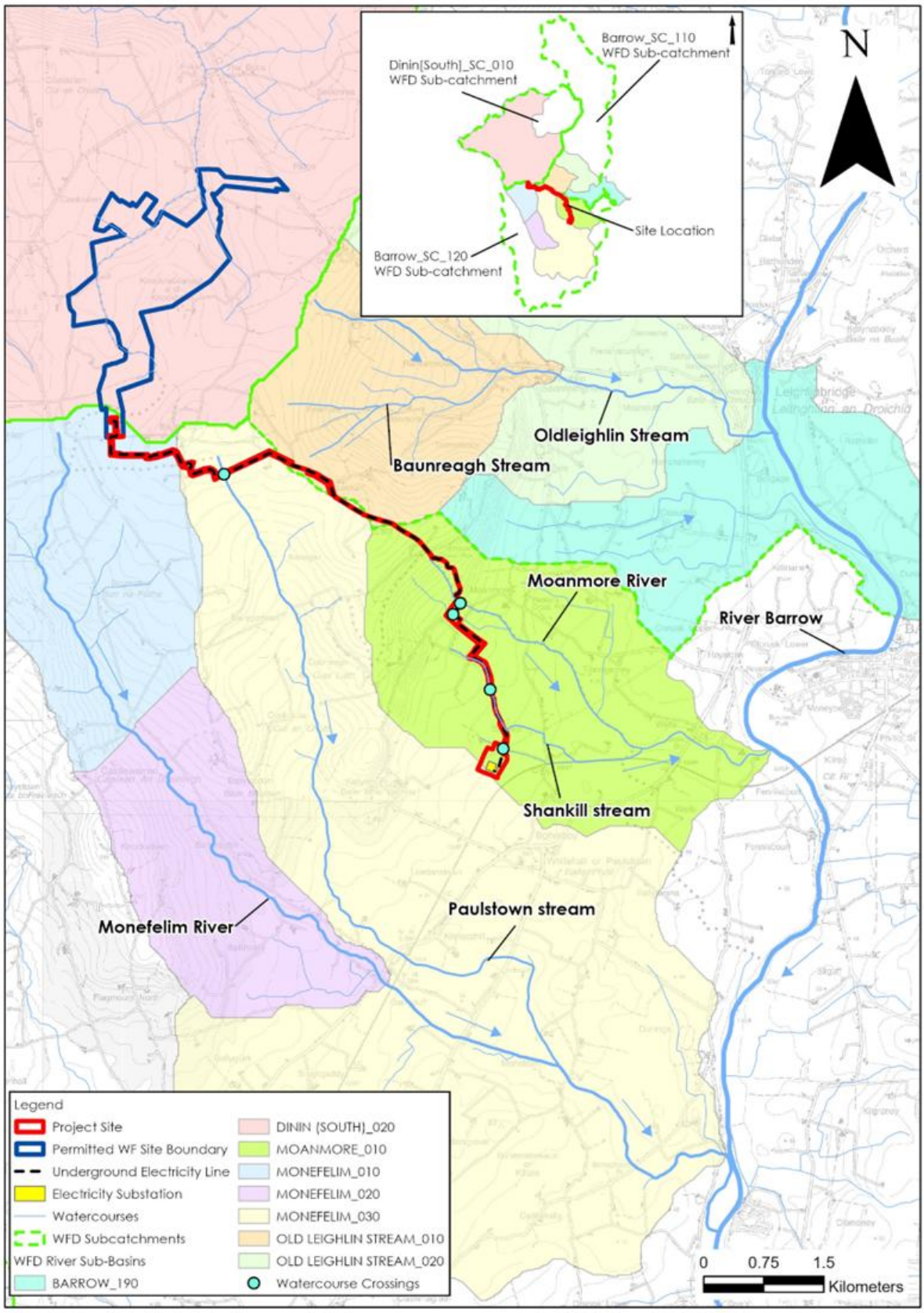

Figure B: Local Hydrology Map

3.2 HYDROGEOLOGY

The Dinantian limestones that underly the electrical substation location and southernmost section of the electricity line route are classified by the GSI (www.gsi.ie)as a Regionally Important Aquifer – Karstified (diffuse) (Rkd). Regional groundwater flows are likely to occur in this aquifer type.

The Westphalian Shales and Sandstones which underlie the electrical control unit and the northern section of the electricity line route are classified by the GSI (www.gsi.ie) as a Poor Aquifer - Bedrock which is Generally Unproductive (Pu) and Locally Important Aquifer – Bedrock which is Generally Moderately Productive (Lm).

Namurian Sandstones, Siltstones and mudstones which underlie the central section of the electricity line route are classified as a Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones (Pl) and Bedrock which is Generally Unproductive (Pu).

In terms of local Groundwater Bodies (GWBs), the electrical control unit and the northern section of the electricity line route are located in the Castlecomer GWB (IE_SE_G_034). The central section of the electricity line route is mapped in the Shanragh GWB (IE_SE_G_124). The substation location and southernmost section of the electricity line route are mapped within the Bagenalstown Lower GWB (IE_SE_G_157).

The Namurian and Westphalian rocks generally have an absence of inter-granular permeability and most groundwater flow is expected to be in the uppermost part of the aquifer comprising a broken and weathered zone typically less than 3m thick, a zone of interconnected fissuring 10m thick.

During the trial pit investigation (refer to Chapter 6), no groundwater inflows were noted in the trial pits carried out at the electricity substation or the electrical control unit.

3.3 DESIGNATED SITES & HABITATS

Within the Republic of Ireland, designated sites include Natural Heritage Areas (NHAs), proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SAC), candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs). The project site is not located within any designated conservation site.

All of the river waterbodies that drain the project site flow into the River Barrow and River Nore cSAC (Site Code: 002162) to the southeast.

At its closest point, this designated site is located approximately 2.7km to the east (as crow flies) and downstream of the substation location.

The Whitehall Quarries pNHA (Site Code: 000855) is situated c. 500m to the southwest of the electricity line at its nearest point and is c. 1.5km northwest of the substation. There is no hydrological connectivity to this designated site.

4. SITE-SPECIFIC FLOOD RISK ASSESSMENT

4.1 INTRODUCTION

The following assessment is carried out in accordance with '*The Planning System and Flood Risk Management Guidelines for Planning Authorities*' (DoEHLG, 2009). The basic objectives of these guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and,
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

A Stage 1 assessment of flood risk requires an understanding of where the water comes from (*i.e.* the source), how and where it flows (*i.e.* the pathways) and the people and assets affected by it (*i.e*. the receptors). It is necessary to identify whether there may be any flooding or surface water management issues related to the proposed site that may warrant further detailed investigation.

As per the guidance (DOEHLG, 2009), the stages of a flood risk assessment are:

- *Flood risk identification* – identify whether there are any flooding issues at a site; and,
- *Initial flood risk assessment* – confirm sources of flooding that may affect a proposed development.

Further to this, a Stage 2 assessment involves the confirmation of sources of flooding, appraising the adequacy of existing information and determining what surveys and modelling approach may be required for further assessment.

4.2 FLOOD ZONE MAPPING

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types or levels of flood zones defined for the purposes of according to OPW guidelines:

- Flood Zone A – medium probability (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);
- Flood Zone B – low probability (between 0.1% or 1 in 1,000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1,000 year and 0.5% or 1 in 200 for coastal flooding); and,
- Flood Zone C – Flood Zone C covers all areas of the plan which are not in zones A or B (less than 0.1% or 1 in 1,000 for both river and coastal flooding).

4.3 FLOOD RISK IDENTIFICATION

4.3.1 Soils Maps – Fluvial Maps

A review of the soil types in the vicinity of the project site was undertaken as soils can be a good indicator of past flooding in an area. Due to past flooding of rivers, deposits of

transported silts/clays referred to as alluvium build up within the floodplain and hence the presence of these soils is a good indicator of potentially flood-prone areas.

Based on the EPA/GSI soil map for the area, alluvium soils are mapped briefly along a small section of the electricity line near the Shankill Stream where the route follows a public road.

As the electricity line route progress nearer to the substation location, the subsoils are mapped as Till derived from limestones (TLs).

4.3.2 Historical OSI Mapping

There is no text on local available historical 6" or 25" OSI mapping for the project site that identifies areas that are "*prone to flooding*" within the project site boundary.

4.3.3 OPW Past Flood Event Mapping

OPW Past Flood Event Mapping (www.floodinfo.ie) has no past flood events mapped near the electricity substation or the electrical control units.

A recurring flood event is however mapped along the electricity line route at the L7117 local road in the townland of Lacken (Flood ID: 2959).

The road is noted to be periodically impassable within the Bagenalstown Area Engineer Meeting – Minutes. The flood source is not specified, but it appears to be surface water runoff related as there is no watercourse nearby.

OPW's Past Flood Event Map for the area is illustrated on **Figure C** below.

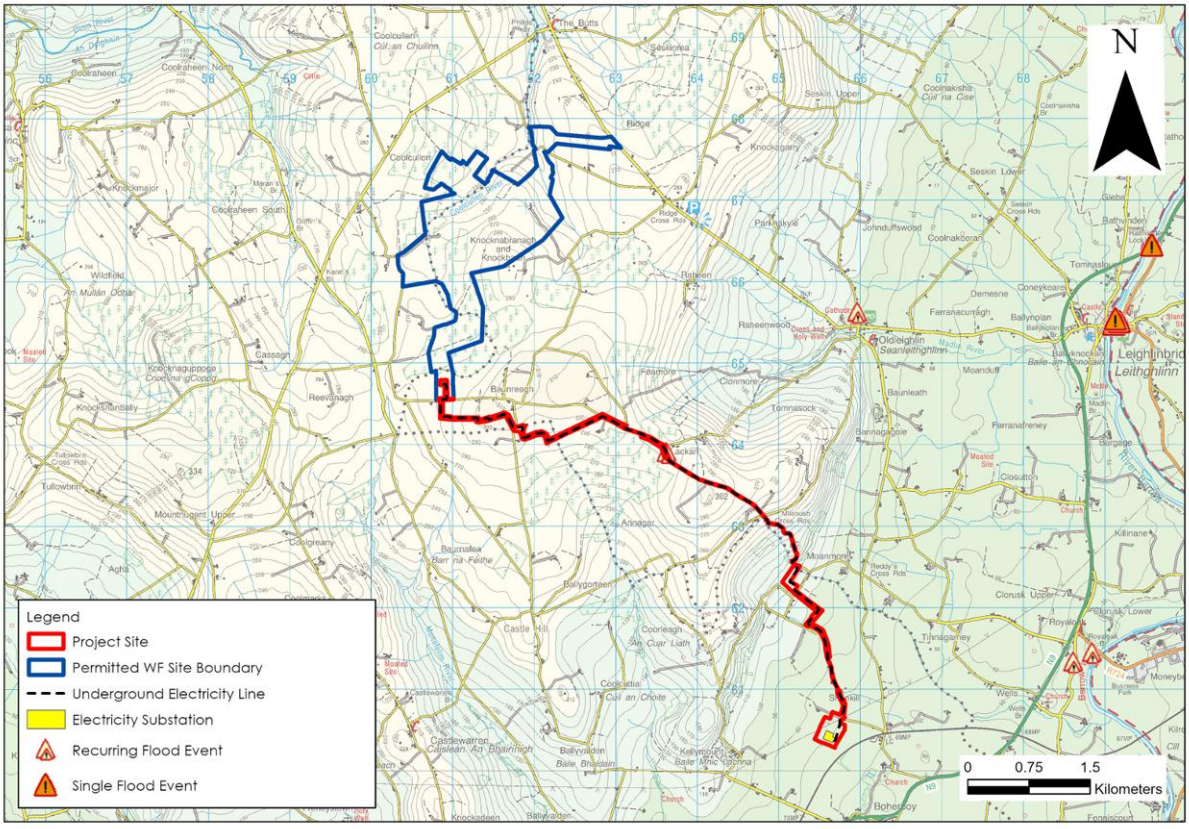

Figure C: OPW Past Flood Event Mapping

4.3.4 OPW Flood Mapping

Where complete, the OPW Flood Extents Mapping (www.floodinfo.ie) is now the primary reference for flood risk planning in Ireland, but this mapping is currently only available for the downstream River Barrow. However, there is National Indicative Fluvial Mapping (NIFM) available for local watercourses as discussed below.

There is no OPW River Flood Extents mapping available for the project site. The nearest available Flood Extents Mapping is found along the main channel of the River Barrow c. 3.5km to the east of the project site, as illustrated on **Figure D** below.

There is also no National Indicative Fluvial Mapping available for the immediate vicinity of the project. NIFM river flood zones are mapped along the Moanmore Stream approximately 1.8km east and downstream of the electricity substation location, before its confluence with the River Barrow.

NIFM flood zones are also mapped along the Monefelim River and Paulstown Stream, however these are at significant downstream distances from the project. For example, river flood zones are mapped along the Monefelim_010 approximately 2.6km south and downstream of the electrical control unit.

Additionally, flood zones are mapped along the Monefelim_030 approximately 2.7km southeast and downstream of where the electricity line crosses the Paulstown Stream (EPA Code: 14P06).

OPW Flood Extents Mapping and NIFM flood zones are shown in **Figure D** below.

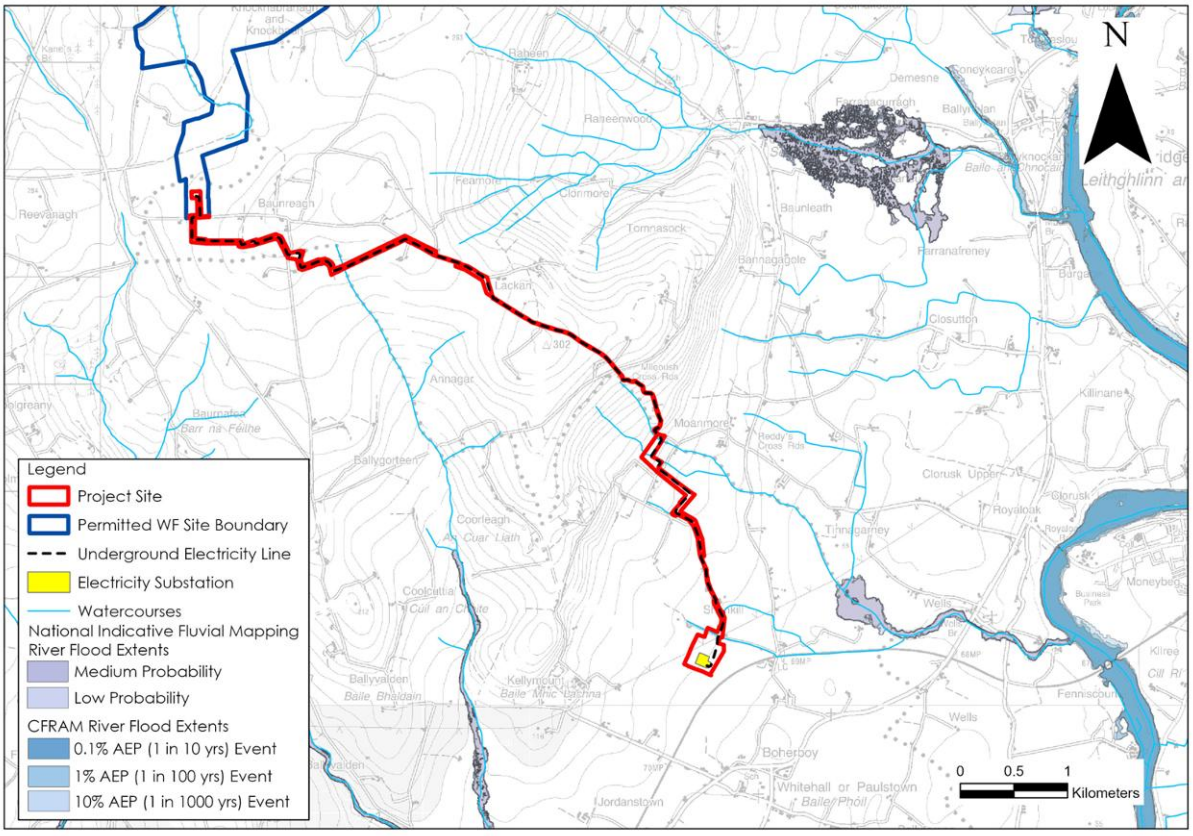

Figure D: OPW Flood Extents and NIFM Flood Zones

4.3.5 Modelled Flood Scenarios Associated with Climate Change

It is likely that climate change will have significant impacts on flooding and flood risk in Ireland due to rising sea levels, increased winter rainfall and more intense rainfall. The CFRAM Flood Extents has modelled flooding associated with potential future climate change scenarios. However, as stated above, no flood extents mapping has been completed in the vicinity of the project site.

National Indicative Fluvial Mapping has been completed for catchments greater than 5km^2 for which flood maps were not produced under the CFRAM Programme. These flood zones have also been modelled for 2 no. potential future climate change scenarios, with the Mid-Range and High-End Future Scenario flood extents generated using an increase in rainfall of 20% and 30% respectively.

These modelled future flood extents do not deviate significantly from the current scenario described in **Section 4.3.4** above and therefore there is no future increased risk at the project site.

4.3.6 GSI Winter 2015/2016 Surface Water Flood Mapping

The Geological Survey of Ireland (GSI) Winter (2015/2016) Surface Water Flooding Map[2] (www.gsi.ie) shows areas of fluvial and pluvial flood extents during the Winter 2015/2016 flood event, which was the largest recorded flood event in many areas.

The GSI mapped does not record any flood zones within or in the immediate environs of the project site. The nearest mapped surface water flood zones are along the main channel of the River Barrow further east and downstream of the project site.

4.3.7 GSI Groundwater Flooding Maps

The GSI also produce Historic Flood Maps and Flood Probability Maps in relation to groundwater flooding.

The GSI Historic flood maps show maximum observed extents of flooding, both groundwater and surface water, over various periods. The Maximum Historic Groundwater flood map shows maximum observed flood extents for locations of recurrent groundwater flooding in limestone regions. The map is primarily based on the winter 2015/2016 flood event, which in most areas represented the largest groundwater flood event on record.

There is no historic groundwater flooding mapped at the project site or surrounding lands.

In addition, the Groundwater Flood Probability Maps shows the probabilistic flood extent of groundwater flooding in limestone regions. These maps are focussed primarily (but not entirely) on flooding at seasonally groundwater flooded wetlands known as turloughs. It should be noted that the predictive maps are limited to locations where the flood pattern was detectable and capable of being hydrologically modelled to a sufficient level of confidence. There are no Groundwater Flood Probability Maps within the project site or in the surrounding areas.

4.3.8 Summary – Flood Risk Identification

Based on the information gained through the flood identification process, it would appear the project site is not located within any high to medium risk fluvial flood zone and is therefore in Flood Zone C (low risk).

[2] GSI *Historical flood mapping principally developed using Sentinel-1 Satellite Imagery from the European Space Agency Copernicus Programme as well as any available historic records (from winter 2015/2016 or otherwise)*

Localised surface water flooding/ponding (runoff) in the townland of Lacken along the electricity line router appears to be a recurring issue.

A site visit was carried out on 24th October 2024 to further assess the risk of flooding at the site.

4.4 SITE SPECIFIC INFORMATION

4.4.1 Site Drainage

An unnamed headwater stream of the Moanmore_010 flows in a southeasterly direction, c. 85m north of the electricity substation location. The unnamed stream confluences with the Shankill (14) Stream (EPA Code: 14S30), which in turn feeds into the Moanmore (14) Stream (EPA Code: 14M24).

The Moanmore Stream discharges into the River Barrow c. 3.5km east of the substation site. The site of the substation itself is drained by a network of field boundary drains that flow north towards the unnamed headwater stream.

The Monefelim River rises c. 0.6km to the southwest of the electrical control unit. The Monefelim River flows to the southeast and discharges into the Barrow River approximately 12.5km from the project site. The Paulstown Stream is a sub-catchment of the Monefelim River.

The route of the underground electricity line crosses 5 no. natural watercourses, 4 no. of which are EPA mapped watercourses:

- Paulstown Stream (EPA Code: 14P06) within the Monefelim_030 river sub basin;
- Moanmore Stream (EPA Code: 14M24) within the Moanmore_010 river sub basin;
- An unmapped watercourse that flows into the Moanmore Stream approximately 1km downstream of the above crossing location;
- Shankill (14) Stream (EPA Code: 14S30) within the Moanmore_010 river sub basin; and;
- The unnamed watercourse/headwater north of electricity substation location within the Moanmore_010 river sub basin.

Refer to **Figure B** for the location of watercourse crossings.

4.4.2 Ground Conditions

The subsoils encountered during trial pitting at the electrical control unit consist mainly of SILT with increasing gravel/stone content with depth due to the underling shallow weathered bedrock. Depth to bedrock at electrical control unit ranged from 0.5m to 1m.

The subsoils encountered at electricity substation comprise a layer of SILT above gravelly CLAY. Bedrock was not encountered at the electricity substation at the maximum trial pit depth of 2.5m.

No ground stability issues were identified by the trial pit investigation and all subsoils were found to be firm to very firm and cohesive which is generally typical of shale, sandstone and limestone tills. No groundwater inflows were recorded.

A walkover survey of the off-road sections of the electricity line route confirmed the presence of mineral soils/subsoils and generally firm under foot ground conditions.

4.4.3 Hydrological Flood Conceptual Model

Potential flooding in the vicinity of the site can be described using the Source – Pathway – Receptor Model (S-P-R). The potential source of flooding in this area with consequences for the project site is fluvial flooding from local watercourses. Potential receptors in the area are land and proposed infrastructure.

However, based on the available mapping, there is a low risk of fluvial flooding at the project site.

Localised surface water ponding may occur as recorded in the townland of Lacken.

4.4.4 Summary – Initial Flood Risk Assessment

Based on the information gained through the flood identification process and Initial Flood Risk Assessment process, the sources of flood risk for the project site are outlined and assessed in **Table A**.

Table A: S-P-R Assessment of Flood Sources for the Project Site

Source	Pathway	Receptor	Comment
Tidal	Not applicable	Land and infrastructure	The proposed site is ~45km from the coast. There is no risk of coastal flooding.
Fluvial	Overbank flooding from local watercourses	Land and infrastructure	There are no fluvial flood zones mapped in the area of the project site (i.e. the project site is located in Flood Zone C)
Pluvial	Ponding of rainwater on site	Land and infrastructure	Based on the GSI surface water flooding maps, pluvial flooding does not appear to be an issue at the site.
Surface water	Surface ponding/ Overflow	Land and infrastructure	Localised surface water flooding (runoff) in the townland of Lacken along the electricity line appears to be a recurring issue.
Groundwater	Groundwater levels	Land and infrastructure	Not an issue at the site.

4.5 PROJECT FLOOD RISK AND MITIGATION

Project stormwater control measures are as follows:

- During the operational phase, stormwater from the substation and electrical control unit compound areas will be discharged to local drains or to ground via soakaways following attenuation;
- Stormwater discharge from the project site will be limited to greenfield runoff rates, therefore there will be no increase in storm water runoff rates entering the local environment.;
- Runoff from the compound areas will also be passed through an oil interceptor to prevent any discharge of hydrocarbons.

Due to the underground nature of the electricity line route in the townland of Lacken, existing surface water flooding issues will not be exacerbated.

5 no. natural watercourse crossings will be required along the electricity line route. The watercourses to be crossed are all small lower order streams. However, no instream works are required at any of the crossing locations, as horizontal directional drilling will be employed.

A bottomless culvert/bridging structure will be installed at the unnamed watercourse north of the electricity substation to accommodate construction of the access track.

The installation of the culvert will require a Section 50 license application to the OPW in accordance with the Arterial Drainage Act 1945. The stream crossing will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

5. PLANNING POLICY AND JUSTIFICATION TEST

5.1 PLANNING POLICY AND COUNTY DEVELOPMENT PLAN

The following policies are defined in Kilkenny CDP 2021-2027 (**Table B**) and Carlow CDP 2022 – 2028 (**Table C**).

in respect of flooding, and we have outlined in the column to the right how these policies are provided for within the proposed development design:

Table B: Kilkenny County Council Planning Policy/Objective and Responses

No.	Policy/Objective	Development Design Response
10.2.6.2	Where flood risk may be an issue for any proposed development, a detailed flood risk assessment should be carried out appropriate to the scale and nature of the development and the risks arising. In particular, any area within or adjoining flood zone A or B, or flood risk area, shall be the subject of a site-specific Flood Risk Assessment appropriate to the type and scale of the development being proposed. This shall be undertaken in accordance with the Planning System and Flood Risk Management – Guidelines and the Strategic Flood Risk Assessment accompanying this Plan.	This document provides a site specific FRA for the project.
10.2.8	For developments adjacent to watercourses of a significant conveyance capacity any structures (including hard landscaping) must be set back a minimum of 5-10m from the edge of the watercourse to allow access for channel clearing/maintenance. Any required setback may be increased to provide for habitat protection. Development consisting of construction of embankments, wide bridge piers, or similar structures will not normally be permitted in or across flood plains or river channels.	Other than a short section of access track leading to the electricity substation in the vicinity of the unnamed watercourse, there are no proposed new hardstand areas within 5 – 10 metres of a watercourse. The extent of access track located within 10m of the watercourse will not result in a significant conveyance capacity.
10.2.6 to 10.2.8	The Council seeks to ensure the sustainable management of surface water discharges and to minimise the risk of flooding by requiring new development in the City through the incorporation of Sustainable Drainage Systems (SuDS) in new developments.	The project will be consistent with best practice SUDs drainage design. It is proposed that stormwater generated from hardstand surfaces (i.e. electricity substation and electrical control unit) will be attenuated and discharged at greenfied rates
11.11 Energy Storage	The National Transmission Operator – EirGrid and the National Electricity Distribution Operator (ESBn) are required to upgrade their infrastructure to cater for the large increase in flexible renewable generation. This requires role out of storage facilities on the gas and electricity network over the coming decade. This will be supported at domestic scale (batteries in our homes) and commercially at	The project will be consistent with the objective to support the roll out of storage facilities on the gas and electricity network over the coming decade.

	large scale. The Council supports new technologies such as battery storage, liquid air storage and synchronous condensers.	
10.2.6	Have regard to the EU Flood Risk Directive, the Flood Risk Regulations (S.I. No. 122/2010) and the Guidelines for Planning Authorities on the Planning System and Flood Risk Management and Circular PL2/2014, through the use of the sequential approach and application of the Justification Tests in Development Management.	The project is in accordance with the sequential approach set out in the DoEHLG guidelines on Flood Risk and with the principles of development design outlined in Appendix B of these guidelines. A Justification Test is included in this site-specific FRA at **Section 5.2** below
9.2.2	To ensure that appropriate mitigation and/or compensation measures to conserve biodiversity, landscape character and green infrastructure networks are required in developments where habitats are at risk or lost as part of a development.	Appropriate mitigating measures in relation stormwater runoff are outlined above.

Table C: Carlow County Council Planning Policy/Objective and Responses

No.	Policy/Objective	Development Design Response
FR. P2:	Carry out flood risk assessment for the purpose of regulating, restricting and controlling development in areas at risk of flooding and to minimise the level of flood risk to people, business, infrastructure and the environment through the identification and management of existing and potential future flood risk	This document provides a site specific FRA for the project.
FR. P3:	Ensure that all development proposals comply with the requirements of the Planning System and Flood Risk Management – Guidelines for Planning Authorities (DEHLG and OPW, 2009) and Circular PL2/2014 (or any amendments thereto), in particular through the application of the sequential approach and the Development Management Justification Test	The project is in accordance with the sequential approach set out in the DoEHLG guidelines on Flood Risk and with the principles of development design outlined in Appendix B of these guidelines. A Justification Test is included in this site-specific FRA at **Section 5.2** below
FR. P4:	Require the submission of a Site-Specific Flood Risk Assessment (FRA) in areas at risk of flooding. The assessment shall be carried out by a suitably qualified and indemnified professional, shall be appropriate to the scale and nature of the risk to the proposed development and shall consider all sources of flooding. The FRA shall be prepared in accordance with the Planning System and Flood Risk Management - Guidelines for Planning Authorities and shall address climate change, residual risk, avoidance of contamination of water sources and any proposed site-specific flood management measures	This document provides a site specific FRA for the project.
FR. P6:	To ensure each flood risk management activity is examined to determine	This site specific FRA allows for climate change

	actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan Flood Risk Management.	

5.2 JUSTIFICATION TEST REQUIREMENT

The matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test[3] is shown in **Table D**.

It may be considered that the project is a 'Highly vulnerable development' as it is associated with essential infrastructure for wind energy.

The project site is located entirely within Flood Zone C and is therefore appropriate from a flood risk planning perspective.

Table D: Matrix of Vulnerability versus Flood Zone

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification test	Justification test	**Appropriate**
Less vulnerable development	Justification test	Appropriate	Appropriate
Water Compatible development	Appropriate	Appropriate	Appropriate

Note: Taken from Table 3.2 (DoEHLG, 2009)
***Bold:** Applies to this project.*

[3] *A 'Justification Test' is an assessment process designed to rigorously assess the appropriateness, or otherwise, of particular developments that are being considered in areas of moderate or high flood risk, (DoEHLG, 2009).*

6. REPORT CONCLUSIONS

- The project site is not located within any OPW mapped high to medium risk fluvial flood zones and is therefore in Flood Zone C (low risk);
- The existing localised surface water flooding/ponding issue (runoff) in the townland of Lacken will not be exacerbated by the project due to the underground nature of the electricity line;
- As outlined in **Section 5.1** above, the project is consistent with the relevant planning objectives from the Kilkenny and Carlow County Development Plans;
- As outlined in **Section 4.5** above, the implementation of standard mitigation and drainage control measures ensures that there will be no potential to increase flood risk anywhere at the project site;
- The project satisfies the criteria of the Justification Test required under the DoEHLG guidelines.

* *

7. REFERENCES

DOEHLG	2009	The Planning System and Flood Risk Management.
Met Eireann	2010	Monthly and Annual Averages of Rainfall for Ireland 1981-2010.