Condition 7 of the original Planning Application to Wexford County Council (WCCRef: PL 2004/4702 An Bord Pleanála Ref PL26.211725) states the following in relation to the decommissioning of the wind farm:

> ***"Upon termination of the use of the windfarm, the mast and turbines shall be dismantled and removed from the site and the site shall be restored to its existing condition in accordance with the requirements of the planning authority. Prior to commencement of the development, the developer shall lodge with the planning authority a cash deposit, a bond of an insurance company, or other security to secure the satisfactory reinstatement of the site. The form and amount of the security shall be as agreed between the planning authority and the developer or, in default of agreement, shall be determined by An Bord Pleanála."***

Should the Decommissioning Plan as set out in the Planning Conditions for the Existing Castledockrell Wind Farm be implemented, it may lead to environmental effects on geology and soils due to the potentially extensive ground works required to remove existing access tracks and the turbine foundations. Local subsoils are not expected to be significantly affected during these potential decommissioning works, however a more environmentally sensitive approach is outlined for the end of the proposed extended operational period (i.e., in 20 years), as set out below. The effect of decommissioning is considered to have a long-term, slight negative impact in the context of this EIAR.

8.5.2 Construction Phase Effects

As the Proposed Development consists of an extension of life to an existing wind farm, no construction related excavations, groundworks or other intrusive works are planned. Therefore, **No Significant Effects** to the subsurface environment (soils or geology) will occur.

8.5.3 Operational Phase Effects

No effects on soils and geology have occurred, or are anticipated, during the operational phase. The operational phase of the development will not involve any disturbance to topsoil, subsoils or geology of the area. Routine operational and maintenance works are anticipated to be required throughout the lifespan of the Proposed Development. These works are likely to include minor upgrades or replacements of turbine components, and mechanical/electrical components related to the control building. There is potential for limited use of plant and machinery as part of this maintenance work. There would be **No Significant Effects** on soils and geology associated with any future maintenance works.

8.5.3.1 Contamination of Soil by Leakages and Spillages

During routine maintenance works, oils and lubricants may be used, plant and machinery may require refueling on-site and so hydrocarbons may be present. Also, the transformers in each turbine are a mix of oil cooled and dry type cast resin transformer. Managed incorrectly, there is the risk of spills and leaks associated with these operations impacting on land and soils.

Pathway: Topsoil, subsoil and bedrock pore space.

Receptor: Topsoil, subsoil and bedrock.

Potential Impact: Negative, direct, slight, short term, medium probability impact on topsoil, subsoils and bedrock.

Mitigation Measures

Oil used in transformers (at each turbine) and any storage of oils or hydrocarbons within the control building compound could potentially leak during the operational phase and impact on soils and subsoils. Turbine transformers are located within the turbine hardstands, with dedicated concrete foundations, so any leaks would be contained within the turbine transformer units and hydrocarbons would not be able to permeate to ground. In addition:

- All plant and machinery to be serviced before being mobilised to site;
- No plant maintenance completed on-site, any broken-down plant removed from site to be fixed;
- Refuelling completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums stored in secure, impermeable bunded storage areas away from open water;
- Only designated trained operators authorised to refuel plant on-site;
- Procedures and contingency plans set up to deal with emergency accidents or spills; and,
- Highest standards of site management maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during works.

Residual Impact

The implementation of the above mitigation measures will result in a residual **Imperceptible, Negative Direct, Short Term, Unlikely Effect** to land, topsoil, subsoils or bedrock. There was no recorded or observed evidence of storage of significant quantities of hydrocarbons or other chemicals, nor any leakages or spillages of hydrocarbons during the site walkover.

Significance of Effects

Based on the assessment above **No Significant Effects** on land, topsoil, subsoils or bedrock as a result of leakages or spillages due to future maintenance works are expected.

Significance of Effects

No Significant Effects on land, soils and geology environment are envisaged during the operational stage of the Proposed Development.

8.5.4 Decommissioning Phase

The potential impacts associated with future decommissioning of the Proposed Development in 20 years will be similar to those associated with a typical wind farm construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works, as outlined in Chapter 4, Section 4.6 of this report.

During decommissioning, it may be possible to reverse or at least reduce some of the potential impacts caused during the initial construction of the wind farm by rehabilitating construction areas such as turbine bases and hard standing areas. This will be done by covering with local topsoil and reseeding with a local native mix to encourage vegetation growth and reduce run-off and sedimentation.

Condition 7 of the original planning permission (WCC 2004/4702 and ABP PL26.211725) outlines the conditions for decommissioning, as set out in Section 8.5.1 above.

It is considered that this Condition is not appropriate in the current context, from an environmental perspective, for the Proposed Development. Upon decommissioning of the Proposed Development, the wind turbines will be disassembled in reverse order to how they were erected. All above-ground turbine components will be separated and removed off-site for reuse or recycling. The disassembly and removal of the turbines will not have an impact on the subsurface environment (soils and geology) at the site.

It is proposed to leave turbine foundations in place underground and to cover with earth and reseed as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environmental nuisances such as noise, vibration and dust.

It is proposed to leave underground cables in place where they are unlikely to be impacted by typical agricultural works. It is proposed that the site roadways will be left in-situ, as appropriate, to facilitate access for agricultural lands. A decommissioning plan will be agreed with the local authority at least three months prior to decommissioning of the Proposed Development.

Other impacts such as possible soil compaction and contamination by fuel leaks will remain but will be of reduced magnitude. Mitigation measures implemented in the Operational Phase, as outlined in Section 8.5.3.1, will be implemented during the future decommissioning phase to avoid any potential effects.

However, as noted in the Scottish National Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013), reinstatement proposals for a wind farm are made far in advance, so within the 20-year lifespan of the Proposed Development, technological advances and preferred approaches for reinstatement might change. According to the SNH guidance, it is, therefore:

> *'Best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm'.*

The '*Decommissioning of Onshore Wind Turbines'* document as published by Wind Europe[3] provides guidance in relation to the protection of soil and prevention of contamination while decommissioning turbines. Relevant guidance set out in this document will be adhered to during the decommissioning phase of the Proposed Development.

No Significant Effects on the subsurface soils and geology are envisaged during the decommissioning stage of the Proposed Development.

8.5.5 Potential Cumulative Impacts

Potential cumulative effects on geology and soils between the Proposed Development and other developments in the vicinity, including those listed in Section 2.9 of this EIAR were also considered as part of this assessment. The nearest wind energy development to the Existing Castledockrell Wind Farm is the existing Turbine 12 of the Castledockrell Windfarm, granted under a sperate planning application (WCC Ref 2008/0335), approximately 330m from T11, its closest point, and Bola More Wind Farm located approximately 2.6km west of the Proposed Development. Both the existing Castledockrell Turbine 12 and the Bola More Wind Farm development were also subject to an EIA which identified mitigation measures to ensure that no significant impact to land, soils or geology would occur. As both of these wind farms are operational and no groundworks are proposed at either site, there is no potential for cumulative impacts in relation to land, soils or geology that will occur.

[3] https://windeurope.org/intelligence-platform/product/decommissioning-of-onshore-wind-turbines/

Beyond cumulative wind farm assessment in the study area, the existing 110kV underground grid connection cable was also assessed for potential effects upon soils and geology. The grid connection is composed of approximately 8.1km of buried 110kV transmission line from the existing onsite 110kV substation at the Existing Castledockrell Wind Farm to the existing Lodgewood 220kV substation, located to the southeast of the Proposed Development. The grid connection is existing linear underground infrastructure and there are no associated potential impact pathways which could lead to negative effects in combination with the Proposed Development

Due to the limited scale of other developments in the vicinity, there is little potential for significant impacts to land, soil, and geology resulting from those developments. The Proposed Development does not involve any construction or excavation works, and there is no potential for significant impacts to land, soil, and geology. Therefore, No Significant Cumulative Effects on land, soils and geology environment are anticipated during the continued operational and decommissioning phases of the Proposed Development.

8.5.6 Summary

The Proposed Development (extension of life of the Existing Castledockrell Wind Farm) does not involve any construction works, including excavations or otherwise, that may have the potential to impact local soils or underlying geology. Historically, groundworks, including excavations for turbine foundations, and trenching for laying of cables, formed part of the construction of the wind farm in 2010.

During the site walkover on the 26th of September 2023, no evidence of any geotechnical incidents or residual impacts to the land, soils and geology of the site was observed.

Storage and handling of small quantities of hydrocarbons/chemicals may be required during the operational and decommissioning phases however **No Significant Effects** are likely.

No Significant Effects to the land, soil and geology at the site have occurred, or are anticipated, as a result of the proposed extension of the Proposed Development's continued operational phase.

9. WATER

9.1 Introduction

9.1.1 Background and Objectives

This chapter of the Environmental Impact Assessment Report (EIAR) provides a baseline assessment of the environmental setting of the Proposed Development in terms of hydrology and hydrogeology and discusses the potential likely significant effects of the Proposed Development on the receiving environment.

The full description of the Proposed Development is provided in Chapter 4 of this EIAR.

The objectives of this assessment area to:

- Produce a baseline study of the existing water environment (surface and groundwater) in the area of the Proposed Development;
- Identify likely positive and negative impacts of the development on surface and groundwater during construction and operational phases of the development;
- Identify mitigation measures implemented to avoid, reduce, or offset significant negative impacts;
- Assess significant residual impacts and effects;
- Assess cumulative impacts of the Proposed Development along with other local infrastructure developments.

9.1.2 Statement of Authority

This section of the EIAR has been prepared by Keelin Bourke and Gráinne Griffin, and reviewed by Sean Creedon, all of MKO. Keelin is a graduate Environmental Scientist with MKO having joined the company in September 2023. Keelin holds a BSc (Hons) in Environmental Science from University College Cork and an MSc (Dist) in Environmental Engineering from Trinity College Dublin. Prior to taking up her position with MKO, Keelin worked as an Environmental Health and Safey Officer in an EPA licensed Waste Transfer Station in Cork City. Keelin's current key strengths and areas of expertise are in environmental surveying, report writing and environmental mapping. Since joining MKO, Keelin has become a member of the MKO Environmental Renewables Team which work on producing high quality Environmental Impact Assessment Reports for a variety of Renewable Energy clients. Gráinne is an Environmental Scientist with MKO with over 4 years' experience in the environmental consultancy sector, which included ecological roles as a marine mammal observer and an aerial survey operator. Gráinne holds a BSc in Applied Freshwater & Marine Biology from ATU Galway and a MSc in Environmental Leadership from the University of Galway. Gráinne's key strengths and areas of expertise include managing and researching reports in areas of environmental conservation and policy, ecology, renewable energy, marine spatial planning, and climate action. Gráinne has experience in report writing, including Appropriate Assessments, Natura Impact Statements, feasibility studies and EIA screening reports. Gráinne also holds skills in environmental restoration project research and design. Since joining MKO Gráinne has been involved in coordinating environmental site work for a wide range of developments, assisting in stakeholder engagement, scoping exercises, organising and attending pre-application meetings with local authorities and An Bord Pleanála. Within MKO, Gráinne has been assisting managers in the coordination and production of EIARs for largescale SID wind energy developments. Gráinne also holds a membership with the Chartered Institute of Ecology and Environmental Management (CIEEM). Sean is an Associate Director in the Environment Team at MKO. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy

related developments. He has worked on the planning and environmental impact elements within all stages of wind farm project delivery. He is a member of the MKO senior management team responsible for developing the business, mentoring team members, fostering a positive culture and promoting continuous employee professional development. Sean has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland

9.1.3 Scoping and Consultation

The scope for this chapter of the EIAR has also been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties. This consultation process is outlined in Section 2.7 of this EIAR. Issues and concerns highlighted with respect to local water sources are summarised in Table 9-1 below.

Table 9-1 Summary of Water Environment related Scoping Responses

Consultee	Description	Addressed in Section
Geological Survey of Ireland (GSI)	Recommended the use of their Groundwater Data, Geological Heritage Data and Geological Mapping Viewer in the compilation of the EIAR Chapter	9.3.4
Health Service Executive (HSE)	Included reference to a number of other EIAR chapters. With regards to Water, requested that any drinking water from surface or groundwater sources be identified alongside any Public and Group water schemes or any other private water supplies such as wells, and to ensure protection of all sources in relation to the Proposed Development. Any potential effects to drinking water sources, along with hydrological characteristics or the site and surrounding area were requested to be identified and assessed within the EIAR.	9.3
Inland Fisheries Ireland (IFI)	No response received at the time of report issue.	n/a
Irish Water (IW)	No response received at the time of report issue.	n/a
Wexford County Council, Water Services	No response received at the time of report issue.	n/a

9.1.4 Relevant Legislation

This EIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU.

Regard has also been taken of the requirements of the following legislation (where relevant) as it pertains to the water environment:

- S.I. No. 349 of 1989: European Communities (Environmental Impact Assessment) Regulations, and subsequent Amendments (S.I. No. 84 of 1994, S.I. No. 101 of 1996, S.I. No. 351 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001, S.I. 134 of 2013 and the Minerals Development Act 2017), the Planning and

Development Act 2000 (as amended), and S.I. 600 of 2001 Planning and Development Regulations and subsequent Amendments. These instruments implement EU Directive 85/337/EEC and subsequent amendments, on the assessment of the effects of certain public and private projects on the environment;

- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Planning and Development Act, 2000, as amended;
- S.I. No 296 of 2018: European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which transposes the provisions of Directive 2014/52/EU into Irish law;
- S.I. No. 293 of 1988: European Communities (Quality of Salmonid Waters) Regulations, resulting from EU Directive 78/659/EEC on the Quality of Fresh Waters Needing Protection or Improvement in order to Support Fish Life;
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended by S.I. No. 296/2009; S.I. No. 386/2015; S.I. No. 327/2012; and S.I. No. 77/2019 and giving effect to Directive 2008/105/EC on environmental quality standards in the field of water policy and Directive 2000/60/EC establishing a framework for Community action in the field of water policy) and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations which implement EU Water Framework Directive (2000/60/EC) establishing a framework for the Community action in the field of water policy and provide for implementation of 'daughter' Groundwater Directive (2006/118/EC) on the protection of groundwater against pollution and deterioration. Since 2000 water management in the EU has been directed by the Water Framework Directive (2000/60/EC) (as amended by Decision No. 2455/2011/EC; Directive 2008/32/EC; Directive 2008/105/EC; Directive 2009/31/EC; Directive 2013/39/EU; Council Directive 2013/64/EU; and Commission Directive 2014/101/EU ("WFD"). The WFD was given legal effect in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003
- S.I. No. 684 of 2007: Waste Water Discharge (Authorisation) Regulations 2017, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);S.I. No. 106 of 2007: European Communities (Drinking Water) Regulations 2007and S.I. No. 122 of 2014: European Communities (Drinking Water) Regulations 2014, arising from EU Directive 98/83/EC on the quality of water intended for human consumption (the "Drinking Water Directive") and EU Directive 2000/60/EC;
- S.I. No. 9 of 2010: European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended by S.I. No. 389/2011; S.I. No. 149/2012; S.I. No. 366/2016; the Radiological Protection (Miscellaneous Provisions) Act 2014; and S.I. No. 366/2016);,

9.1.5 Relevant Guidance

The water section of the EIAR is carried out in accordance with guidance contained in the following:

- Environmental Protection Agency (2022): Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (September 2015): Draft - Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) where relevant;
- Environmental Protection Agency (September 2015): Draft – Revised Guidelines on the Information to be Contained in Environmental Impact Statements where relevant;
- European Commission (2017) Guidance on Screening;
- European Commission (2017) Guidance on Scoping;

- European Commission (2017) Guidance on the preparation of the Environmental Impact Assessment Report;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2005): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016);
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006); and,
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

9.2 Methodology

9.2.1 Desk Study & Preliminary Hydrological Assessment

A desk study and preliminary hydrological assessment of the site of the Proposed Development and the surrounding study area (i.e., lands within the immediate vicinity of the wind farm) was completed in advance of the site walkover. This involved collection of all relevant geological, hydrological, hydrogeological and meteorological data for the area. This included review of the following sources:

- Environmental Protection Agency (EPA) Maps application (https://gis.epa.ie/EPAMaps/);
- Tailte Éireann GeoHive Geospatial Data Hub (www.geohive.ie);
- Geological Survey of Ireland (GSI) - Groundwater Database (www.gsi.ie);
- GSI – Groundwater Wells and Springs database (https://www.gsi.ie/en-ie/data-and-maps/Pages/Groundwater.aspx#Wells)
- GSI – 1:500,000 scale bedrock geology map of Ireland (https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx)
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- EPA/Water Framework Directive Map Viewer (www.catchments.ie);
- OPW Flood Hazard Mapping (www.floodinfo.ie);
- Environmental Protection Agency – "Hydrotool" Map Viewer (www.epa.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie); and,
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie).

9.2.2 Impact Assessment Methodology

Please refer to Chapter 1 of the EIAR for details on the impact assessment methodology (EPA, 2002, 2003, 2015, 2017 and 2022). In addition to the above methodology, the sensitivity of the water environment receptors was assessed on completion of the desk study and baseline study. Levels of sensitivity which are defined in Table 9-2 are then used to assess the potential effect that the Proposed Development may have on them.

Table 9-2 Receptor Sensitivity Criteria (Adapted from www.sepa.org.uk)

Sensitivity of Receptor	
Not sensitive	Receptor is of low environmental importance (e.g. surface water quality classified by EPA as A3 waters or seriously polluted), fish sporadically present or restricted. Heavily

Sensitivity of Receptor	
	engineered or artificially modified and may dry up during summer months. Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character. No abstractions for public or private water supplies. GSI groundwater vulnerability "Low" – "Medium" classification and "Poor" aquifer importance.
Sensitive	Receptor is of medium environmental importance or of regional value. Surface water quality classified by EPA as A2. Salmonid species may be present and may be locally important for fisheries. Abstractions for private water supplies. Environmental equilibrium copes well with all natural fluctuations but cannot absorb some changes greater than this without altering part of its present character. GSI groundwater vulnerability "High" classification and "Locally" important aquifer.
Very sensitive	Receptor is of high environmental importance or of national or international value i.e. NHA or SAC. Surface water quality classified by EPA as A1 and salmonid spawning grounds present. Abstractions for public drinking water supply. GSI groundwater vulnerability "Extreme" classification and "Regionally" important aquifer

9.3 Receiving Environment

9.3.1 Site Description, Land and Topography

The Proposed Development is situated on a relatively flat area of agricultural land at the plateau of sloping hills to all sides, approximately 2.6km from Templeshanbo Village and 3.6km from Ballindaggan villages to the southwest and 2.5 km from Castledockrell Village to the east. The Proposed Development is located 8.1km west of Ferns and 6.5km south of Bunclody in the townlands Kilcullen, Ballynelahillan, Carranroe, Tomatee, Knockduff and Sroughmore.

The Proposed Development consists of a proposed lifetime extension of the original Castledockrell Wind Farm for an additional 20 years. The existing Castledockrell Wind Farm consists of 11 no. turbines located to the northwest of Castledockrell Village, with access via a Local Road, L2012. The Proposed Development is located on the upland agricultural land located at the top of a plateau of sloping hills to all sides which form natural boundaries of the wind farm site.

The Environmental Impact Assessment Report (EIAR) Study Area for the Proposed Development is approximately 97 hectares (ha) while the total development footprint of the Proposed Development (i.e., the existing Castledockrell Wind Farm) is approximately 3.23ha. The vast majority of the EIAR study area is under agricultural use, split between arable and pastural land throughout the site.

While the Proposed Development is located in an upland area, the topography across the site is relatively flat and slopes downwards in all directions. The site has a maximum elevation of approximately 218 metres Ordnance Datum (m OD) in the west of the site, at T05 and a minimum elevation of approximately 170 metres Ordnance Datum (m OD) in the east of the site at T11. The Blackstairs Mountains run from the northwest to southwest of the windfarm site. Mount Leinster and Black Rock Mountain occur to the east of the site, with peak elevations of 796 mAOD and 599.6 mAOD respectively. The predominant land use in the areas surrounding Castledockrell Wind Farm is agricultural land and small patches of commercial forestry to the east/northeast, with scattered one-off housing and small developments also present.

The Proposed Development contains approximately 3.8 km of site roads, constructed of consolidated gravel with a running width of approximately 4.5m. Access to the site for general traffic such as maintenance vehicles is via the current existing entrance to the southwestern section of the wind farm site from the L2012 Local Road that runs adjacent to the site. The L2012 Local Road is located along the western boundary of the site which runs in a north-south direction connecting to the R745 Regional

Road at the Monalee Cross Roads and to the L2007 Local road at Bola Beg. The location of the Proposed Development of the Proposed Development is shown in Figure 1-1 of Chapter 1.

9.3.2 Water Balance

Long term rainfall and evaporation data was sourced from Met Éireann. The 30-year annual average rainfall (AAR) (1978 – 2007) data from the Met Eireann weather station at Kilkenny, Co. Kilkenny are presented in Table 9-3. The Kilkenny weather station is located approximately 42 km west of the Proposed Development and is the closest weather station for which the most recent long-term averages are available.

The closest synoptic station where the average potential evapotranspiration (PE) is recorded is at Kilkenny, Co. Kilkenny also. The long-term average PE for this station is 537.63 millimetres per year (mm/yr). this value is used as a best estimate of the site PE. Actual Evaporation (AE) at the site is estimated as 510.75 mm/yr (which is 0.95 x PE).

Table 9-3 Local Average long-term Rainfall Data (mm)

Station				Easting (ITM)		Northing (ITM)		Ht (mOD)		Opened		Closed	
Kilkenny, Co. Kilkenny				649393		657440		66		1957		2008	
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	**Mean AAR (mm)**	**AAR (mm)**
78.3	66.1	67.9	56.4	60.4	61.0	54.6	77.8	69.0	95.3	80.2	90.4	**71.45**	**857.4**

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 = 857.4mm/yr – 510.75 mm/yr = 346.65mm/yr.

Based on recharge coefficient estimates from the GSI (www.gsi.ie), 85% recharge is reported for the majority of the Proposed Development site i.e the plateau upon which the existing turbines are located) while the downhill section of the site has a recharge coefficient of 60% (i.e areas within the EIAR site boundary which are down gradient of this plateau). This means that 85% or 60% of the effective rainfall in each respective area infiltrates into the ground and becomes groundwater, the remaining 15% or 40% of the effective rainfall will runoff as surface water into rivers, lakes and streams.

Based on the recharge coefficient, the annual recharge and runoff rates for the Proposed Development (i.e., Existing Castledockrell Wind Farm) are estimated to be 271.8mm/yr or 191.9mm/yr; and 47.97mm/yr or 127.9mm/yr respectively.

9.3.3 Surface Water

9.3.3.1 Regional and Local Hydrology

The entire site of the Proposed Development lies within the South Eastern River Basin District (RBD). With respect to regional hydrology, under the Water Framework Directive (WFD) the Proposed Development is located entirely within the Slaney and Wexford Harbour surface water catchment. The Proposed Development site is located within the Slaney (SC070) regional surface water sub-catchment. Bordering sub-catchments include the Urrin (SC010) and Slaney (SC060) surface water sub-catchments. A regional hydrology map is shown as Figure 9-1.

9.3.3.2 Local and Site Drainage

The nearest named watercourse to the Proposed Development is the River Glasha, a river which has its origins in the lowland areas of Black Rock Mountain and flows east into the River Slaney approximately 3.5km northeast of the wind farm. The River Slaney is located approximately 3.2km from the nearest turbine (T11) at its closest point. The River Slaney origins are in the western Wicklow Mountains, where its flows west and then south, through Co. Wicklow, Carlow and Wexford into St. Georges Channel in the Irish Sea at Wexford Town.

There are no watercourses within the EIAR site boundary, however a number of streams were recorded downhill surrounding the windfarm site. Two streams are located to the north of the wind farm, approximately 400m northwest of T09 and 600m northwest of T01which run in a northerly direction towards the River Glasha into the River Slaney northeast of the wind farm, ultimately draining into Wexford Harbour. One stream, located approximately 870m east of the Proposed Development runs directly into the River Slaney, while another stream approximately 1km to the south east, also directly joins the River Slaney. Pullinstown Big River also follows along approximately 1.6km to the west-southwest of Castledockrell Wind Farm, joining the Urrin River upstream of Enniscorthy, where it ultimately meets the River Slaney before flowing into the Irish Sea.

With regard to the existing wind farm and substation infrastructure drainage, the development mainly adopts an "over the edge" drainage approach in conjunction with sections of roadside drainage swales. Site drainage measures installed during the construction phase (i.e. silt traps settlement & ponds) have since been removed as the site has naturally revegetated overtime.

Roadside drainage is present along sections of the main spinal access tracks in the Proposed Development site. Overall surface water runoff from the hardstand areas and access roads disperses locally over ground onto adjacent vegetated surfaces (natural vegetation filters) and eventually drains in all directions due to the sloping topography surrounding the site. There are no existing watercourses or springs within the EIAR Site Boundary. A local hydrology map is presented as Figure 9-2, while the EIAR Study Area is defined in Chapter 1 of this EIAR.

9.3.3.3 Flood Risk Identification

OPW's indicative river and coastal flood map (www.floodinfo.ie), CFRAM Preliminary Flood Risk Assessment (PFRA) maps which can be accessed at the Department of Environment, Community and Local Government on-line planning mapping (www.myplan.ie), and historical mapping (i.e. 6" & 25" base maps) were consulted to identify those areas as being at risk of flooding.

There are no flood incidents recorded within the vicinity of the Proposed Development on the OPW's indicative river and coastal flood map. Please note that not all local flooding issues are recorded on the OPW database.

The Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie) has areas downhill to the southeast of the Proposed Development in Enniscorthy, which are classified as liable to flood under a 1-in-10 year scenario. There are no fluvial or pluvial flood zones identified on the PFRA mapping within the vicinity of the Proposed Development site.

Historical 6" and 25" maps for the proposed route were consulted to identify areas that are "prone to flooding". There are no areas within the vicinity of the Proposed Development identified as prone to flooding shown in the historical mapping. Based on the above information there is low potential risk of flooding at the development site.

Map Legend

- EIAR Site Boundary
- Water Framework Directive Subcatchments

N

Drawing Title
Regional Hydrology

Project Title
Castledockrell Wind Farm
Extension of Operational Life

Drawn By	Checked By
KB	ÓM
Project No.	Drawing No.
210847	Figure 9-1
Scale	Date
1:50,000	2024-01-08

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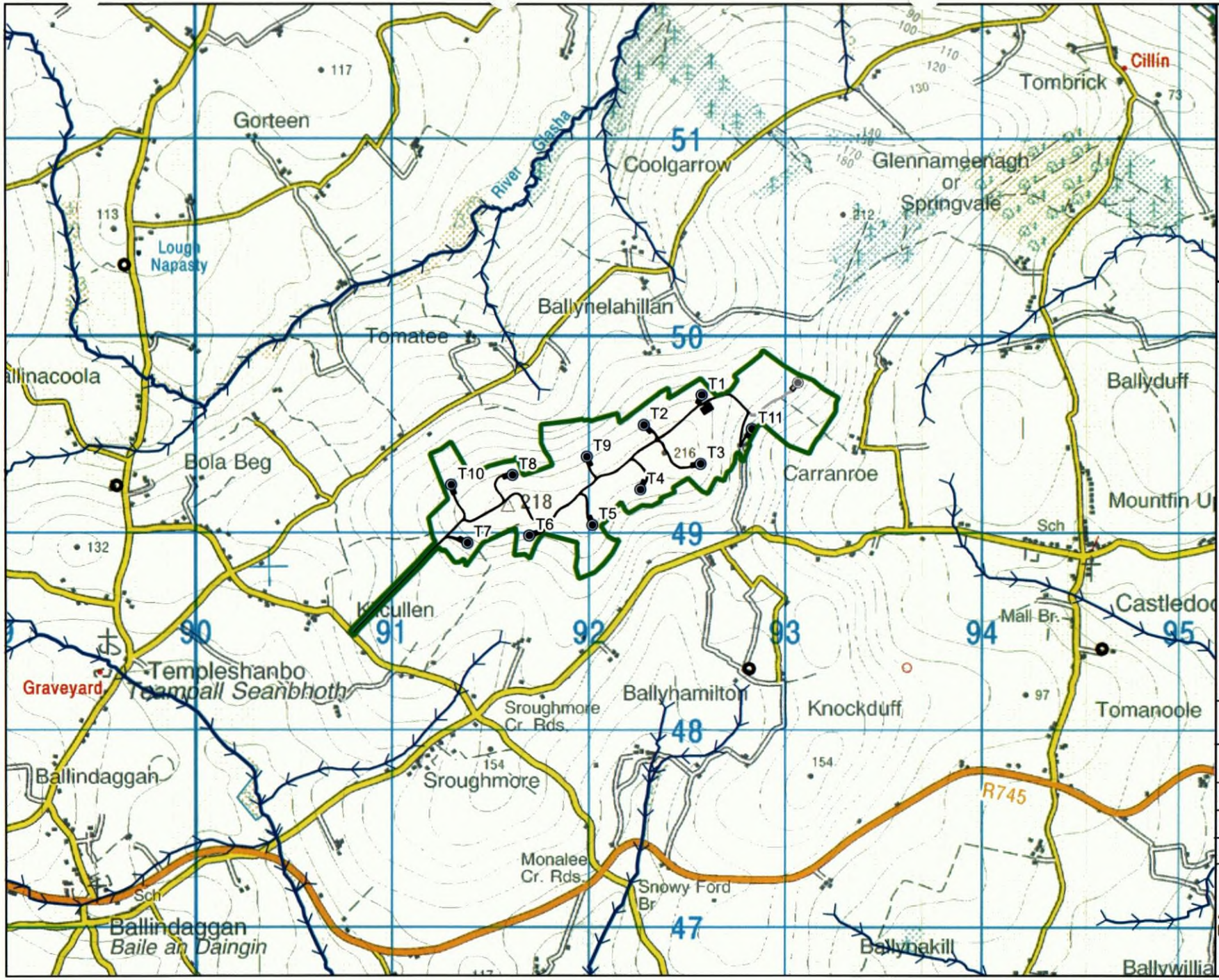

Map Legend

- EIAR Site Boundary
- Proposed Development Turbines
- Castledockrell Wind Farm Footprint
- Turbine 12
- Turbine 12 Footpint
- GSI Wells and Springs

Drawing Title: Local Hydrology

Project Title: Castledockrell Wind Farm Extension of Operational Life

Drawn By	Checked By
KB	BT
Project No.	Drawing No.
210847	Figure 9-2
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1:25,000	2025-03-03

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9.3.3.4 Surface Water Hydrochemistry

The Environmental Protection Agency's (EPA) Quality Rating System (Q-Rating) is a biotic index used to rate the ecological quality of streams and rivers. The rating system assigns streams a Q-Value of between 1 and 5, with 1 indicating bad ecological quality and 5 indicating the highest ecological quality. The nearest EPA monitoring points to the Proposed Development are located on the River Glasha, a western tributary of the River Slaney, and the Ballingale stream, an eastern tributary of the River Slaney.

The River Glasha Station is located on the local road bridge over the River Glasha, approximately 1.2km northwest of the nearest turbine (T10). The latest Q-Value from 2022 shows a score of 4 (Good Water Quality) for the River Glasha which joins with the River Slaney approximately 5.3km downstream of the monitoring point. The Ballingale stream station is located approximately 4km east of the nearest turbine (T11) on a local road bridge. The latest Q-Value from 2022 shows a score of 4 (Good Water Quality) for the Ballingale stream, which joins with the River Slaney approximately 280m downstream. These watercourses are not expected to be affected by the continued operation of the existing Castledockrell Wind Farm due to the fact that the wind farm has been in operation since 2011 and there are no additional groundworks proposed. No surface water sampling was performed on the site of the Proposed Development as it was not deemed to be a requirement due to the absence of any construction works or activities associated with the Proposed Development which could impact upon water quality. There are also no surface water features present within the EIAR Site Boundary.

9.3.4 Groundwater

9.3.4.1 Hydrogeology

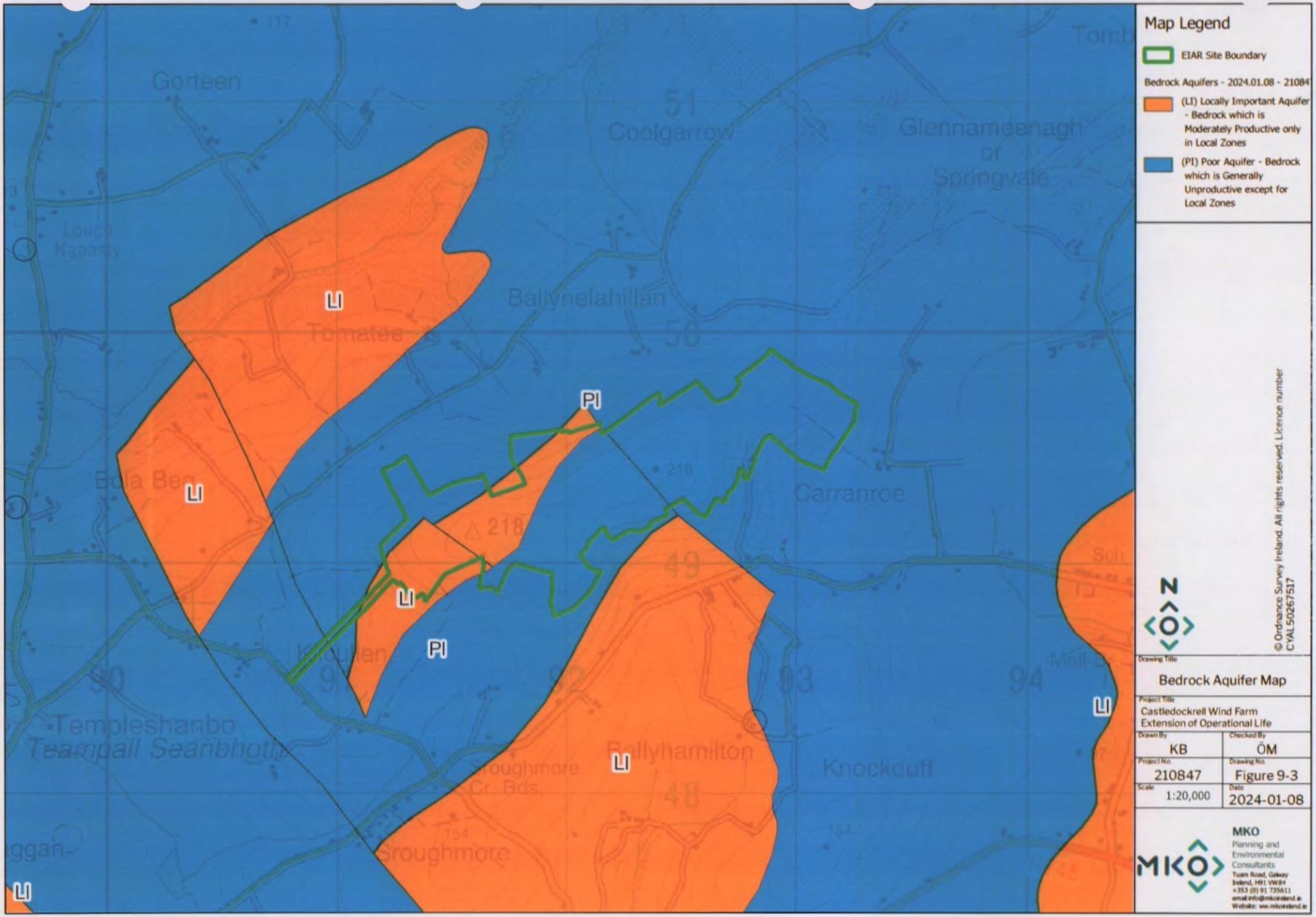
Based on the GSI bedrock map of the region, the Proposed Development is underlain by the Maulin Formation (OTMAUL), consisting of dark blue-grey slate, phyllite and, and the Ballylane Shale Formation (OABYLA) consisting of green-grey and grey slates and shales interbedded with green of pale grey siltstones. These two bedrock formations are both Ordovician era formations of Deep Marine slate, schist & minor greywacke.

The Maulin Formation is classified by the GSI as being a locally important aquifer which is moderately productive only in local zones, while the Ballylane shale Formation is classed as a Poor Aquifer that is generally unproductive except for local zones. A bedrock aquifer map is shown as Figure 9-3.

The Proposed Development is underlain by the generally poorly productive Ballyglass Ground Water Body (GWB) as delineated by the EPA/GSI. The Ballyglass GWB is the largest GWB in the South Eastern RBD and is characterised by the mountainous terrain of the Wicklow Mountains and Blackstairs Mountains, which runs from northeast to the southwest of the GWB. Transmissivities have been estimated to be in the range of 0.1-10 m^2/d. effectives thickness of the GWB is estimated to range between 0-7 meters.

The depth to which groundwater varies below ground level (bgl) in the Proposed Development was not noted as part of the original EIS prepared for the Castledockrell Wind Farm based on the topography of the site, the groundwater flow is generally northwest to southwest.

A regional groundwater body map is provided as Figure 9-4.


Gorteen
Coolgarrow
Glennameenagh or Springvale
Ballynelahillan
Tomatee
Carranroe
Templeshambo
Teampall Seanbhoth
Ballyhamilton
Knockduff
Sroughmore
Sroughmore Cr. Bds
LI
PI
Map Legend
EIAR Site Boundary
Bedrock Aquifers - 2024.01.08 - 21084
(LI) Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
(PI) Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
N
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Drawing Title
Bedrock Aquifer Map
Project Title
Castledockrell Wind Farm
Extension of Operational Life
Drawn By
KB
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Map Legend

- EIAR Site Boundary

WFD Groundwater Bodies

- Ballyglass GWB
- Castlebridge North GWB
- Enniscorthy GWB
- Industrial Facility (P0394-01)
- New Ross GWB

N

Drawing Title: Groundwater Bodies

Project Title: Castledockrell Wind Farm Extension of Operational Life

Drawn By	Checked By
KB	ÓM
Project No.	Drawing No.
210847	Figure 9-4
Scale: 1:100,000	Date: 2024-01-08

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9.3.4.2 Groundwater Vulnerability

Groundwater vulnerability is generally mapped as varying between Rock at or near Surface or Karst (X), and Extreme (E) across the area of the Proposed Development. Most of the site of the Proposed Development falls under the category of Rock at or near Surface or Karst (X).

9.3.4.3 Groundwater Hydrochemistry

As this is an existing development and no groundworks are proposed, groundwater sampling has not been undertaken. As there is no excavation or construction activity associated with the Proposed Development groundwater quality impacts, or discharges to groundwater are not anticipated.

The Initial Characterisation Report on the Ballyglass GWB contains hydrochemical data detailing the hydrochemical signature of the GWB. The bedrock strata of the aquifer are siliceous, while sampling conducted by the EPA shows the GWB to have a low electrical conductivity, of 94 – 266 µs/cm.

9.3.5 Water Framework Directive Water Body Status & Objectives

The Water Framework Directive (WFD) establishes a framework for the protection of ground and surface waters and their dependent habitats and wildlife. Under the directive the EPA is working to classify all waterbodies in the State and to assign a risk status to each of them. The overall objective of the WFD is for all waterbodies to achieve a minimum of 'Good' water quality status.

Local Groundwater Body and Surface Water Body status and risk result are available from (www.catchments.ie).

9.3.5.1 Groundwater Body Status

Groundwater Body (GWB) status information is available (www.catchments.ie). Please refer to Figure 9-4 for the location and extent of associated groundwater bodies.

In terms of WFD status the Ballyglass GWB (IE_SE_G_011) which underlies the Proposed Development site is defined as 'At Risk'. This classification represents the risk of the Ballyglass GWB of failing to meet the Water Framework Directive objectives by 2027. While classed as at risk, it is not classed as a 'High Status Objective'. The WFD sub-catchment assessment report for the Slaney_SC_070 (EPA, 2019)[1] identifies the Ballyglass GWB as facing unknown anthropogenic pressures.

Monitoring data available for the GWB shows a 'Good' value for each assessment.

9.3.5.2 Surface Water Body Status

Local surface water body status and risk result are available from (www.catchments.ie). There are 2 no. surface water bodies identified within the immediate vicinity of the site, namely the River Glasha (Glasha(Slaney)_010) approximately 1km north at its closest point (T10) and the River Slaney (Slaney_150) approximately 3.3km east at its closest point (T11). The River Glasha, which flows into the River Slaney, is classed as 'At Risk', with no 'High Status Objective'. The River Slaney itself is classed as 'Not at Risk' of reaching its WFD objectives by 2027, with no 'High Status Objective'. The WFD sub-

[1] *https://www.catchments.ie/wp-content/files/subcatchmentassessments/12_1%20Slaney_SC_070%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf*

catchment assessment report for the Slaney_SC_070 (EPA, 2019)[2] identifies the River Glasha as facing environmental pressures from agriculture, in particular due to excess sedimentation, with an observed decline in biological status from 'Good' to 'Moderate'. The River Slaney has seen an improvement in its biological status from 'Moderate' to 'Good', with no significant environmental pressures.

The operation of the Existing Castledockrell Wind Farm to date has not had any long-term impact on the water quality of these streams. As the Proposed Development does not involve any excavation or construction activity no impact is anticipated for surface waterbodies in the area.

9.3.6 Designated Sites & Habitats

Designated sites include National Heritage Areas (NHAs), Proposed National Heritage Areas (pNHAs) Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs). There are 11 designated sites within 15km of the Proposed Development, which are:

- Slaney River Valley SAC
- Blackstairs Mountains SAC
- River Barrow and River Nore SAC
- Wexford Harbour and Slobs SPA
- Slaney River Valley pNHA
- Blackstairs Mountains pNHA
- Bunclody Slate Quarries pNHA
- Johns Hills pNHA
- Killoughrum Forest pNHA
- Clone Fox Covert pNHA
- Ballynabarney Wood pNHA

The existing Castledockrell Wind Farm is not located within any designated site or habitat. It is located approximately 4.4km away from the Blackstairs Mountains SAC and pNHA at its closest point (T10). However, as there are no groundworks or construction works proposed as part of the Proposed Development, it is not expected that there will be any negative effects associated with the proximity to the Blackstairs Mountains SAC and pNHA. The Proposed Development has been operational as a Wind Farm since 2011, and no negative effects have been observed in relation to the Blackstairs Mountains SAC and pNHA.

Natural Heritage Areas (NHAs) are sites of national importance for nature conservation designated under the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. A review of the National Parks and Wildlife Service (NPWS) website indicates that there are 7 no. pNHAs located within 15km of the site.

Designated sites within proximity to the Proposed Development are detailed further in Chapter 6: Biodiversity of this EIAR, and in the accompanying Appropriate Assessment Screening Report (AASR) and Natura Impact Statement (NIS).

9.3.7 Water Resources

A search of the Geological Survey of Ireland (GSI) well database (www.gsi.ie) indicates that there are 3 no. wells mapped in the vicinity of the Proposed Development. These mapped wells are boreholes that

[2] *https://www.catchments.ie/wp-content/files/subcatchmentassessments/12_1%20Slaney_SC_070%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf*

were drilled for agricultural and domestic, public supply and agricultural only purposes. They are located approximately 4.3km east 4.7km north and 5.5km east respectively from the approximate centre of the site.

The GSI Database is not exhaustive, and it is most likely that other private wells exist within the vicinity. Due to the local aquifer characteristics and topography, it is not likely that groundwater flows towards these wells occurs. Based on the absence of construction activity and limited maintenance work proposed during the operational phase of the extension of life of the Existing Castledockrell Wind Farm, no impacts to groundwater quality, quantity or flow are likely.

9.3.8 Receptor Sensitivity

Due to the existing nature of the Proposed Development, the potential for impacts to surface water and groundwater are not likely. No new construction works, excavations, groundworks or significant alterations to the existing wind farm are proposed. The primary risk to groundwater at the site would be from cementitious materials, hydrocarbon spillage and leakages. There is limited potential for these risks to occur during the operational phase of a wind farm as significant quantities of potentially hazardous materials are not stored on-site. All potential contamination sources are carefully managed at the site during the operational phase of the Proposed Development and mitigation measures have been put in place to deal with these potential minor impacts.

Groundwater within the vicinity of the Proposed Development is not identified as sensitive to pollution, although the groundwater vulnerability is classed as either Rock at or near Surface or Karst (X) or Extreme (E), the aquifer is locally productive but generally unproductive, with no private-use wells present on the site. No significant interactions with the hydrogeological regime are expected to occur during the operational phase of the wind farm.

There are two surface water features which were identified as occurring adjacent to the site of the Proposed Development, namely the River Glasha Network, approximately 1km north of T10 and the Slaney River Network approximately 3.3km east of T11. These surface waters are known to face other environmental pressures, in particular from agriculture. These surface waters also form part of designated sites and are important natural habitats, as outlined in Chapter 6: Biodiversity. As such, these surface waters are considered to be very sensitive to potential contamination.

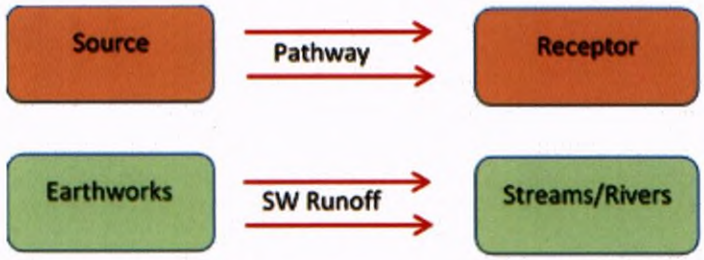
Mitigation measures currently in place at the operational wind farm to ensure the protection of all downstream receiving waters will be continued should the application for extension of life be granted.

Implementation of these mitigation measures will ensure that surface runoff is of a high quality and will not impact on the quality of downstream surface water bodies. No additional drainage works are proposed at the site, thereby avoiding changes to flow volumes leaving the site.

9.4 Likely, Significant Impacts and Mitigation Measures Implemented

9.4.1 Overview of Impact Assessment Process

The conventional source-pathway-target model (see below, top) was applied to assess potential impacts on downstream environmental receptors (see below, bottom as an example) as a result of the Proposed Development.



Where potential impacts are identified, the classification of impacts in the assessment follows the descriptors provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022); and,
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).

The description process clearly and consistently identifies the key aspects of any potential impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

In order to provide an understanding of the stepwise impact assessment process applied below, we have firstly presented a summary guide that defines the steps (1 to 7) taken in each element of the impact assessment process (refer to Table 9-4). The guide also provides definitions and descriptions of the assessment process and shows how the source-pathway-target model and the EPA impact descriptors are combined.

Using this defined approach, this impact assessment process is then applied to all operation activities which have the potential to generate a source of significant adverse impact on the geological and hydrological/ hydrogeological (including water quality) environments.

Table 9-4 Impact Assessment Steps

Step 1	Identification and Description of Potential Impact Source: This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described.	
Step 2	Pathway / Mechanism:	The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of this type of development, surface water and groundwater flows are the primary pathways, or for example, excavation or soil erosion are physical mechanisms by which a potential impact is generated.
Step 3	Receptor:	A receptor is a part of the natural environment which could potentially be impacted upon, e.g. human health, plant / animal species, aquatic habitats, soils/geology, water resources, water sources. The potential impact can only arise as a result of a source and pathway being present
Step 4	Pre-mitigation Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impact before mitigation is put in place.
Step 5	Proposed Mitigation Measures:	Control measures that will be put in place to prevent or reduce all identified significant adverse impacts. In relation to this type of development, these measures are generally provided in two types: (1) mitigation by avoidance, and (2) mitigation by engineering design.

Step 6	Post Mitigation Residual Impact:	**Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impacts after mitigation is put in place.**
Step 7	Significance of Effects:	**Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment.**

9.4.2 'Do-Nothing' Scenario

Article IV, Part 3 of the EIA Directive states that the EIAR should include "an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge." This is referred to as the "do-nothing" alternative. EU guidance (EU, 2017) states that this should involve the assessment of "an outline of what is likely to happen to the environment should the Project not be implemented – the so-called 'do-nothing' scenario."

The 'Do-Nothing' alternative with regard to the Proposed Development, is to decommission the existing wind farm in 2025 when its current permission expires. As part of the decommissioning stage, the existing turbines would be dismantled, and the site reinstated; please see Section 4.6 in Chapter 4 of this EIAR for further details regarding decommissioning. The Proposed Development seeks to extend the operational life of the wind farm to 2045, at which stage the wind farm would be decommissioned.

In implementing the 'Do-Nothing' alternative however, i.e. decommissioning the existing wind farm in 2025, the opportunity to continue utilising the existing renewable energy infrastructure would be lost. So too would the opportunity to continue contributing to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas (GHG) emissions. The existing wind farm has a generating capacity of c.25.3 Megawatts (MW) which is capable of suppling approximately 15,830 households with electricity every year (see Section 4.3.1.5 in Chapter 4 of this EIAR for calculations).

The opportunity to continue to provide maintenance-related employment, local authority development contributions, rates and investment in the local area would also be lost. Further details on the current Community Benefit Fund, and the Fund associated with the Proposed Development can be found in Section 1.5.7 of Chapter 1: Introduction.

9.4.3 Construction Phase

The Castledockrell Wind Farm is currently operational, and it is proposed to extend the duration of operation of the wind farm by 20 years, until 2045. No construction activities will occur as part of the Proposed Development, therefore there are no construction phase effects on water.

9.4.4 Operational Phase

There will be no soil disturbance or use of machinery during the operation phase. Furthermore, since there was no deep excavation associated with the project there is no potential for impacts on groundwater flow during the operation phase. Therefore, **no effects** are envisaged during the operational phase.

The operational wind farm does not require on-site storage of significant quantities of materials or liquids likely to cause a pollution incident, however small quantities of hydrocarbons may be required from time to time in order to operate/maintain machinery. Chapter 4: Description of the EIAR states that there will be no ground disturbing works associated with the operational phase, no natural drainage features will be altered and there will be no direct or indirect discharges to natural watercourses during the continued operation of the wind farm.

The Slaney River Valley SAC is of international value for nature conservation and would have a high sensitivity to changes in water quality. However, given the measures in place to protect water quality detailed above, in the unlikely event that a pollution event did occur, it would be localised, small-scale, short-term, with a negligible magnitude of change. This potential impact has therefore been assessed as not significant.

The habitat Key Ecological Receptors (KERs) were assessed as being of local (higher) value and would have a high sensitivity to changes in water quality. However, given the measures in place to protect water quality detailed above, in the unlikely event that a pollution incident occurred, it would be localised, small-scale, short-term, with a negligible magnitude of change. This potential impact has therefore been assessed as not significant.

9.4.4.1 Potential Release of Hydrocarbons During Operation and Storage

During routine maintenance works plant and machinery may require refueling on-site and so hydrocarbons may be present. Also, the transformers in each turbine are a mix of oil cooled and dry type cast resin transformer. Managed incorrectly, there is the potential for spills / leaks of oils from this equipment resulting in contamination of surface and groundwater. The closest surface water feature to the existing onsite substation is a tributary of the River Glasha (EPA 12G57). This watercourse is located approximately 665m to the north/northwest of the existing substation.

Pathway: Surface water, soil/bedrock pore water and groundwater.

Receptor: Surface water, groundwater, sea.

Potential Impact: Negative, direct, slight, short term, medium probability impact on surface waters and groundwater.

Mitigation Measures

Oil used in transformers (at each turbine) and any storage of oils or hydrocarbons within the Proposed Development Site could potentially leak during the operational phase and impact on groundwater or surface water quality. Turbine transformers are located within the turbine hardstands, with dedicated concrete foundations, so any leaks would be contained within the turbine transformer units and hydrocarbons would not be able to permeate to ground. In addition:

- All plant and machinery to be serviced before being mobilised to site;
- No plant maintenance completed on-site, any broken-down plant removed from site to be fixed;
- Refuelling completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums stored in secure, impermeable bunded storage areas away from open water;
- Only designated trained operators authorised to refuel plant on-site;
- Procedures and contingency plans set up to deal with emergency accidents or spills; and,
- Highest standards of site management maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during works.

These mitigation measures are considered sufficient to reduce risk to ground/peat/soils and subsoils, and to groundwater and surface water quality.

Residual Impacts

The implementation of the above mitigation measures will result in a residual **neutral, imperceptible, direct, short term, unlikely effect** on surface water and groundwater. There was no recorded or observed evidence of storage of significant quantities of hydrocarbons or other chemicals, nor any leakages or spillages of hydrocarbons during the site walkover.

Significance of Effects

No significant effects on the water environment are envisaged during the operational stage of the Proposed Development.

9.4.5 Decommissioning Phase - Likely Significant Effects and Mitigation Measures

The potential impacts associated with decommissioning of the Proposed Development in 2045 will be similar to those associated with a typical wind farm construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works, as outlined in Chapter 4, Section 4.8 of this report.

During decommissioning, it may be possible to reverse or at least reduce some of the potential impacts caused during the initial construction of the wind farm by rehabilitating construction areas such as turbine bases and hard standing areas. This will be done by allowing these areas to naturally regenerate and revegetate naturally.

In relation to decommissioning, Condition 8 of the original Planning Application to Wexford County Council (Ref: WCC 2004/4702ABP Ref PL26.211725) states the following in relation to the decommissioning of the wind farm:

> *"Upon termination of the use of the windfarm, the mast and turbines shall be dismantled and removed from the site and the site shall be restored to its existing condition in accordance with the requirements of the planning authority. Prior to commencement of the development, the developer shall lodge with the planning authority a cash deposit, a bond of an insurance company, or other security to secure the satisfactory reinstatement of the site. The form and amount of the security shall be as agreed between the planning authority and the developer or, in default of agreement, shall be determined by An Bord Pleanála."*

It is considered that the above Condition is not appropriate in the current context, from an environmental perspective, for the Proposed Development. Upon decommissioning of the Proposed Development, the wind turbines will be disassembled in reverse order to how they were erected. All above- ground turbine components will be separated and removed off-site for reuse or recycling. The disassembly and removal of the turbines will not have an impact on the hydrological environment at the site. As stated in the *Decommissioning of Onshore Wind Turbines* (Wind Europe Intelligence Platform, 2020) the EU Waste Framework Directive (2008/98/EC) states that the waste oils must be collected separately (where this is technically feasible) and treated in accordance with the waste hierarchy and without any harm to human health and the environment.[3] This guidance will be adhered to upon decommissioning of the existing Castledockrell Wind Farm.

It is proposed to leave turbine foundations in place underground and to covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environmental nuisances such as noise, vibration and dust.

[3] *https://windeurope.org/intelligence-platform/product/decommissioning-of-onshore-wind-turbines/*

It is proposed to leave underground cables in place, with the ducting to be left in place, where they are unlikely to be impacted by typical agricultural works. It is proposed that site roadways will be left in situ, as appropriate, to facilitate agricultural and amenity uses by the local community. A decommissioning plan will be agreed with the local authority at least three months prior to decommissioning of the Proposed Development.

Other impacts such as possible soil compaction and contamination by fuel leaks will remain but will be of reduced magnitude. Mitigation measures to avoid these potential impacts will be implemented.

However, as noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made far in advance, so within the proposed 20-year extension to the lifespan of the Proposed Development, technological advances and preferred approaches to reinstatement may change. According to the SNH guidance, it is, therefore:

> *'Best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm'.*

No significant effects on the hydrological and hydrogeological environment are envisaged during the decommissioning stage of the Proposed Development.

9.4.5.1 Earthworks Resulting in Suspended Solids Entrainment in Surface Waters

Decommissioning phase activities that require earthworks resulting in removal of vegetation cover/ road pavement material and excavation of mineral subsoil (where present) are detailed in Chapter 4: Description. However, it is not intended to stockpile any material onsite during the Decommissioning Phase.

This activity has the potential to result in the release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies. However, given the relatively small, localised scale of the works, and the fact that no materials will be stockpiled onsite, the volume of runoff from decommissioning works is expected to be minimal in relation to the overall runoff to local waterbodies.

Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient watercourses and dependant ecosystems.

Pre-Mitigation Potential Impact: Indirect, negative, significant, temporary, likely impact.

Implemented Mitigation Measures

The key mitigation measure during the decommissioning phase is the avoidance of sensitive aquatic areas. The River Slaney runs approximately 4.5km from the western border of the site of the Proposed Development. A tributary of the Slaney, the River Glasha, runs in a west-east direction approximately 1.4km north of the Proposed Development. Because of this proximity to surface waters, mitigation measures were put in place in the original construction phase. No in-stream works would be required during the decommissioning phase of the existing wind farm. Best construction practices will be adhered to throughout the decommissioning phase of the development.

Residual Impact

The implementation of the mitigation measures discussed above will prevent the release of any significant quantity of suspended solids to surface watercourses. Therefore, there is likely to be **no residual impact** on downstream waters, from earthworks during the decommissioning phase.

Significance of Effects

Based on the analysis above there would be **no significant effects** on surface water quality resulting from earthworks during the decommissioning phase of the project.

9.4.5.2 Potential Impacts on Groundwater Levels and Local Well Supplies During Excavations

Dewatering of deep excavations have the potential to impact on local groundwater levels. No significant dewatering works are likely and therefore, no groundwater level impacts are likely to occur from the decommissioning of the wind farm infrastructure.

Pathway: Groundwater flowpaths.

Receptor: Groundwater levels.

Pre-mitigation Potential Impact: None.

Implemented Mitigation Measures

No effect on groundwater is anticipated, therefore no further mitigation measures are proposed.

Residual Impact

No effects on groundwater levels or local well supplies are likely to occur during the decommissioning phase of the project.

Significance of Effects

Decommissioning of the project will have **no significant effects** on groundwater.

9.4.5.3 Potential Release of Hydrocarbons during Decommissioning and Storage

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Pathway: Groundwater flowpaths and grid route/road drainage network.

Receptor: Groundwater and surface water.

Pre-Mitigation Potential Impact: