MWP

Environmental Impact Assessment Report (EIAR)

Volume 3: Appendix 4
Flood Risk Assessment (FRA)

Dernacart Wind Farm
110kV Substation and Grid Connection

Statkraft Ireland

October 2024

MWP

Flood Risk Assessment

Dernacart Windfarm Grid Connection
County Laois

Statkraft

September 2024

MWP

Contents

Tables

Figures

Plates

Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
23268	MWP-XX-XX-RP-Z-6005-S0	P02	27/09/2024	BM	MF	MF	Final

MWP, Engineering and Environmental Consultants
Address: Park House, Bessboro Road, Blackrock, Cork, T12 X251
www.mwp.ie

Glossary of Acronyms and Terms

AEP	Annual Exceedance Probability
API	Antecedent Precipitation Index
CFRAMS	Catchment Flood Risk Assessment and Management Study
DEFRA	Department for Environment, Food and Rural Affairs
DTM	Digital Terrain Model
EPA	Environmental Protection Agency
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FSR	Flood Studies Report
FSU	Flood Studies Update
GDSDS	Greater Dublin Strategic Drainage Study
HEP	Hydrological Estimation Point
HEFS	High End Future Scenario
LAP	Local Area Plan
M aOD	Metres Above Ordnance Datum
MRFS	Mid-Range Future Scenario
MWP	Malachy Walsh & Partners
OPW	Office of Public Works
PSFRM	The Planning System and Flood Risk Management Guidelines, November 2009
SAAR	Standard Average Annual Rainfall
SuDS	Sustainable Urban Drainage Systems

1. General

1.1 Introduction

MWP Engineering and Environmental Consultants have been commissioned to carry out a Flood Risk Assessment in relation to the Proposed 110kV Substation and an associated access track, Underground Windfarm Collector Cable and Access Track and Underground Grid Connection Cable in Portarlington Co. Laois.

1.2 Overview of Existing Site

The proposed substation development site is located in County Offaly within the townland of Barranaghs. The site is situated in a rural lightly populated area approximately 1.3km southwest of Garryhinch village, approximately 3km northeast of Mountmellick town and approximately 6km southwest of Portarlington town. Figure 1-1 illustrates the geographical location of the proposed substation site. The site of the proposed 110kV substation currently comprises greenfield lands comprising a mix of agricultural grasslands, scrub and marginal lands with mature and semi mature trees. The site is bound on all sides by existing mature hedgerows. Immediately beyond the site to the west is a private access road and agricultural lands. A private access also flanks the eastern boundary with a conifer plantation to its east. A Coillte conifer plantation lies immediately to the north of the site while the R423 runs immediately to the south of the site. The consented Dernacart windfarm is located on lands approximately 2.3km to the northwest of the site.

The proposed access track and underground electrical cabling from the Dernacart windfarm to the substation is also to be sited entirely within the townland of Barranaghs and traverses through commercial forestry plantation, scrub and peatland.

The proposed underground 110kV grid connection cable will connect the proposed 110kV Dernacart Wind Farm substation at Barranaghs to the consented 110kV substation at Brackalone, Co. Laois. The grid connection cable is to be installed solely within the public road network, and will have a length of c. 10.85km that crosses over the administrative areas of Offaly County Council and Laois County Council passing through townlands of Barranaghs, Garryhinch, Annamore in County Offaly and Coolnavarnoga, Coolaghy, Kilbride, Ballymorris, Cooltederry and Bracklone Co. Laois. The physical environment along the majority of the route is characterised with sections of ribbon development and dispersed detached housing before entering the more urban and built up environment of Portarlington town. The landscape along the rural sections of the route primarily consists of patchwork farmland, with fields enclosed by hedgerows, along with boglands and conifer plantations.

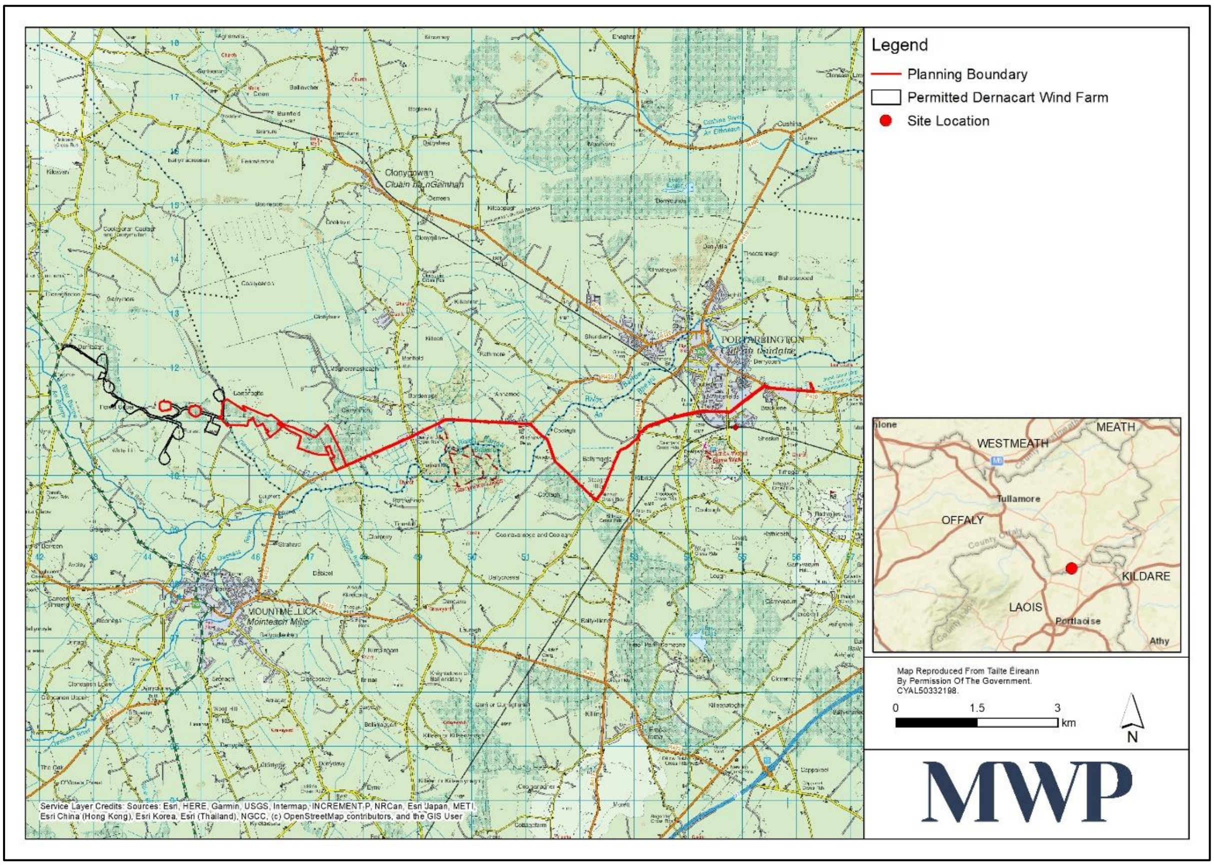

Figure 1-1: Site Location

1.3 Overview of Proposed Development

The proposed substation development footprint is illustrated in Figure 1-2 and illustrates the positions of the proposed plant and infrastructure, including internal access/service roads within the development boundary, future expansion area and a new site entrance from the R423. See also Planning Drawing No 23268-MWP-00-00-DR-C-5200. The overall proposed 110kV substation compound will occupy an area of approximately 1.6ha divided into two adjoining sections: an EirGrid section (c.9865m^2 in area) along with a future expansion area, and an IPP (Independent Power Producer) section (c.2775m^2 in area), each of which are enclosed within a 2.6m high palisade fence. An additional outer concrete post and rail fence (1.4m in height) will be installed around the perimeter of the EirGrid compound. Each section will contain a control building and an outdoor electrical yard including electrical equipment such as electrical pylons, over and underground ducting & cables, busbars, disconnects, breakers, sealing ends, lightning and lighting masts. The IPP section will also contain one grid transformer within a bunded enclosure with back up emergency diesel generator and tank. The EirGrid control building will be c440.2m^2 in area and contain a control room, battery room, generator room, meeting room, welfare facilities and workshop/store. The IPP control building will be c160.2m^2 in area and contain a control room, switchgear room, welfare facilities and store room. Both buildings will be a block built single storey building approximately 8.50m in height, with pitched roof and an external blockwork and plastered finish. Parking will be provided within the compound area adjacent to each of the buildings. There will be a very small water requirement for toilet flushing and hand washing and therefore it is proposed to harvest water from the roofs of the buildings. The discharge from the sanitary facilities within each building will go to separate wastewater holding tanks located within the substation compound where the effluent will be temporarily stored and removed at regular intervals by a permitted waste contractor and removed to a licensed/permitted waste facility for treatment and disposal.

The IPP and Eirgrid buildings will have a Finished Floor Level of 72.15mOD. The IPP and Eirgrid compound will have a Finished Compound Level of 72.0mOD.

Figure 1-3 and Figure 1-4 shows the proposed route of the underground electrical cabling (UGC) from the Wind Farm to the proposed substation. See also Planning Drawings No. 23268-MWP-00-00-DR-C-5102 and 5103. The length of the route is approximately 2.5km with an overall development footprint of approximately 1.5ha. A 5.5m wide access track of open stone finish will be laid over the underground collector cable to facilitate access between the wind farm and the substation. There are 4 no water crossings required along this route. Tree felling (c.2.8ha) and hedgerow removal (approximately 320m) will also be required to accommodate this access road.

The proposed route for the installation of an underground grid cable (UGC) from the proposed 110kV Dernacart Wind Farm substation compound in Barranaghs townland to the consented Bracklone 110kV substation in Portarlington, Co. Laois is shown in Figure 1-5. The grid connection will have a length of c.10.85 km passing through the townlands of Barranaghs, Garryhinch, Annamoe in County Offaly and Coolnavarnoga, Coolaghy, Kilbride, Ballymorris, Cooltederry and Bracklone Co. Laois. The UGC works will consist of the installation of ducts and joint bays in an excavated trench within the public road network to accommodate power cables, and a fibre communications cable to allow communications between Deranacrt Wind Farm Substation and Bracklone Substation. The proposed grid connection will require a Road Opening License (ROL) prior to the commencement of any grid connection works on the public road. The road surface of the public roads will be reinstated to the standards set out by the Department of Transport, Tourism and Sport Guidelines on the Opening, Backfilling and Reinstatement of Trenches on Public Roads (April 2017).

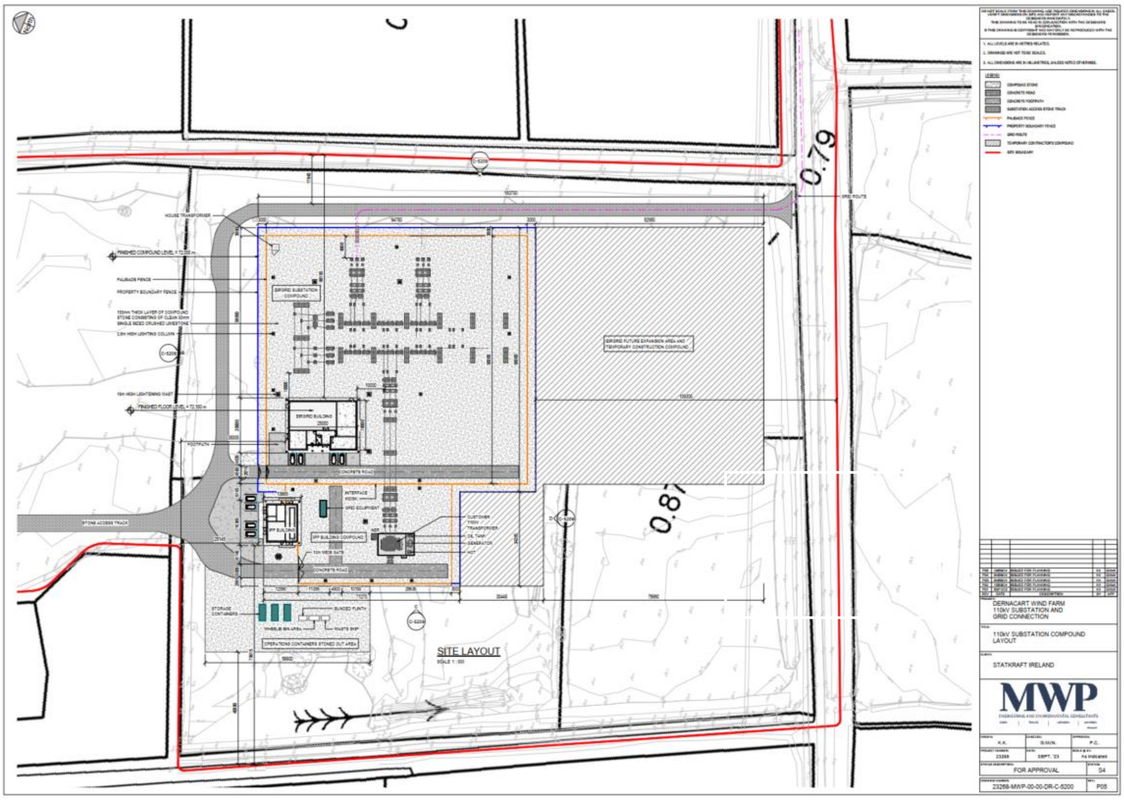

Figure 1-2: Proposed Site Layout

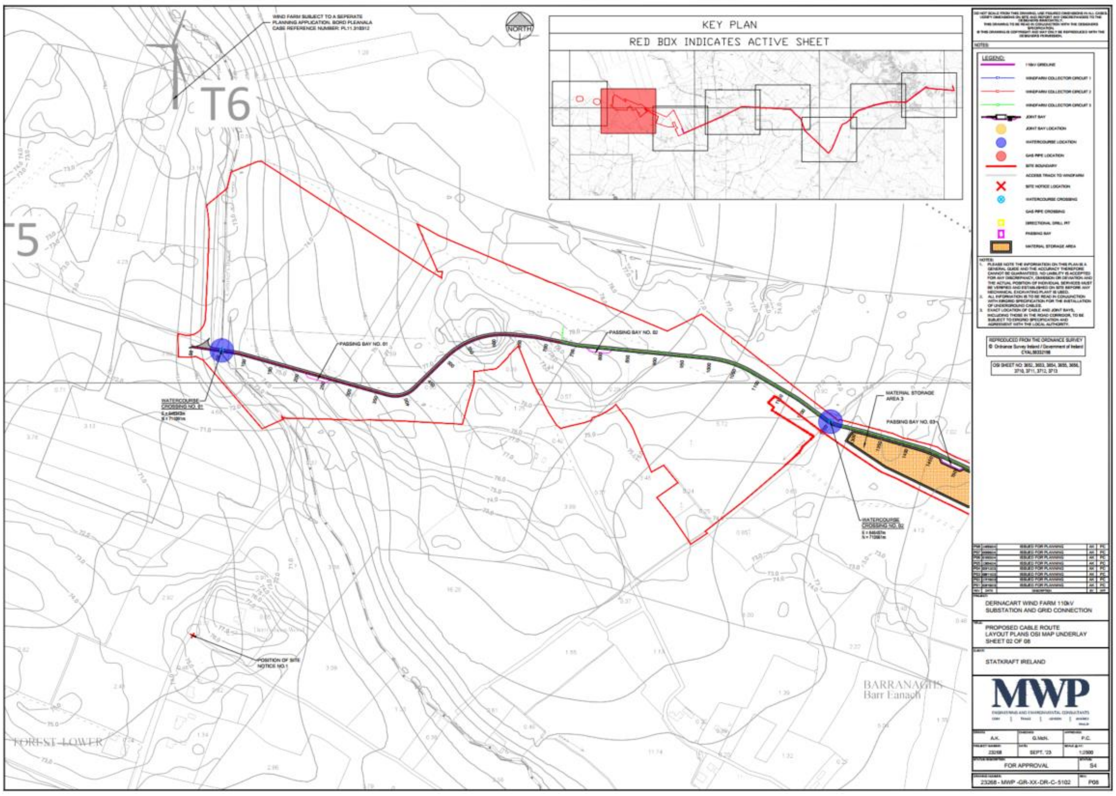

Figure 1-3: Proposed route of the underground electrical cabling

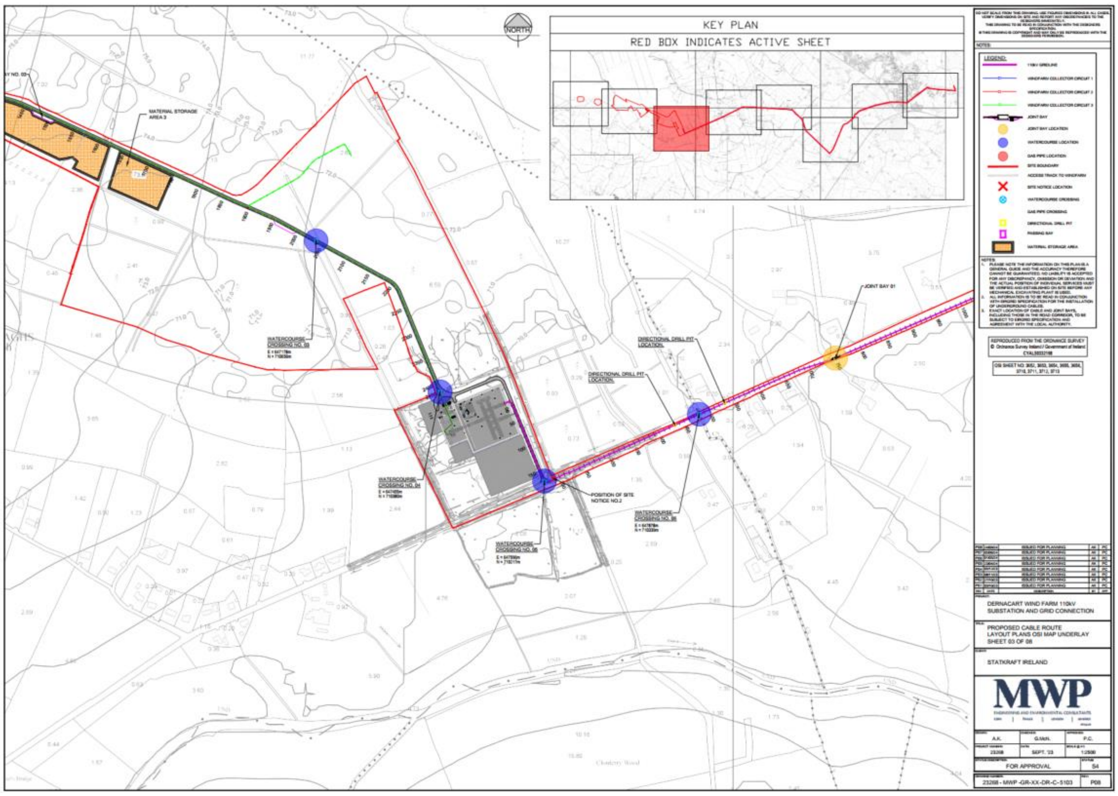

Figure 1-4: Proposed route of the underground electrical cabling

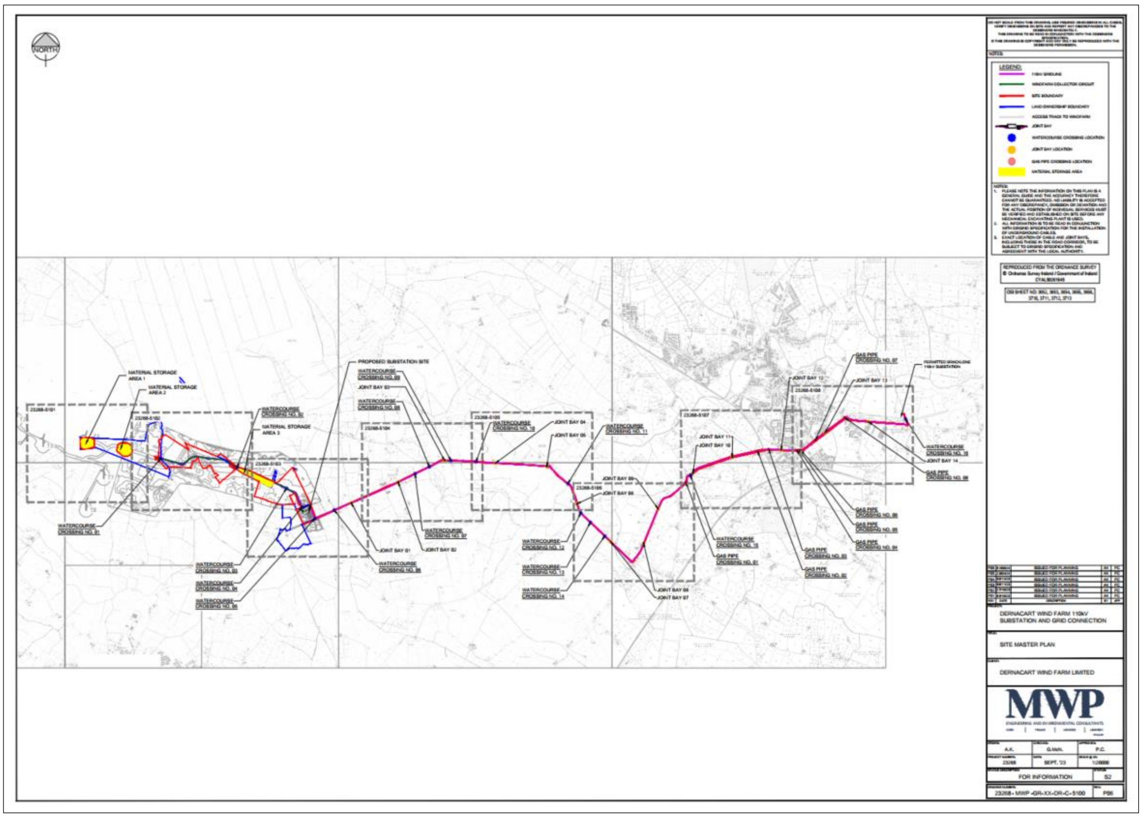

Figure 1-5: Underground grid cable route

1.4 Objectives

The purpose of the report is to establish the flood risk associated with the proposed substation and, if appropriate, to recommend mitigation measures to prevent any increase in flood risk within the site or externally in the wider area.

The report has been prepared in the context of *The Planning System and Flood Risk Management – Guidelines for Planning Authorities, November 2009*, published by the Office of Public Works and the Department of Environment, Heritage and Local Government. Flood Risk Assessments are carried out at different scales by different organisations. The hierarchy of assessment types are Regional (RFRA), Strategic (SFRA) and Site-specific (FRA). This report is site-specific.

1.5 Methodology

The Flood Risk Management Guidelines document outlines three stages in the assessment of flood risk as follows:

Stage 1 Flood risk identification – to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation;

Stage 2 Initial flood risk assessment – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to determine what surveys and modelling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. The extent of the risk of flooding should be assessed which may involve preparing indicative flood zone maps. Where existing river or coastal models exist, these should be used broadly to assess the extent of the risk of flooding and potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures; and

Stage 3 Detailed risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve use of an existing or construction of a hydraulic model or a river or coastal cell across a wide enough area to appreciate the catchment wide impacts and hydrological processes involved.

This report has been prepared generally in accordance with these stages.

1.6 Flood Risk & Zones

In the Planning System and Flood Risk Management Guidelines document, the likelihood of a flood occurring is established through the identification of Flood Zones which indicate a high, moderate or low risk of flooding from fluvial or tidal sources. Table 1-1 below includes the definition of Flood Zones as well as the implications for planning. The flood zone type is determined based on current water surface levels without allowance for climate change and without the benefit of any flood defences. It is important to note that the Flood Zones do not take other sources of flooding, such as groundwater or pluvial, into account, so an assessment of risk arising from such sources should also be made, where appropriate.

Flood Zone	Description & Summary of Planning Implications
Zone A High probability of flooding	More than 1% probability (1 in 100) for river flooding and more than 0.5% probability (1 in 200) for coastal flooding. Most types of development would be considered inappropriate in this zone.
Zone B Moderate probability of flooding	0.1% to 1% probability (between 1 in 100 and 1 in 1,000) for river flooding and 0.1% to 0.5% probability (between 1 in 200 and 1 in 1,000) for coastal flooding. Highly vulnerable development, such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone.
Zone C Low probability of flooding	This zone defines areas with a low risk of flooding from rivers and the coast (i.e. less than 0.1% probability or less than 1 in 1,000). Development in this zone is appropriate from a flooding perspective (subject to assessment of flood hazard from sources other than rivers and the coast).

Table 1-1: Definition of Flood Zones

The Guidelines have outlined three Vulnerability Classifications for developments based on the proposed land use and type of development. These classifications and particular examples of development types which would be included in each classification are summarised as follows;

- **Highly Vulnerable Development:** This would include emergency services, hospitals, schools, residential institutions, dwelling houses, essential infrastructure, water & sewage treatment etc.
- **Less Vulnerable Development:** Retail, leisure, commercial, industrial buildings, local transport infrastructure.
- **Water-compatible development:** Docks, marinas and wharves. Amenity and open space, outdoor sports and recreation and essential facilities such as changing rooms.

The Guidelines include a matrix that determines the appropriateness of different types of development based on their vulnerability classification and the Flood Zones in which they are located. The matrix is reproduced in Table 1-2 below.

Where the matrix indicates that a development is not appropriate it may still be justified based on a procedure described as a Justification Test.

The proposed substation development is classed as Highly Vulnerable Development and development in Flood Zone C is appropriate. If the Justification Test is passed, development within Flood Zone A/B could be appropriate.

Vulnerability Classification	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

Table 1-2: Vulnerability Matrix

2. Flood Risk Identification (Stage 1)

Possible sources of flood risk were identified by;

- Geology & Soil Mapping
- Flood History - examination of available information on the OPW website (www.floodinfo.ie)
- National Indicative Fluvial Mapping
- South Eastern Catchment Flood Risk And Management Study (SE CFRAMS)
- GSI Winter 2015/2016 Surface Water Flooding
- Offaly County County Council Strategic Flood Risk Assessment
- Internet Searches
- Walkover survey of the subject site and the nearby watercourse & drainage ditches
- Topographical Survey & Existing Drainage

2.1 Geology & Soil Mapping

The geology and soils at the site have been reviewed using the Geological Survey of Ireland database. The proposed site location is underlain predominantly by *Cutover/cutaway peat* according to Teagasc soil data. The site also has strains of *BminPD - mineral poorly drained* and *BminPDPT - peaty poorly drained mineral*. The quaternary sediment map indicates that the site is predominantly underlain by *Cut over raised peat*. There are also strains of *Gravels derived from Limestones, Till derived from limestones* and *Alluvium*. The bedrock geology in this area is dominated by Ballysteen Formation which is described as *Dark muddy limestone, shale*.

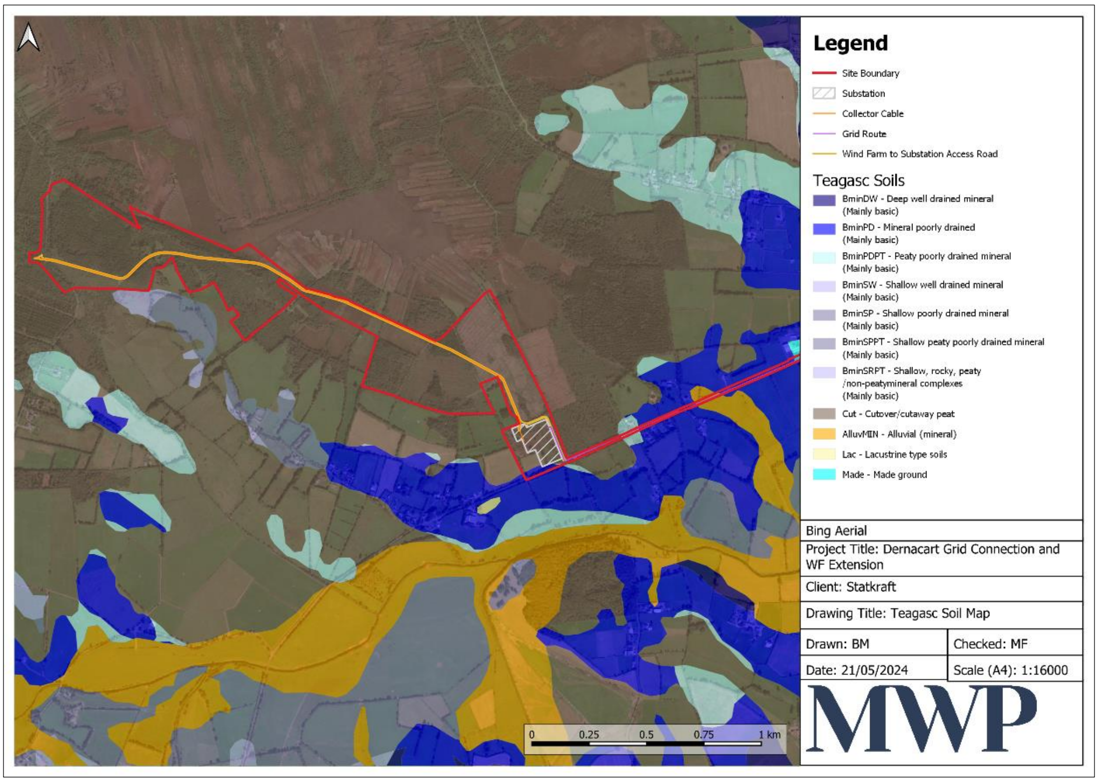

Figure 2-1: Teagasc Soil Map

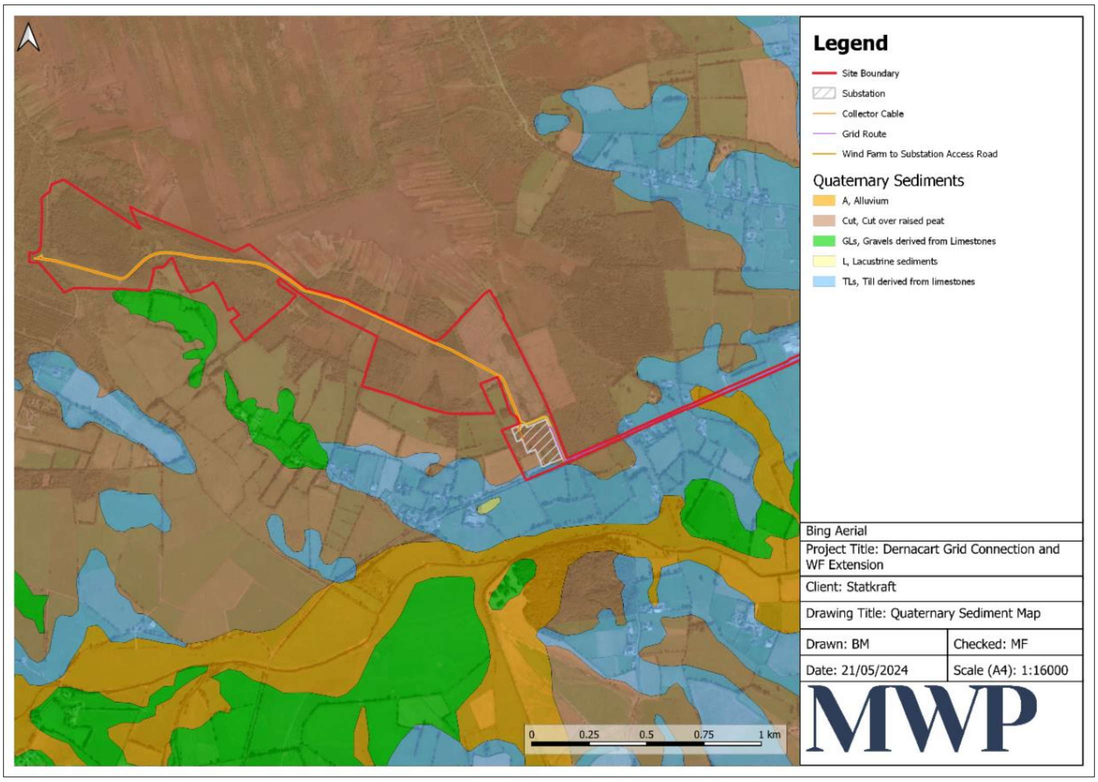

Figure 2-2: Quaternary Sediment Map

2.2 Flood History – OPW Local Area Summary Report

The Office of Public Works (OPW) floodinfo.ie website summarises all recorded past flood events near the site. There are three recurring flood events and one past flood events within 2.5km of the site which has been reported and is summarised as follows;

ID-2365: Barrow Borness Bridge Jan 1995 - Dated Flood - 31/01/1995

ID-2649: Barrow Bay Mountmellick Recurring - The Bay, Mountmellick – The Barrow and Owenass rivers overflows their banks after heavy rainfall every year. No road or property is affected, however significant land area is flooded.

ID-2778: Barrow Garryhinch Recurring - Garryhinch - River Barrow flood plain, Floods most winters. Road is liable to flood.

ID-2779: Barrow Cottoner's Bridge Recurring - Cottoner's Bridge - River Barrow flood plain, Floods most winters. Road is liable to flood.

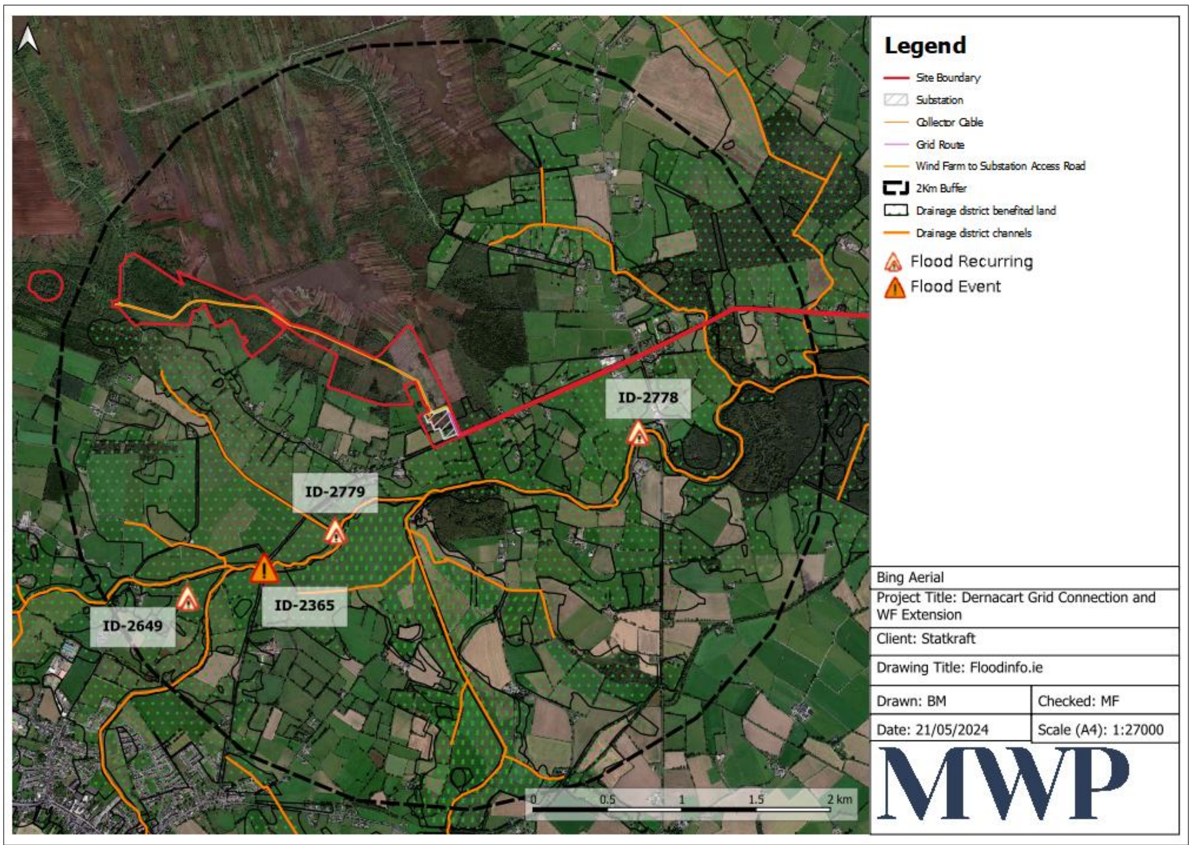

Figure 2-3: Extract from Floodinfo.ie

A portion of land within the site boundary is covered by a drainage district benefitted land. Drainage Districts were carried out by the Commissioners of Public Works under a number of drainage and navigation acts from 1842 to the 1930s to improve land for agriculture and to mitigate flooding. Channels and lakes were deepened and widened, weirs removed, embankments constructed, bridges replaced or modified and various other work was carried out. The purpose of the schemes was to improve land for agriculture, by lowering water levels during the growing season to reduce waterlogging on the land beside watercourses known as callows. Drainage Districts cover approximately 10% of the country, typically the flattest areas. Local authorities are charged with responsibility to maintain Drainage Districts. The Arterial Drainage Act, 1945 contains a number of provisions for the management of Drainage Districts in Part III and Part VIII of the act. The Act was amended on a number of occasions, e.g. to transpose EU Regulations and Directives such as the EIA, SEA, and Habitats Directives and the Aarhus Convention.

The Benefited land layer identifies land that was drained as part of the Drainage District. The original maps also identified other land owned by the same landowner so as to calculate the appropriate charge for maintenance.

2.3 National Indicative Fluvial Mapping

The National Indicative Fluvial Flood Maps have been produced for catchments greater than 5km² in areas for which flood maps were not produced under the National Catchment Flood Risk Assessment and Management Programme (CFRAM). An extract of the fluvial flood mapping for the current scenario is shown in Figure 2-4. These maps are not the best achievable representation of projected flood extents, such as those that could be generated through detailed hydraulic modelling, and are only indicative of the predicted flood extent of any given probability at any particular location. They should not be used for local decision-making or any other purpose without verification and seeking the advice of a suitable professional.

The flood maps may be used in the Stage 1 Flood Risk Assessment (Flood Risk Identification) to identify areas where further assessment would be required if development is being considered within or adjacent to the flood extents shown on the maps. Similarly, the maps may be used to identify whether flood risk might be a relevant issue when considering a planning application, or when discussing a potential application at pre-planning stage. Local site inspections, and / or making use of the knowledge or staff familiar with a particular area, are essential to determine if the maps for a given area are reasonable. For the purposes of flood zoning, or making decisions on planning applications, it is strongly recommended that a Stage 2 Flood Risk Assessment (Initial Flood Risk Assessment), as set out in the Planning System and Flood Risk Management Guidelines, is undertaken (where there are proposals for zoning or development, and where the area may be prone to flooding, as described above). These maps are 'predictive' flood maps showing indicative areas predicted to be inundated during a theoretical fluvial flood event with an estimated probability of occurrence, rather than information for actual floods that have occurred in the past, which is presented, where available, on the 'past' flood maps.

The maps refer to flood event probabilities in terms of a percentage Annual Exceedance Probability, or 'AEP'. This represents the probability of an event of this severity occurring in any given year. They are also commonly referred to in terms of a return period (e.g. the 100-year flood). The flood extents for the 1% and 0.1% AEP Present Day Scenario (Current Scenario) flood events are illustrated in Figure 2-4 below. The NIFM mapping indicates that there is no flood risk to the proposed substation site.

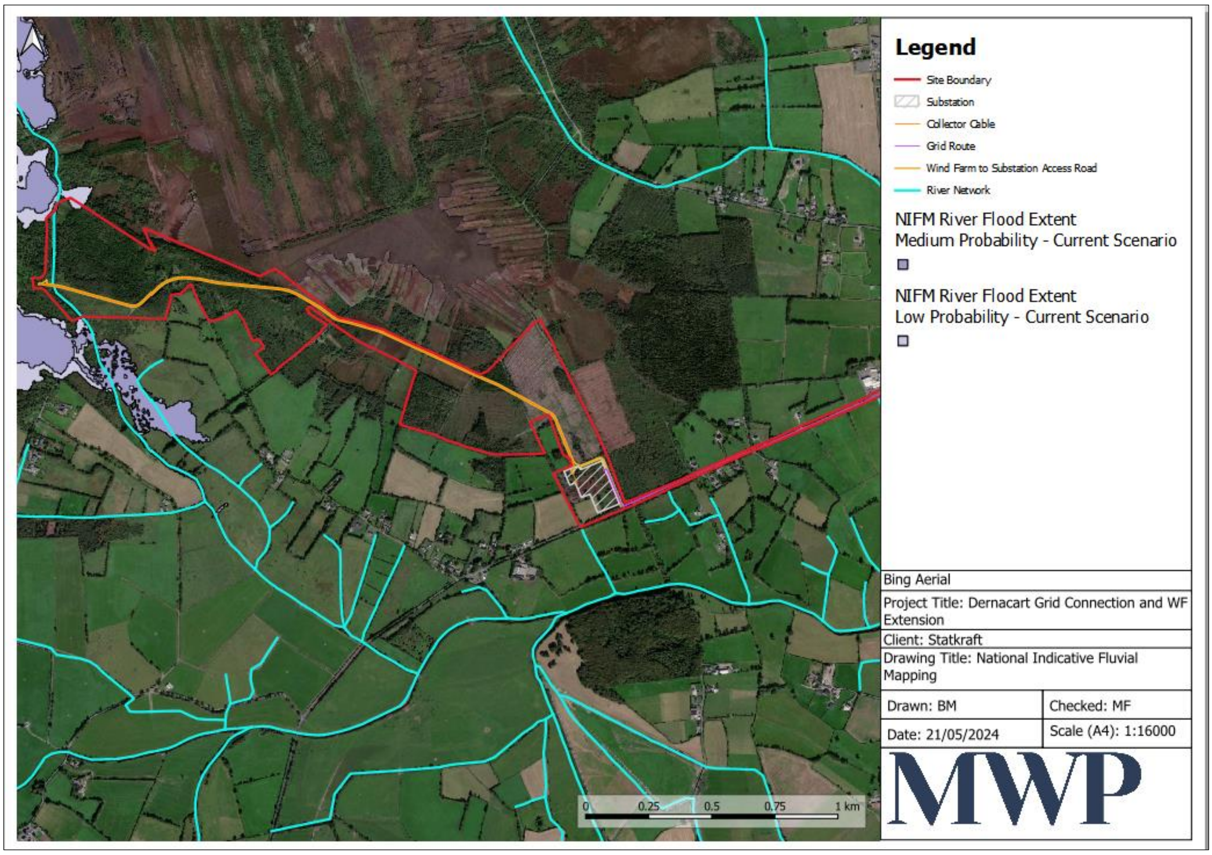

Figure 2-4: National Indicative Fluvial Mapping

2.4 South Eastern Catchment Flood Risk and Management Study (SE CFRAMS)

The OPW SE CFRAM study is the most detailed mapping in the area. The SE CFRAM involved detailed hydraulic modelling of rivers and their tributaries along with coastal flooding. Flood extents have been generated for the River Barrow. The mapping indicates that the lands immediately south of the proposed substation are at risk of flooding during the 1% AEP and 0.1% AEP Fluvial Flood event. An extract of the flood extent map for the present-day scenario is shown in Figure 2-5 below.

An extract of the flood extent map for the Mid-Range Future Scenario (MRFS) is presented in Figure 2-6 below. The Mid-Range Future Scenario extents where generated taking in in the potential effects of climate change using an increase in rainfall of 20% and sea level rise of 500mm. The mapping indicates that the substation is at risk of flooding during the 0.1% AEP MRFS Fluvial Flood event.

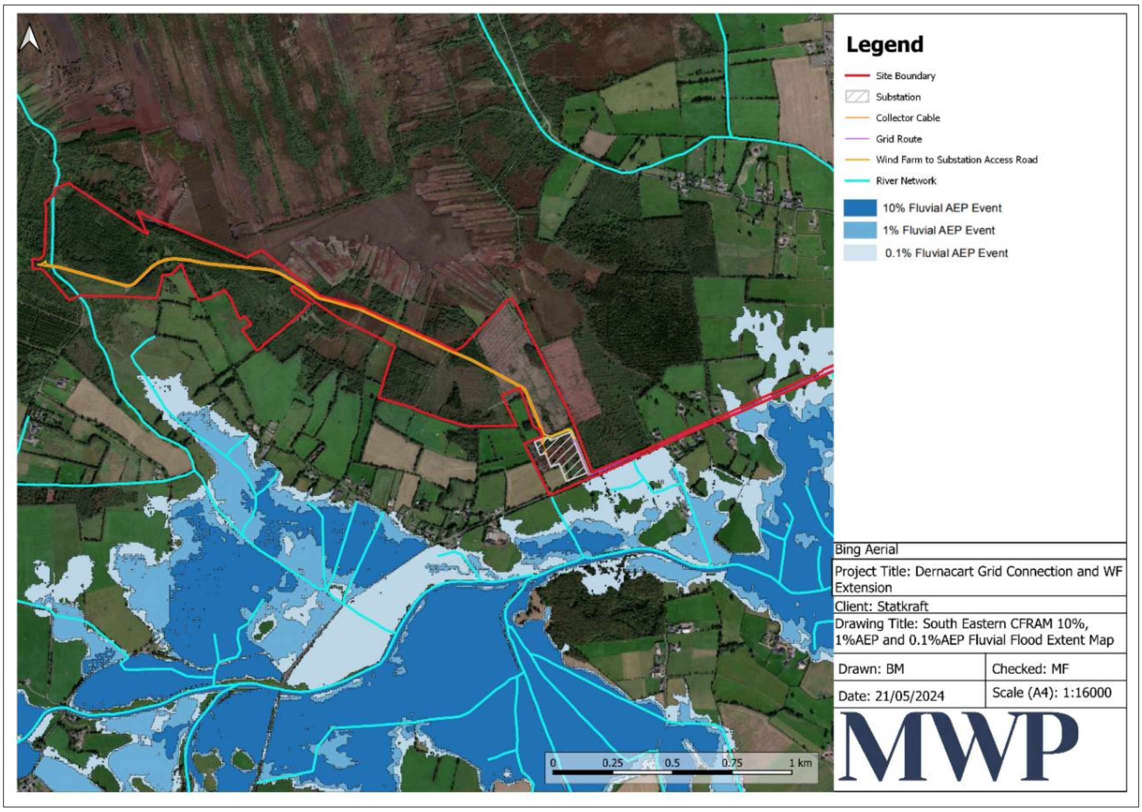

Figure 2-5: South Eastern CFRAM 10%, 1%AEP and 0.1%AEP Fluvial Flood Extent Map

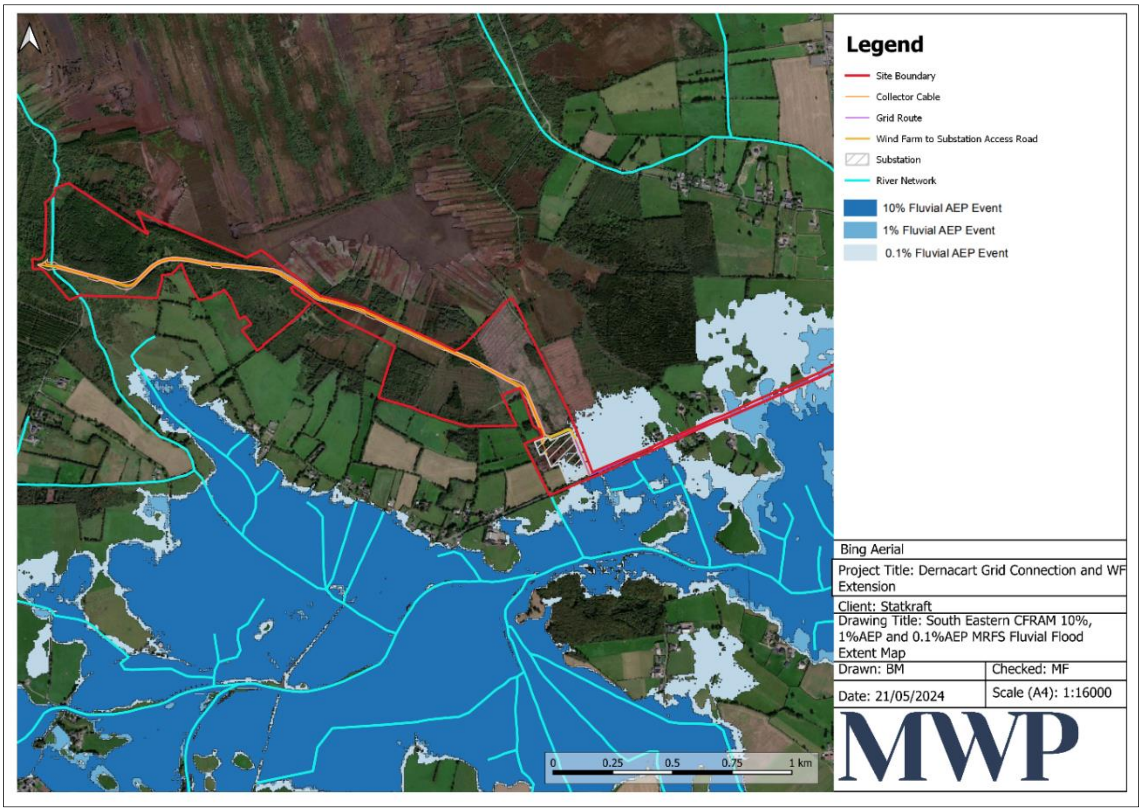

Figure 2-6: South Eastern CFRAM 10%, 1%AEP and 0.1%AEP MRFS Fluvial Flood Extent Map

2.5 GSI Winter 2015/2016 Surface Water Flooding

The Winter 2015/2016 Surface Water Flooding map shows fluvial (rivers) and pluvial (rain) floods, excluding urban areas, during the winter 2015/2016 flood event. There is no flooding indicated within the proposed substation development site during this flood event as seen in Figure 2-7 below.

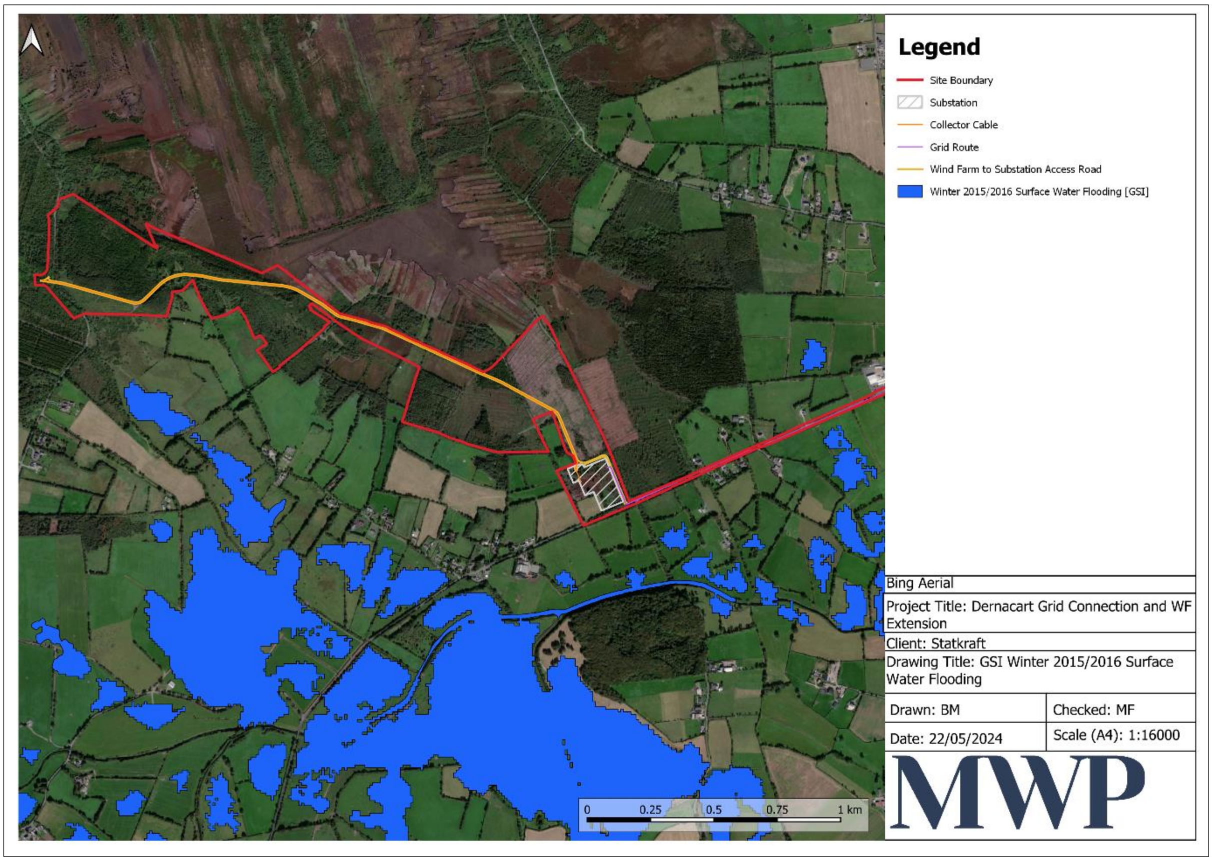

Figure 2-7: GSI Winter 2015/2016 Surface Water Flooding

2.6 Offaly County Council Strategic Flood Risk Assessment

The Offaly County Council Development Plan 2021-2027 Strategic Flood Risk Assessment (SFRA) produced flood mapping to provide a broad (wide area) assessment of all types of flood risk to inform strategic land-use planning decisions. The Strategic Flood Risk Assessment has been updated in the current Offaly County Council Development Plan 2021 -2027. According to this and under the Planning Guidelines, the Flood Zone mapping for the County is principally derived from the CFRAM where possible. The Offaly County Council 2021-2027 SFRA mapping places the proposed substation within Flood Zone C.

2.7 Internet Searches

An internet search was conducted to gather information about whether the site was affected by flooding previously. There were no reports of flooding within the proposed site.

2.8 Topographical Survey & Existing Drainage

The site topography and levels are available from several sources. These include topographical survey drawings and OSI LiDAR data. The site generally slopes from north west to south east. According to the topographic survey, the proposed substation development has drainage ditches along it's northern, eastern, southern and western boundaries.

The Regional Road (R423) runs along the southern boundary of the proposed substation. The road generally falls in an easterly direction according to the topographic survey. The centre of the R423 levels were compared against levels in proposed development site immediately north and levels within the field immediately to the south. The topographic survey indicates that the R423 levels are higher than the proposed development site immediately north and the field immediately to the south, ranging from 0.77m to 2.28m and 0.7m to 1.87 respectively.

2.9 Walkover survey of the subject site and the nearby watercourse & drainage ditches

The site and surrounding lands were inspected by MWP Engineering and Environmental Consultants on the 10th October 2023. This walkover survey was undertaken to obtain a good appraisal of the existing site conditions and to determine if there are any potential sources of flooding at the site including possible fluvial flooding or flooding from overland flows or groundwater. Photographs from the site visit are presented in Plate 1.

During the site walkover survey the following key features were noted at the site;

- In general, the proposed substation site is wet underfoot, with waterlogged patches.
- Drainage ditches were observed around entire perimeter of proposed substation site.
- The drainage ditches can sometimes be full of water or may only contain a small volume of water depending on rainfall.

	
Drainage Ditch Along Southern Boundary of Proposed Substation Site	Drainage Ditch Along Western Boundary of Proposed Substation Site

	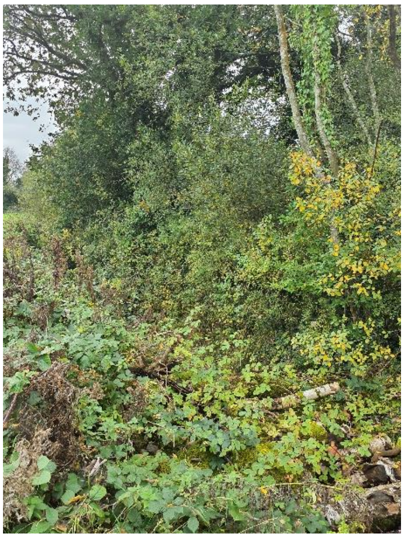
Drainage Ditch Along Western Boundary of Proposed Substation Site	Drainage Ditch Along Western Boundary of Proposed Substation Site

Plate 1: Site Walkover Photographs

2.10 Summary of Stage 1 FRA

The Stage 1 FRA has identified a potential flood risk at this site. Therefore, a Stage 2 FRA will be carried out to provide a more comprehensive assessment of the flood risk.

3. Initial Flood Risk Assessment (Stage 2)

The purpose of Initial Flood Risk Assessment is primarily to ensure that the relevant flood risk sources are identified so that they can be addressed appropriately in the Detailed Flood Risk Assessment.

3.1 Flooding Sources

The potential sources of flooding and their relevance to the flood risk at the site are outlined in the following sub-sections.

3.1.1 River Flooding

Fluvial flooding occurs when the capacity of a river channel is exceeded and water flows onto the adjacent land or floodplain. The main watercourse in proximity to the proposed substation is the River Barrow which flows from west to east c.345m from the site's southern boundary, south of the R423.

The South Eastern CFRAM mapping shows that the proposed substation site is not impacted by the 1% or 0.1% AEP flood event during the current scenario (See Figure 3-1). The centre of the R423 levels along the southern boundary of the proposed substation site range from approximately 71.03mOD to 71.31mOD. The centre of the R423 road levels are higher than the levels in the field immediately to the south of the proposed substation site. The difference in elevation of the centre of the R423 road levels when compared to the elevation of the field immediately to the south of the proposed substation vary from approximately 0.7m to 1.87m, from west to east respectively. There is a node (14BARO_O.0003D) approximately 370m south of the proposed substation site on the River Barrow as seen below on Figure 3-1, which gives flows and water levels for the 10%, 1% and 0.1% AEP events. The water levels are presented in Table 3-1 below. It should be noted that the water level for node (14BARO_O.0003D) would have been obtained within the River Barrow channel and does not necessarily relate to the overbank/floodplain areas, as the topography of the floodplain areas will vary. The node (14BARO_O.0003D) gives a water level of 69.81mOD for the 0.1% AEP fluvial event. The South Eastern CFRAM fluvial flood depth map indicates there is between 0.5m to 1.0m depth of flooding in the the fields immediately to the south of the proposed substation site for the 0.1%AEP fluvial event as seen in Figure 3-2 below. Based on the topographic survey and the flood depth map presented in Figure 3-2 below, the location south of the proposed substation where the depth of flooding is equal to 0.5m - 1m, the corresponding ground elevation is approximately 69mOD to 69.25mOD. Therefore, taking the conservative 1m depth of flooding as presented in Figure 3-2 below, the approximate water level may vary between 70mOD to 70.25mOD. The centre of the R423 road levels are c.71mOD. The approximate difference between the Finished Road Level and the approximate water level in the field immediately to the south of the R423 is 0.8m/1m. Therefore, the site is not at risk of flooding during the present day 1% AEP or 0.1% AEP fluvial flood event.

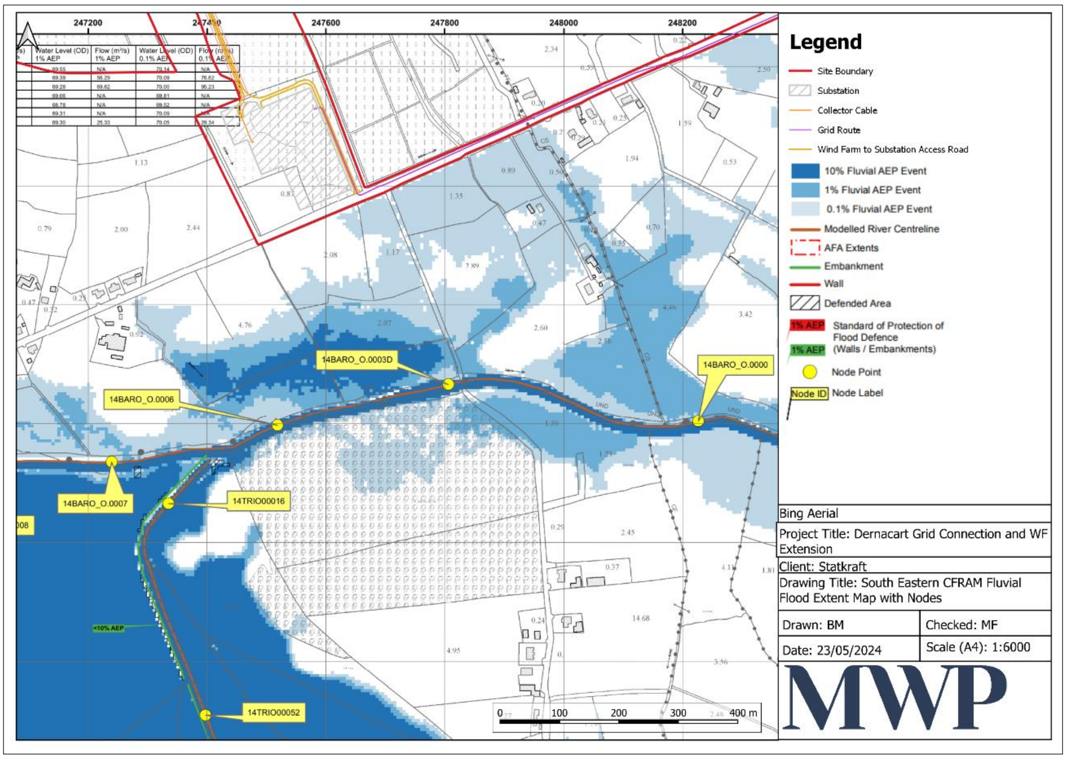

Figure 3-1: South Eastern CFRAM Fluvial Flood Extent Map with Nodes

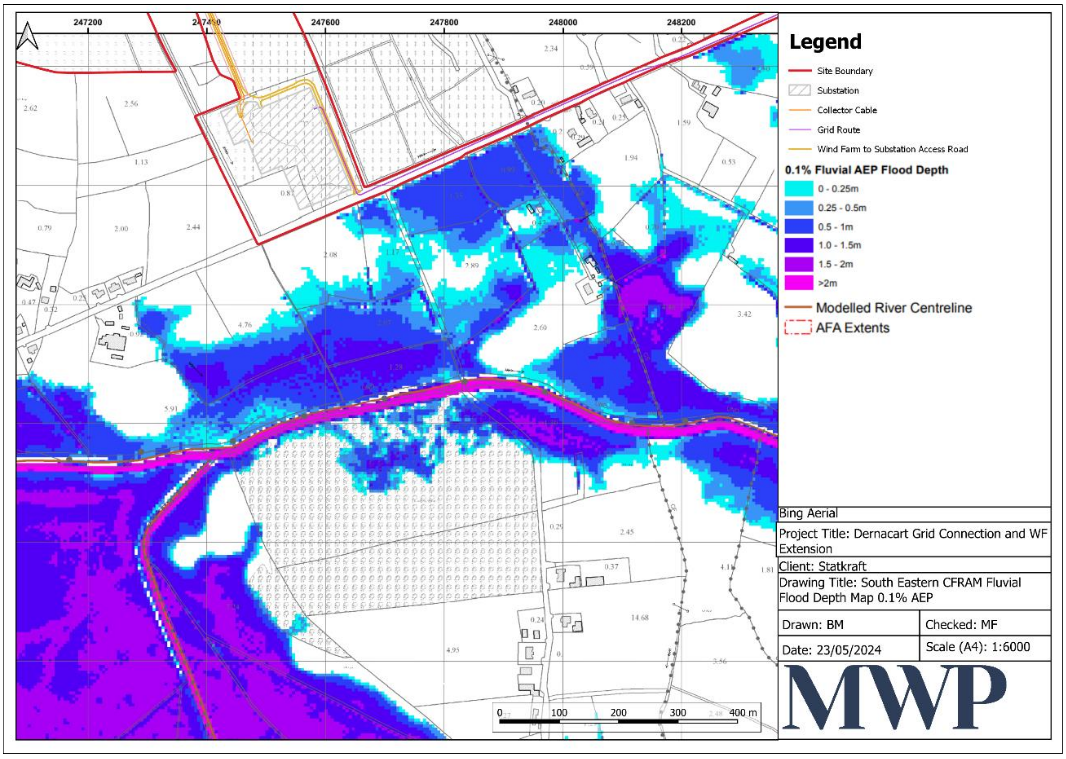

Figure 3-2: South Eastern CFRAM Fluvial Flood Depth Map 0.1% AEP

Node	10% AEP Water Level (mOD)	1% AEP Water Level (mOD)	0.1% AEP Water Level (mOD)
14BARO_O.0003D	69.03	69.06	69.81

Table 3-1: South Eastern CFRAM Water Levels for 10%, 1% & 0.1% AEP Fluvial Events

3.1.2 Pluvial Flooding

Overland flow or pluvial flooding occurs when rainfall intensity exceeds the infiltration capacity of the ground. The excess water flows overland to the nearest watercourse or piped drainage system. Intense rainfall events can result in ponding in low areas or upstream of physical obstructions. Overland flow is most likely to occur following periods of sustained and intense rainfall when the ground surface becomes saturated. Flood risk from pluvial sources exists in all areas. The existing site is a greenfield site. Increase in hardstanding area will increase the risk of pluvial flooding. There is no history of pluvial or surface water flooding on the site.

As part of the proposed development, a site surface water management system will be constructed on the site so as to attenuate run-off. The drainage system will be implemented along all works areas including all internal site access roads, storage areas, substation and temporary construction compound. At the outset it is proposed to install clean water cut-off drains around the perimeter of the development areas to intercept surface water run-off from catchments uphill of the proposed development works. The cut-off drains will collect and divert the collected runoff around site infrastructure to prevent it entering the site.

At the substation compound, it is proposed that surface water runoff from the roofs of the substation buildings, and hard-surfaced areas within the electrical yard, including areas where a risk of a contaminant leak or spill may be present (such as the transformer bund), will be collected in a series of filter drains, roof guttering and downpipes and routed to an underground gravity drainage network. All runoff collected in the stormwater sewer network will pass through an oil/petrol Interceptor prior to discharging to an attenuation unit on the south-east side of the substation compound. The attenuation unit will provide attenuation of the surface water runoff generated from the hard surfaces of the development. The attenuated surface water runoff is then proposed to overflow at a controlled rate equal to the greenfield runoff rate to an existing vegetated land drain on the western side of the compound.

A separate surface water run-off drainage system will be implemented along all internal access roads, to separate and collect ‘dirty water’ run-off from the roadway and to intercept clean over land surface water flows from crossing internal roadways. To achieve separation, clean water drains will be positioned on the upslope and dirty water drains positioned on the downslope of roadsides, with road surfaces sloped towards dirty drains. Clean water will be piped under both the access roads and downslope collection drains to avoid contamination. Piping the clean water under the service road allows the clean water to follow the course it would have taken before construction thus mimicking the existing surface water over land flow pattern of the site and thus not altering the natural existing hydrological regime on site.

3.1.3 Estuarial Flooding

Estuarial or tidal flooding is caused by higher-than-normal sea levels which occur primarily due to extreme high tides, storm surges, wave action or due to high river flows combining with high tides. This risk is not relevant to this site as the proposed site is located inland. Therefore, this does not require further consideration in this report.

3.1.4 Groundwater Flooding

Groundwater flooding occurs when the water table rises to the level of the ground surface due to rainfall and flows out over the surface. Groundwater flooding occurs relatively slowly and generally poses a low hazard to people. There is no known history of such an occurrence in the vicinity of the site or no karstic landforms within the site. For these reasons this source of flooding will not be considered further in this report.

3.2 Flood Zone Identification

The South Eastern Catchment Flood Risk and Management Study is the most detailed mapping in the area and contains flood zone mapping for this area as indicated in Figure 3-1. As indicated, the proposed substation site is located in Flood Zone C (i.e. outside of Flood Zone A & B) therefore the site has a low probability of flooding as defined in the Flood Risk Management Guidelines and described in Section 1.6 above. The type of development being proposed is appropriate for this flood zone and a Justification Test for the proposed development is therefore not required.

3.3 Potential Impacts of Flood Elsewhere

Since the proposed substation does not interact with floodplains or flow paths, the proposed development will not adversely impact on fluvial or groundwater flood risk elsewhere.

The proposed substation site will create impermeable areas that could increase storm water runoff rates. This will be adequately mitigated by incorporating appropriate Sustainable Urban Drainage Systems (SuDS) into the detailed design which will include limiting the discharge rate from the site to existing greenfield runoff rates.

3.4 Stage 2 Summary of Identified Flood Risk

It has been established that the potential for flooding within the proposed site is low and therefore a Stage 3 Flood Risk Assessment is not required.

4. Conclusions & Recommendations

A summary of the main findings of this FRA is as follows;

- This report has been prepared in the context of The Planning System and Flood Risk Management – Guidelines for Planning Authorities, November 2009 (PSFRM), published by the Office of Public Works and the Department of Environment, Heritage and Local Government.
- The development consists of a Proposed 110kV Substation and an associated access track, Underground Windfarm Collector Cable and Access Track and Underground Grid Connection Cable in Portarlington Co. Laois.
- There is no record of previous flooding occurring at this site.
- The flood risk assessment has identified that the site is within Flood Zone C as defined in the Flood Risk Management Guidelines and is appropriate for the proposed development.
- It was demonstrated that the proposed development will not have an adverse impact on flooding elsewhere.
- The detailed design of the site drainage system for the development will include appropriate SuDS, including limiting the post-development discharge rate from the site to existing greenfield runoff rates.