Natura Impact Statement

PROPOSED REPOWERING OF THE EXISTING KILGARVAN WIND FARM

in support of the Appropriate Assessment Process

Prepared for:

Ørsted Onshore Ireland Midco Ltd

Prepared by:

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Table of Contents

Appendix A – Finding of No Significant Effects report: Blackwater River SAC, St. Gobnet's Wood SAC, Glanlough Woods SAC, Killarney National Park SPA, Mullaghanish Bog SAC, Derryclogher Bog SAC, Sheheree Bog SAC

Appendix B – Ecological and Aquatic Survey Schedule Details

Appendix C – Bat Survey Results

Appendix D – Construction and Environmental Management Plan

Appendix E – Proposed Development Drawings

Appendix F – Proposed Decommissioning Plan

Executive Summary

A Screening for Appropriate Assessment (AA) was prepared to assess if significant effects were likely to occur in relation to Natura 2000 sites within the zone of potential impact influence of the Proposed Repowering of the Existing Kilgarvan Wind Farm, hereafter termed the 'Proposed Development'. Orsted intent to apply to An Bord Pleanála for planning permission to remove the existing 28 no. turbines, replace them with 11 no. wind turbines, and upgrade the associated infrastructure on the Existing Kilgarvan Wind Farm site.

It was determined that likely significant effects could arise, in the absence of adequate mitigation, which could adversely impact upon four Natura 2000 sites in particular; Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC and Mullaghanish to Musheramore Mountains SPA. A Findings of No Significant Effects Report was prepared for other sites in the wider area where no likelihood of significant effects was identified (Appendix A).

There is a hydrological link between the Proposed Development site and Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC and Kenmare River SAC. Lesser Horseshoe Bat (*Rhinolophus hipposideros*), a QI species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, and Kilgarvan Ice House SAC has been recorded infrequently within the Proposed Development site. Hen Harrier (*Circus cyaneus*), a Special Conservation Interest species of Mullaghanish to Musheramore Mountains SPA has been recorded on occasion within the Proposed Development site. As these Natura 2000 sites are within the zone of potential impact influence, the potential impact of the Proposed Development on these Natura 2000 sites and their conservation objectives are considered further in this Natura Impact Statement (NIS).

A local population of Kerry Slug (*Geomalacus maculosus*), a species listed on Annexes II and IV of the EU Habitat's Directive, occurs within the EIAR Site Boundary. Kerry Slug was abundant, particularly within open areas of the site, and the site is considered to be of County Importance for the species. The construction phase of the Proposed Development have the potential to result to the disturbance and/or direct loss of Kerry Slug, resulting in locally significant negative impacts on this species, without the implementation of appropriate and site-specific mitigation measures.

Detailed field and desktop surveys were carried out to inform the accompanying EIAR and this NIS. It was determined that, in the case of the Proposed Development, that there is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter (*Lutra lutra*), while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place. While not recorded within the EIAR study boundary, high impact invasive plant species (Japanese Knotweed and Rhododendron) have been recorded in the wider local area. The spread of these species to the downstream Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, could have a negative impact on the QI habitats within this SAC.

While the works associated with the Proposed Development will be located outside of the Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC the Proposed Development site is located relatively close to this Natura 2000 site, for which Kerry Slug is a qualifying interest. There is potential for significant impacts on the local population of Kerry Slug, within the Proposed Development site as a result of habitat loss or disturbance/direct mortality during the construction phase of the Proposed Development. The population of Kerry Slugs on site may be linked or provide a buffer population close to the SAC and therefore, on a precautionary basis, potential effects on Kerry Slug within the site are considered relevant given that these could give rise to subtle indirect effects on the Conservation Objectives of Kerry Slug.

The construction phase of the Proposed Development could result in the temporary and localised disturbance of Hen Harrier and Lesser Horseshoe Bat. Without mitigation measures in place, there is some likelihood that the construction phase could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

Having determined that likely significant effects could occur, in the absence of appropriate mitigation, on Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC and Mullaghanish to Musheramore Mountains SPA, these sites and their conservation objectives were considered in detail in this NIS.

Best practice environmental control measures, drainage design and mitigation measures for the protection of water quality and species such as Kerry Slug, Lesser Horseshoe Bat and Hen Harrier (see accompanying CEMP) have been identified to minimise the risk of potential impacts during the construction and operational phases such that there will be no risk of adverse effects on these Qualifying Features of Natura 2000 sites within zone of potential impact influence of the Proposed Development.

It has been objectively concluded that the Proposed Development will not adversely affect the integrity of the Natura 2000 sites, and there is no reasonable scientific doubt in relation to this conclusion.

1 Introduction

Ecology Ireland Wildlife Consultants Ltd. were commissioned by Ørsted Onshore Ireland Midco Ltd (Orsted) to undertake an appraisal of the potential impacts in relation to the Proposed Repowering of the Existing Kilgarvan Wind Farm, Co. Kerry. Orsted intends to apply to An Bord Pleanála for planning permission to remove the existing 28 no. turbines, erect 11 no. wind turbines, and upgrade the associated infrastructure on the Existing Kilgarvan Wind Farm site in the townlands of Inchincoosh, Lettercannon, Inchee, Coomacullen, and Cloonkeen in County Kerry (See Figure 1-1). Ful details of the Proposed Development can be found in Chapter 4 of the EIAR.

This assessment was undertaken as part of an application by Orsted for planning permission, where European designated conservation sites are present in the wider surrounding area. This report is in support of the Appropriate Assessment (AA) process which was prepared as part of the planning application of the Proposed Development. The 11 no. proposed turbines will meet the potential generation capacity of greater than 50MW. The application meets the threshold for wind energy set out in the Seventh Schedule of the Planning and Development Act 2000, as amended (being '*An installation for the harnessing of wind power for energy production (a wind farm) with more than 25 turbines or having a total output greater than 50 megawatts'*) and is therefore being submitted directly to An Bord Pleanála as a Strategic Infrastructure Development (SID) in accordance with Section 37E of the Planning and Development Act, 2000 as amended. This approach has been confirmed following consultations with the Board under the provisions of Section 37B of the Planning and Development Act 2000 as amended (Case Reference ABP-314798). This report accompanies the planning application for the Proposed Development. The planning application is also accompanied by an EIAR.

A screening assessment is part of an appropriate assessment process that consists of up to four stages, where each stage follows on from the preceding one. In Stage 1, a screening process is undertaken to identify whether significant impacts on a Natura 2000 site are likely to arise from the project or plan in question. If significant impacts are likely to occur, then the process moves on to Stage 2 where an AA considers potential mitigation measures for adverse impacts. If it is considered that mitigation measures will not be able to adequately minimise potential adverse impacts on a Natura 2000 site, then an assessment of alternative solutions is considered in Stage 3. This may then be followed by Stage 4 of the process in the event that adverse impacts remain, and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), allowing an assessment of compensatory measures to be considered. The outcome of a Stage 2 and higher assessment is presented in a report known as a Natura Impact Statement (NIS).

The first part of the assessment is a screening process to identify whether significant[1] effects on a Natura 2000 site are likely to arise from the project or plan in question, in view of best scientific knowledge and in light of the conservation objectives of any relevant European sites, when considered as an individual project or in combination with other plans and projects. If significant effects are likely to occur or if it is unclear whether significant effects are likely to occur, then the process moves onto the next phase where the

[1] A European Court of Justice ruling in 2013 (Case C‑258/11) has stated the following regarding significant effect: "Where a plan or project not directly connected with or necessary to the management of a site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site."

project is subject to AA to determine whether the plan or project would directly affect the integrity of a European site. At this stage, potential mitigation measures for adverse impacts identified in Screening are considered. Typically, a Natura Impact Statement (NIS) is prepared by consultants on behalf of the promoter/developer of a plan or project, and this is part of the information used by the competent authority in carrying out an Appropriate Assessment of the proposed plan or project. If the competent authority is satisfied that the plan or project will not adversely affect the integrity of the site concerned, it may approve the project. If it is considered that mitigation measures will not be able to satisfactorily reduce potential adverse impact on a Natura 2000 site, then an assessment of alternative solutions is considered in the third phase of the assessment process. If adverse impacts remain and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), the final assessment step permits consideration of permission for development with consideration of compensatory measures.

While a screening assessment appraisal or NIS may be provided by the advocate of the plan or project in question, the AA itself is undertaken by the competent authority (*e.g.,* the planning authority and An Bord Pleanála). So, in this case, the Appropriate Assessment for the project, described herein, is undertaken by An Bord Pleanála (ABP); informed by this Screening for AA and NIS and any other relevant information provided to the statutory body.

1.1 Methodology

This report presents in brief the outcome of a Screening for AA. The subsequent Natura Impact Statement (NIS) is prepared to identify whether the Proposed Development, in view of best scientific knowledge and in light of the conservation objectives of any relevant European sites, when considered as an individual project or in combination with other plans and projects, will have an adverse effect on the integrity of any European Site. It is important to emphasise that a screening assessment does not have to ascertain the existence of a significant effect or impact on a Natura 2000 site as such; it only has to establish whether a significant effect or impact is possible or may occur (as per judgement by Ms. Justice Finlay Geoghegan; see guidelines below). At the NIS stage, all mitigation measures necessary to avoid, reduce or offset negative effects are considered.

The conservation objectives of Natura 2000 sites have been compiled by the National Parks & Wildlife Service (NPWS) in relation to the habitats and species (*i.e.,* qualifying interests) for which the sites are selected. These conservation objectives are referred to when carrying out appropriate assessments for plans and projects that might impact on these sites.

Multi-year and multi-season bat field surveys at and in the vicinity of the study area were carried out. This included both active and passive detector surveys from 2018 to 2022 inclusive.

1.1.1 Ecology Surveys

A number of detailed ecological field surveys were undertaken at the Proposed Development site between 2018 and 2022 in order to provide a comprehensive overview of the baseline ecology of the Proposed Development site.

A preliminary botanical survey and habitat mapping exercise was carried out by Michelle O'Neill (BSc MSc) assisted by Claire Deasy (BSc MSc) on 8th & 9th September 2019, 12 February 2019 and 26th August 2019.

Further specialist survey walkovers were carried out by Dr. John Conaghan and Claire Deasy (24th & 29th September 2021) with additional visits by Dr. Conaghan on 12th July 2022 and 10th November 2022.

Non-volant mammal field surveys at the terrestrial biodiversity study area comprised of walkovers and long-term deployment of multiple wildlife trail cameras that were supplemented by casual records made in the course of other terrestrial field surveys (*e.g.* night-time active bat surveys, VP surveys). These dates are provided in Appendix B.

Multi-year and multi-season bat field surveys at and in the vicinity of the study area were carried out. This included both active and passive detector surveys from 2018 to 2022 inclusive. The dates of these surveys are provided in Appendix C. A detailed fatality monitoring survey was carried out around the turbines at Existing Kilgarvan Wind Farm. This survey used dogs to detect signs of carcasses of bats and birds. Searches commenced in September 2021 and searches were carried around each turbine base out on 14 occasions up to November 2022. Data on historic bat roosts in the wider area was sourced from Bat Conservation Ireland and the approximate locations of roosts mapped using GIS. Exact locations of roosts are not revealed due to the sensitivity of this information.

Full breeding season bird surveys were completed in 2018, 2019 and 2022 (3 seasons) and full winter season bird surveys were completed over 2018/2019, 2019/2020 and 2021/2022 (3 seasons). Due to travel restrictions associated with the Covid-19 pandemic the surveys were interrupted in Spring 2020 and recommenced in winter 2021. Surveys carried out included detailed Vantage Point (VP) and hinterland surveys, breeding and winter transect and point count surveys, and dog-based fatality monitoring around the existing turbines.

Kerry Slug, *Geomalacus maculosus*, was known to occur within the Proposed Development site and was observed widely from areas of exposed siliceous rock on initial site visits in 2018. This population is local to the site, occurring outside of the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC. Trees were visually checked at night (under torchlight) during the active bat survey visits for any signs of occurrence of Kerry Slug in the conifer plantation at the Proposed Development site.

A limited amount of Marsh Fritillary, *Euphydryas aurinia* larval food plant, Devil's Bit Scabious, *Succisa pratensis*, was recorded within the Proposed Development site during habitat and botanical assessment (Dry Heath area predominantly). The species has not been recorded in the W07 or W18 10km Grid Squares in recent decades (www.biodiversityireland.ie). However, there are several contemporary records of adult Marsh Fritillary from areas several kilometres to the east of the existing wind farm (NBDC). Areas with Devil's Bit Scabious were checked for signs of larval webs of Marsh Fritillary during site visits on August 21st 2019 and September 8th 2021.

Aquatic field studies were conducted by Aquatic Services Unit (ASU) aquatic ecologists in the spring and summer of 2022 to: (1) identify key aquatic receptors, and (2) fully characterise baseline conditions of instream habitats. The aquatic surveys included; Biological water quality testing (Q-Values), Physico-chemical sampling, electrofishing surveys and Freshwater Pearl Mussel surveys. In addition, field-based fisheries habitat assessments were conducted at all sites, involving visually assessing the principal in-channel and bank-side habitats (e.g., substrates, flow type), and their suitability as spawning and or nursery sites for fish including salmonids and Lamprey species. Locations of survey sites (ITM) were recorded using hand-held GPS. Photographs were taken to record representative views of each survey reach within the Proposed Development site.General habitat descriptions were recorded at sites during key surveys and

sampling (Q-value, electrofishing, water chemistry). Site coordinates and type of survey(s) conducted at each location are shown in Appendix B, along with survey details such as stream order, EPA name and River Water Body (RWB) code, plus current EPA ecological status (2018-2021).

An electrofishing authorisation was obtained under section 14 of the Fisheries Consolidation Act 1959 as substituted by Section 4 of the Fisheries (amendment) Act, 1962. Ten locations were electrofished in the Roughty River sub-catchment on 19th and 20th of August and 29th of September 2022.

A data request to the NPWS for existing Freshwater Pearl Mussel (*Margaritifera margaritifera*) records from the Roughty and Flesk catchments was made. This request returned historical positive records for Freshwater Pearl Mussel in locations downstream of the Proposed Development site. The data is sensitive, so cannot be presented in full in this report. Freshwater Pearl mussel *(Margaritifera margaritifera)* surveys were carried out on 5 July and 3 October 2023 under NPWS Licence C82/2022 (Exp. 31 December 2022) pursuant to Wildlife Acts 1976 to 2022, as amended – Sections 23 and 34, adhering to published Stage 1 and 2 survey guidelines (Anon., 2004). Upstream and downstream co-ordinates for the overall survey reaches of the Roughty and Flesk river channels are set out in Appendix B.

1.1.2 Guidance

Documents associated with the Proposed Development and relevant ecology databases were consulted as part of this assessment. The following guidelines and legal judgements were used in the completion of this assessment;

- OPR Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, March 2021).
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – European Commission Methodical Guidance on the provisions of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (European Commission 2001)
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DoEHLG 2009)
- Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes: Practitioner's Manual (EPA 2013)
- European Court of Justice Ruling 11th April 2013 Case C‑258/11 Peter Sweetman and Others v An Bord Pleanála - Criteria to be applied when assessing the likelihood that N6 Galway City Outer Bypass Road scheme will adversely affect the integrity of Lough Corrib SAC
- High Court Ruling 25th July 2014 by Ms. Justice Finlay Geoghegan; Neutral Citation [2014] IEHC 400; High Court Record No. 2013 802 JR; Kelly -v- An Bord Pleanála – Judicial review of grant of planning by An Bord Pleanála for two wind farm phases in County Roscommon
- High Court Ruling 24th November 2014 by Mr. Justice Hedigan; Neutral Citation [2014] IEHC 557; High Court Record No. 2014 320 JR; Rossmore Properties Limited & Anor -v- An Bord Pleanála
- High Court Ruling 25th February 2016 by Mr. Justice Barton. Neutral Citation [2016] IEHC 134; High Court Record No. 2013 450 JR; Balz & Anor -v- An Bord Pleanála.

- European Court of Justice ruling 12th April 2018 in respect of Case C-323/17 (People Over Wind & Sweetman) - it is not appropriate for the purposes of Appropriate Assessment (AA), at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of a plan or project.

- European Court of Justice ruling 19th April 2018 in respect of Case C-164/17, Compensation vs Mitigation, Grace & Sweetman Vs ABP.

- High Court Ruling 8th February 2019 by Justice Barniville in respect of Kelly -v- An Bord Pleanála & anor. The Court concludes "*as a matter of fact and law, that SUDS are not mitigation measures which a competent authority is precluded from considering at the stage 1 screening stage*". The Irish High Court ([2019] IEHC 84)

- Heather Hill Management Company CLG v An Bord Pleanála (Burkeway Homes Limited as Notice Party) [2019] IEHC 450. Mr. Justice Garrett Simons granted an order of certiorari setting aside the decision of the Board to grant permission for a residential development of 197 units at Bearna Co. Galway, on the basis that it was a material contravention of the Galway County Development Plan (the CDP), it failed to carry out a 'justification test' as required and failed to carry out proper Appropriate Assessment screening.

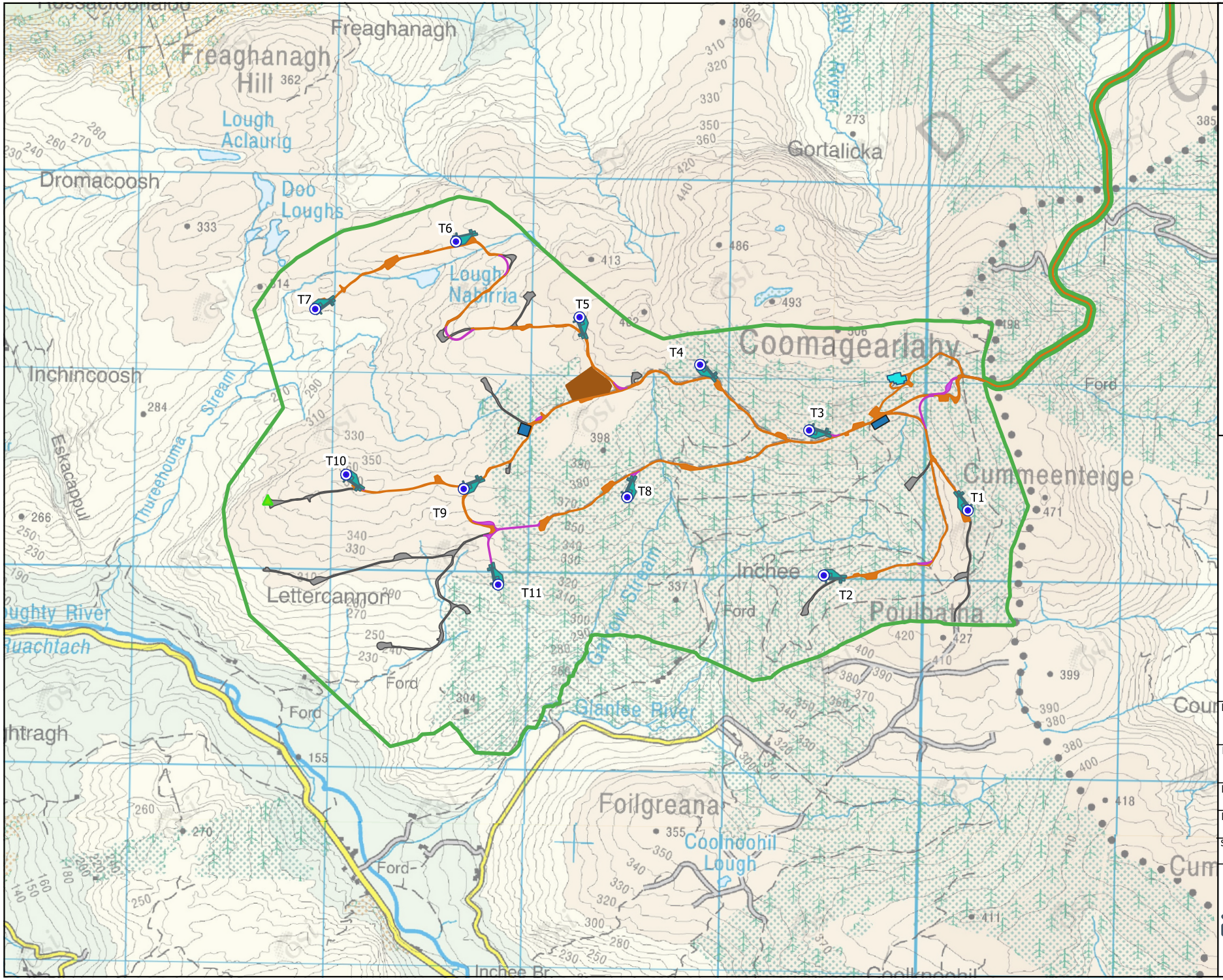
- European Commission. Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, (21-11-18) C (2018) 7261 Final. Commission Notice Brussels.

1.1.3 Information Consulted for this Report

This assessment has been informed by the following sources of data:

- Desk based surveys and site surveys of the Proposed Development site;
- The relevant Chapters of the EIAR accompanying the planning application for the Proposed Development;
- Information on the location, nature and design of the Proposed Development as provided by the client;
- Department of Housing, Planning, Community and Local Government (DHPCLG) online land-use mapping (www.myplan.ie/en/index.html);
- Office of Public Works (OPW) National Flood Hazard Mapping website (www.floodmaps.ie)
- Environmental Protection Agency (EPA) geoportal mapping tool (https://gis.epa.ie/EPAMaps/);
- National Parks and Wildlife Service protected site and species information and data (https://www.npws.ie/protected-sites);
- National Biodiversity Data Centre (www.biodiversityireland.ie); and
- Ordnance Survey of Ireland mapping and aerial photography (www.osi.ie).

Figure 1-1 Proposed Development Layout



2 Stage 1: Screening for Appropriate Assessment

2.1 Brief Description of the Site & Project

2.1.1 Site Location

The Proposed Development site is located approximately 5.5km northeast of the village of Kilgarvan Co. Kerry, and approximately 6km west of Coolea, Co. Cork. Current land use on the site comprises wind energy in relation to the Existing Kilgarvan Wind Farm, low-intensity agriculture and small areas of coniferous forestry. Land use in the wider landscape of the site comprises a mix of agriculture, low density residential areas, commercial forestry and wind energy. It is proposed to access the Proposed Development via the existing wind farm site entrance and 7.9km access road, off the N22 at Cloonkeen.

The Proposed Development site is located within the South Western River Basin District across three different catchments; Lee, Cork Harbour and Youghal Bay (Hydrometric Area 19), Dunmanus-Bantry-Kenmare (Hydrometric Area 21) and Laune-Maine-Dingle Bay (Hydrometric Area 22) and three different sub-catchments; Roughty_SC_010, Flesk (Kerry)_SC_010 and the Sullane_SC_010 (www.epa.ie).

Several small, first order streams rise within the site and drain to the main channel of the Roughty River. The existing access road intersects with several small upper headwater streams of the Flesk and Sullane river sub-catchments Flesk (Kerry)_010 (22_8) and Sullane_SC_010 (19_10).

Roughty sub-catchment: The Proposed Development site is drained by 3 no. tributaries of the Roughty River; Glanlee, Lettercannon and Thureehouma. These mountain streams each confluence with the Roughty main channel between 6.5km and 8.3km upstream of Kilgarvan. The Roughty then flows westwards for c.15km, discharging to the Atlantic Ocean at Kenmare Bay. Q-values indicate 'good' and 'high' ecological status (Q4, Q4-5) for waters in the three tributary streams draining the Proposed Development site. The outlet site for each of the tributaries (K19, K23, K27) were all potential 'high' status. The upper tributary sites tended to be slightly poorer, although still meriting 'good' status meaning all are compliant with WFD objectives. The Roughty River main channel sites were each potential 'high' status (Q4-5) which aligns with high density of juvenile salmonids during electrofishing and low nutrient levels during water sampling surveys. The Roughty River is at high status (Q4-5).

Flesk sub-catchment: The site access road travels south towards the Existing Kilgarvan Wind Farm from the N22, crossing the mountains high above the Flesk River, intersecting 1 no. small tributary (unnamed) near the Cloonkeen sub-station and N22 site entrance and 3 no. small headwater streams of the Owgarriv Tributary of the Flesk River (2 no. branches of Coumacullen stream and Cloonkeen 22 stream). The Cloonkeen river is crossed by the existing access road and flows for 2.4km where it joins the Owngarriv Tributary and flows for 860m before flowing into the Flesk which is part of the Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC. The Flesk then flows further north for another 23.4km where it discharges into Lough Leane which makes up part of the Killarney National Park SPA. The tributaries confluence 23.5km and 27.5km, respectively, upstream of Killarney, before discharging via Killorglin (Laune River) to the Atlantic Ocean at Dingle Bay. Q-values indicate 'high' ecological status (Q4-5) on the main channel of the Flesk River (F2) in the reach downstream of the relevant tributary confluences. Owgarriv tributary sites (F7, F8), receiving drainage from the middle section of the access road, and the Sullane tributary (S1) which receives drainage from the westerly extent of the access road were each at potential 'high' status. Flesk tributaries A and B drain the easterly extent of the access road and it is possible they are

ephemeral (dry at times). In September 2022, Flesk A was potential 'moderate' status in the upper reach (F6), but 'good' status downstream (F4), nearer the Flesk River confluence. Flesk B (F5) is a small, low volume gully stream fed by forestry drains and was at potential 'good' status. It was noted that the Flesk A and B tributaries were physically impacted by pre-existing forestry drainage (deepened, incised).

Sullane sub-catchment: A very small proportion of access road drainage connects, mainly via existing forestry drains to a small headwater of the "Barr Duinse" tributary of the upper Sullane River. A single existing watercourse intersection is 11km upstream of Baile Bhuirne, Co. Cork and connects to the River Lee via Macroom and Cork City, discharging to Cork Harbour >65km away. The single representative site sampled was indicative of 'high' status (Q4-5) based on the sensitive macroinvertebrate community present. High levels of forestry activity were noted in the catchment upstream of the sample site.

Within the Proposed Development site, road upgrades are proposed over a total of 10 no. existing watercourse crossings; 5 no. crossings are located on tributaries of the Roughty River within the site, an additional 4 no. crossings are located on the main access road from the N22 and cross tributaries of the Flesk River and 1 no. existing crossing is located on the Inchamore stream within the Sullane River catchment. All of the existing watercourse crossings are culverted and no instream works are proposed. In addition, there is 1 no. new proposed watercourse crossing located *c.* 190m north of T11 which will be required to facilitate the Proposed Development.

2.1.2 Existing Wind Farm and Planning History

The Existing Kilgarvan Wind Farm encompass a number of distinct wind farm projects, each with their own separate planning permissions. There is a total of 28 no. turbines that are operational at the Existing Kilgarvan Wind Farm comprising 13 no. Nordex N90s and 15 no. Vestas V90s turbines.

As part of the Kilgarvan I Wind Farm Development, permission was granted for the construction of 21 no. turbines under the following planning references:

- 02/1241 – permission to construct 17 turbines and associated structures;
- 03/2176 – Extended hub height from 60m to 80m;
- 03/992176 – Extended the expiry date of planning ref 03/2176; and
- 03/2306 – Extension of 4 no. turbines

15 no. of the 21 no. permitted turbines were constructed, comprising Vestas V90 turbines with a total installed capacity of 42.5 MW. The planning permissions for Kilgarvan I Wind Farm was granted in 2007 and does not have a planning condition specifying an expiry date for its operational life.

The Kilgarvan II Wind Farm consists of several separate planning permissions, which were constructed together under the following planning permissions:

- Inchincoosh consisting of 6 no. turbines under Planning References 07/1605 and 07/4364
- Lettercannon consisting of 7 no. turbines under planning references PL. 08.209629, 07/4515 and 07/4701
- Sillahertane consisting of 10 no. turbines under planning reference Pl. 03/1359.

23 no. turbines were installed under the above planning permissions. It should be noted that the 10 no. Sillahertane turbines as detailed above are not planned to be decommissioned at this time and do not form part of the Proposed Development.

Kilgarvan II Wind Farm was commissioned in 2009 and planning conditions attached to the planning permissions for the wind farm specify a 20-year operation life from commencement of operation. The Kilgarvan II Wind Farm operational life is therefore due to expire in 2029.

The Proposed Repowering of the Existing Kilgarvan Wind Farm will involve the removal of 28 no. turbines and the erection of 11 no. wind turbines. Therefore, the cumulative number of turbines operational at the site will decrease substantially as a result of the Proposed Development.

The Proposed Development will have a potential generating capacity greater than 50 megawatts (MW) and will make use of the existing 110kV infrastructure built as part of the Existing Kilgarvan Wind Farm. This infrastructure will continue to connect the Proposed Development to the National Electricity Grid via the existing 110kV Coomagearlahy substation. There will be minor upgrades to the existing 110kV Coomagearlahy substation to ensure that it is in line with current EirGrid specifications.

2.1.3 Proposed Development

The Proposed Development will comprise the removal of 28 no. existing wind turbines, the construction of 11 no. wind turbines with a maximum blade tip height of between 119.5m and 200 metres 200 metres and all associated works. The Proposed Development will utilise the existing onsite 110kV Coomagearlahy electrical substation, along with the existing 110kV overhead line to Clonkeen 110kV Substation.

The Proposed Development comprises:

i. Removal of 28 no. existing turbines and relevant ancillary infrastructure permitted under Kerry County Council and An Bord Pleanála Planning References; 02/124, 03/2176, 03/2306, 07/1605, 07/4364, Pl. 08.209629, 07/4515, 07/4701, Pl. 08.232259 and 05/1351;

ii. Erection of 11 no. wind turbines with a blade tip height range from 199.5m to 200m, a hub height range from 118m to 125m and a rotor diameter range from 149m to 163m, along with associated foundations and hard standing areas;

iii. A thirty-five year operational life from the date of full commissioning of the wind farm;

iv. Underground electrical 33kV and communication cabling connecting the proposed turbines and meteorological mast to the existing 110kV Coomagearlahy substation in the townland of Inchee;

v. Upgrade of and the continued use of the existing onsite Coomagearlahy 110kV substation in the townland of Inchee, permitted under Kerry County Council References 07/3648, 04/1648, 06/1143, 06/2660;

vi. Upgrade of existing tracks, hardstand areas and provision of new site access roads and junctions;

vii. The extension and reuse of the 1 no. existing borrow pit;

viii. 2 no. temporary construction compounds;

ix. Meteorological mast, with a height of 100m and upgrade of existing associated foundation and hard standing area;

x. Forestry felling;

xi. Site drainage;

xii. Biodiversity Enhancement measures;

xiii. Operational stage site signage; and,

xiv. All ancillary works and apparatus

This application seeks a ten-year planning permission and a 35-year operational life from the date of commissioning of the Proposed Development.

The existing 28 no. turbines onsite will be removed in accordance with Ørsted policy, whereby any elements of the turbines that are to be removed will be recycled and reused, and no components will be sent to landfill.

The grid connection from the Proposed Development to the national grid will be via the existing onsite Coomagearlahy 110kV substation. There will be minor upgrade works to the existing onsite substation, however no upgrades will be needed for the 110kV infrastructure.

The Proposed Development site will be accessed via the existing site entrance from the N22, currently used to access the Existing Kilgarvan Wind Farm. The access junction is located approximately 5.1km north of the Proposed Development site in the townland of Cloonkeen.

The drainage plans for the Proposed Development will not significantly alter the existing drainage regime at the site. Any existing drains will be routed under/around the proposed access roads using culverts as required. Runoff from access roads, turbine bases, and developed areas (construction compounds, met masts) will be collected and treated in local (proposed) silt traps and settlement ponds/swales and then discharged over buffered outfalls.

As part of the proposed drainage design, it is proposed that runoff from the proposed infrastructure will be collected locally in new proposed silt traps, settlement ponds and vegetated buffer areas prior to release into the existing site drainage network. The new proposed drainage measures will then create significant additional attenuation to what is already present.

Tree Felling and Replacement Forestry Planting

As part of the Proposed Development, tree felling will be required within and around the Proposed Development footprint to allow for the construction of the turbine bases, road widening, access roads, underground cabling, and the other ancillary infrastructure.

A small section of the Proposed Development site is located on commercial forestry, namely Turbine No. 11 and its associated infrastructure. A total of 8.9ha of commercial forestry will be permanently felled within and around Turbine No. 11 and its associated infrastructure, along with existing treeline boundaries.

The commercial forestry felling activities required as part of the Proposed Development will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments. The policy requires that a copy of the planning permission for the Proposed Development be submitted with the felling licence application; therefore the felling licence cannot be applied for until such time as planning permission is obtained for the Proposed Development.

In line with the Forest Service's published policy on granting felling licences for wind farm developments, areas cleared of forestry for access roads, and any other wind farm-related uses will have to be replaced by replanting at an alternative site or sites. The Forest Service policy requires replacement or replanting on a hectare for hectare basis for the footprint of infrastructure developments.

The estimated 8.9 hectares that will be permanently felled for the footprint of the Proposed Development infrastructure will be replaced or replanted on a hectare for hectare basis as a condition of any felling licence that will be issued in respect of the Proposed Development. Replanting is a requirement of the Forestry Act and is primarily a matter for the statutory licensing processes that are under the control of the Forest service.

The replacement of the 8.9 hectares of forestry can occur anywhere in the State subject to licence. The replacement of forestry, felled as part of the Proposed Development, may occur on any lands, within the state, benefitting from Forest Service Technical Approval[2] for afforestation. Under the Forestry Regulations 2017, all applications for licences for afforestation require the prior written approval (technical approval) of the Minister for Agriculture, Food and the Marine. Before the Minister can grant approval, he/she must first determine if the project is likely to have significant effects on the environment (for EIA purposes) and assess if the development, individually or in combination with other plans or projects is likely to have a significant effect on a European site (for Habitats purposes).

2.1.4 Construction Methodology

This section describes the construction methodology for the Proposed Development. A Construction and Environmental Management Plan (CEMP) has been development by MKO (2024) for the Proposed Development (See Appendix D) and accompanies the planning application.

Temporary Construction Site Compounds

There are two temporary construction compounds proposed as part of the Proposed Development. The locations of the compounds are shown in drawings provided in Appendix E.

The construction compound will consist of a bunded refuelling and containment area for the storage of lubricants, oils and site generators etc, and full retention oil interceptor, waste storage area, temporary site offices, staff facilities and car-parking areas for staff and visitors. Temporary port-a-loo toilets and toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. There will also be a water supply on site for hygiene purposes, by way of a temporary storage tank.

There are 2 no. temporary construction compounds proposed as part of this application. Both of these temporary construction compounds are located on areas of existing hardstanding which will need to be upgraded and extended in order to accommodate the compounds. Temporary Construction Compound 1 is located approximately 325m east of Turbine No. 3 and measures 3,012m^2 in size. Temporary Construction Compound 2 is located approximately 410m northeast of Turbine No. 9 and measures 2,951m^2.

[2] All proposed forestry developments where the area involved is greater than 0.1 hectare must receive the prior written approval of the Forest Service. The application for approval is known as Pre-Planting Approval – Form 1.

The compound will typically be constructed as follows:

- The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs, and associated settlement ponds will be installed around the perimeter;
- The compound will be extended using a similar technique as the construction of the excavated site roads as discussed below;
- Where required, a layer of geogrid will be installed, and compacted layers of well graded granular material will be spread and lightly compacted to provide a hard area for site offices and storage containers;
- Areas within the compound will be constructed as site roads and used as vehicle hard standings during deliveries and for parking;
- A bunded containment area will be provided within the compound for the storage of lubricants, oils and site generators etc.;
- A waste storage area will be provided within the compound;
- If necessary the compound will be fenced and secured with locked gates, although fencing would only be utilised where significant risk of danger to third parties or vandalism is envisaged;
- Upon completion of the construction phase of Proposed Development, the compound will be decommissioned and allowed to re-vegetate naturally, landscaping with topsoil as required;
- During the construction phase, a temporary toilet block unit will located within the temporary construction compound for use during the construction phase. Elsewhere on site, self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants, and;
- The water supply to the site will be from a temporary water storage tank which will be filled using a mobile water tank which will source water locally as required.

<u>Removal of Existing Turbines</u>

The existing 28 no. turbines onsite will be removed from site in accordance with Orsted policy, whereby all elements of the turbines will be recycled and reused, and no components will be sent to landfill. A methodology for the decommissioning of the turbine blades is set out below.

- Blades will be segmented into approximately 9 pieces using an excavator mounted shear;
- Technicians will remove root rings and any other associated metal for recycling;
- The construction crew will ensure that there are no contaminants present (e.g. oils, brake dust, grease rubber hoses);
- Blade segments will then be lifted via telehandler to a suitable container for transport (e.g. 40 cubic yard RORO skips and/or trailer mounted articulated bulk carriers);
- Segments will then be transported to suitable licenced processing facilities, such as Kenmare Transfer Station (W0086), Coolcaslagh Transfer Station (W0072) or Killarney Waste Disposal Unlimited Company (W0217) to be shredded;
- The shredded output will be used in a suitable licenced cement co-processing or a waste-to-energy facility.
- Site cables will be treated in one of two ways:
    - In the case where cables are direct buried in peat, the ends will be snipped and the cable will be left in place;

  - In the case where the cables have been trenched, the cable will be pulled out from the ducting and the ends will be sealed.
- Where roads and hardstanding areas are not being reused by local landowners or the Proposed Development, they will be covered over with local topsoils and left to naturally reseed.

The turbine nacelle and tower sections are metallic and can therefore also be recycled. The tower will be broken out into its original tower sections and will be transported offsite to a suitable licenced or waste processing facility, such as Kenmare Transfer Station (W0086), Coolcaslagh Transfer Station (W0072) or Killarney Waste Disposal Unlimited Company (W0217).

Site Drainage System

Drainage water from any works areas of the site of the Proposed Development will not be directed to any natural watercourses within the site. Two distinct methods will be employed to manage drainage water within the site. The first method involves keeping clean water clean by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting any drainage waters from works areas within the site that might carry silt or sediment, to allow attenuation and settlement prior to controlled diffuse release.

The drainage design is intended to maximise erosion control, which is more effective than having to control sediment during high rainfall. Such a system also requires less maintenance. The area of exposed ground will be minimised. The drainage measures will prevent runoff from entering the works areas of the site from adjacent ground, to minimise the volume of sediment-laden water that must be managed. Discoloured run-off from any construction area will be isolated from natural clean run-off.

There is no one guidance document that deals with drainage management and water quality controls for wind farms and other renewable energy developments. However, a selection of good practice approaches has been adopted in preparation of this drainage design, and these are taken from the various best practice guidance documents listed below. These relate to infrastructure and operational works on forested sites, forest road design, water quality controls for linear projects, forestry road drainage and management of geotechnical risks. To achieve best practice in terms of water protection through construction management all drainage management is prepared in accordance with guidance contained in the following:

- Forest Protection Guidelines (Forest Service, 2002);
- Forest Operations and Water Protection Guidelines (Coillte, 2013);
- Forestry and Water Quality Guidelines (Forest Service, 2000b); and,
- Forests and Water, Achieving Objectives under Ireland's River Basin Management Plan 2018-2021 (DAFM, 2018).
- MacCulloch (2006): Guidelines for risk management of peat slips on the construction of low volume low cost roads over peat (Frank MacCulloch Forestry Civil Engineering Forestry Commission, Scotland);
- National Roads Authority (2005): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Farm Development Guidelines for Planning Authorities (September 1996);
- Eastern Regional Fisheries Board: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;

- Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works Adjacent to Watercourses*;
- Scottish Natural Heritage, 2010: Good Practice During Wind Farm Construction;
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Water Courses (UK Guidance Note);
- CIRIA Report No. C648 (2006): CIRIA (Construction Industry Research and Information Association) guidance on 'Control of Water Pollution from Linear Construction Projects';
- CIRIA Report Number C532 (2001): Control of water pollution from construction sites - Guidance for consultants and contractors.; and,
- Control of water pollution from linear construction sites – Technical guidance CIRIA C684 London, 2006.

Control of water pollution from linear construction projects -Technical guidance. CIRIA C648 The drainage design for the Proposed Development will incorporate measures outlined below. A detailed drainage design for the Proposed Development, incorporating all principles and measures outlined in this drainage design description, has been prepared, and is included in Appendix E.

Interceptor Drains

Interceptor drains will be installed upgradient of any works areas to collect surface flow runoff and prevent it reaching excavations and construction areas of the site where it might otherwise have come into contact with exposed surfaces and picked up silt and sediment. The interceptor drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. This will minimise the volume of potentially silty runoff to be managed within the construction area.

The interceptor drains will be installed in advance of any main construction works commencing. The material excavated to make the drain will be completed on the downslope edge of the drain to form a diversion dike. On completion of the construction phase works, it is envisaged that the majority of the interceptor drains could be removed. At that stage, there will be no open excavations or large areas of exposed ground that are likely to give rise to large volumes of potentially silt-laden run off. Any areas in which works were carried out to construct roads, turbine bases or hardstands, will have been built up with large grade hardcore, which even when compacted in place, will retain sufficient void space to allow water to infiltrate the subsurface of these constructed areas. It is not anticipated that roadways or other installed site infrastructure will intercept ground-conveyed surface water runoff to any significant extent that would result in scouring or over-topping or spill over. Where drains are to be removed, they will be back-filled with material from the diversion dyke. Interceptor drains may have to be retained in certain locations, for example where roadways are to be installed on slopes, to prevent the roadways acting of conduits for water that might infiltrate the roadway sub-base. In these cases, interceptor drains will be maintained in localised areas along the roadway with culverts under the roadway, which will allow the intercepted water to be discharged to vegetation filters downgradient of the roadway. Similarly, in localised hollows where water is likely to be funnelled at greater concentrations than on broader slopes, interceptor drains, and culverts may be left in situ following construction.

The velocity of flow in the interceptor will be controlled by check dams (see Section 4.6.5.3 below), which will be installed at regular intervals along the drains to ensure flow in the channel is non-erosive. On steeper sections where erosion risks are greater, a geotextile membrane will be added to the channel.

Interceptor drains will be installed horizontally across slopes to run in parallel with the natural contour line of the slope. Intercepted water will travel along the interceptor drains to areas downgradient of works areas, where the drain will terminate at a level spreader (see Section 4.6.5 below). Across the entire length of the interceptor drains, the design elevation of the water surface along the route of the drains will not be lower than the design elevation of the water surface in the outlet at the level spreader.

Swales

Drainage swales (or collector drains) are shallow drains that will be used to intercept and collect run-off from construction areas of the site during the construction phase. Drainage swales will remain in place to collect runoff from roads and hardstanding areas of the Proposed Development during the operational phase. A swale is an excavated drainage channel located along the downgradient perimeter of construction areas, used to collect and carry any potentially sediment-laden runoff to a sediment-trapping facility and stabilised outlet. Swales are proven to be most effective when a dike is installed on the downhill side. They are similar in design to interceptor drains described above.

Drainage swales will be installed downgradient of any works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and picked up silt and sediment. Swales will intercept the potentially silt-laden water from the excavations and construction areas of the site and prevent it reaching natural watercourses.

Drainage swales will be installed in advance of any main construction works commencing. The material excavated to make the swale will be compacted on the downslope edge of the drain to form a diversion dike.

Check Dams

The velocity of flow in the interceptor drains and drainage swales, particularly on sloped sections of the channel, will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow is non-erosive. Check dams will also be installed in some existing artificial drainage channels that will receive waters from works areas of the site.

Check dams will restrict flow velocity, minimise channel erosion and promote sedimentation behind the dam. The check dams will be installed as the drains are being excavated.

The proposed check dams will be made up of straw bales (temporary use only) or stone, or a combination of both depending on the size of the drainage swale it is being installed in. Where straw bales are to be used, they will be secured to the bottom of the drainage swale with stakes. Clean 4-6 inch stone will be built up on either side and over the straw bale to a maximum height of 600mm over the bottom of the interceptor drain. In smaller channels, a stone check dam will be installed and pressed down into place in the bottom of the drainage swale with the bucket of an excavator.

The check dams will be installed at regular intervals along the drains to ensure the bottom elevation of the upper check dam is at the same level as the top elevation of the next down-gradient check dam in the drain. The centre of the check dam will be approximately 150mm lower than the edges to allow excess water to overtop the dam in flood conditions rather than cause upstream flooding or scouring around the dams.

Check dams will not be used in any natural watercourses, only artificial drainage channels and interceptor drains. The check dams will be left in place at the end of the construction phase to limit erosive linear flow in the drainage swales during extreme rainfall events.

Check dams are designed to reduce velocity and control erosion and are not specifically designed or intended to trap sediment, although sediment is likely to build up. If necessary, any excess sediment build up behind the dams will be removed. For this reason, check dams will be inspected and maintained regularly to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.

Level Spreader

A level spreader will be constructed at the end of each interceptor drain to convert concentrated flows in the drain, into diffuse sheet flow on areas of vegetated ground. The levels spreaders will be located downgradient of any proposed works areas in locations where they will not contribute further to water ingress to construction areas of the Proposed Development site.

The water carried in interceptor drains will not have come in contact with works areas, and therefore should be free of silt and sediment. The level spreaders will distribute clean drainage water onto vegetated areas where the water will not be reconcentrated into a flow channel immediately below the point of discharge. The discharge point will be on level or only very gently sloping ground rather than on a steep slope so as to prevent erosion.

The slope in the channel leading into the spreader will be less than or equal to 1%. The slope downgradient of the spreader onto which the water will dissipate will have a grade of less than 6%. The availability of slopes with a grade of 6% or less will determine the locations of level spreaders. If a slope grade of less than 6% is not available in the immediate area downgradient of a works area at the end of a diversion drain, a piped slope drain (see Section 4.7.5.5 below) will be used to transfer the water to a suitable location.

The spreader lip over which the water will spill will be made of a concrete kerb, wooden board, pipe, or other similar piece of material that can create a level edge similar in effect to a weir. The spreader will be level across the top and bottom to prevent channelised flow leaving the spreader or ponding occurring behind the spreader. The top of the spreader lip will be 150mm above the ground behind it. The length of the spreader will be a minimum of four metres and a maximum length of 25 metres, with the actual length of each spreader to be determined by the size of the contributing catchment, slope and ground conditions.

Clean four-inch stone can be placed on the outside of the spreader lip and pressed into the ground mechanically to further dissipate the flow leaving the level spreader over a larger area.

Piped Slope Drains

Piped slope drains will be used to convey surface runoff from diversion drains safely down slopes to flat areas without causing erosion. Once the runoff reaches the flat areas it will be reconverted to diffuse sheet flow. Level spreaders will only be established on slopes of less than 6% in grade. Piped slope drains will be used to transfer water away from areas where slopes are too steep to use level spreaders.

The piped slope drains will be semi-rigid corrugated pipes with a stabilised entrance and a rock apron at the outlet to trap sediment and dissipate the energy of the water. The base of drains leading into the top of the piped slope drain will be compacted and concavely formed to channel the water into the corrugated pipe. The entrance at the top of the pipe will be stabilised with sandbags if necessary. The pipe will be anchored in place by staking at approximately 3-4 metre intervals or by weighing down with compacted soil. The bottom of the pipe will be placed on a slope with a grade of less than 1% for a length of 1.5 metres, before outflowing onto a rock apron.

The rock apron at the outlet will consist of 6-inch stone to a depth equal to the diameter of the pipe, a length six times the diameter of the pipe. The width of the rock apron will be three times the diameter of the pipe where the pipe opens onto the apron and will fan out to six times the diameter of the pipe over its length.

Piped slope drains will only remain in place for the duration of the construction phase of the Proposed Development. On completion of the works, the pipes and rock aprons will be removed, and all channels backfilled with the material that was originally excavated from them.

Piped slope drains will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and blockages. Stake anchors or fill over the pipe will be checked for settlement, cracking and stability. Any seepage holes where pipe emerges from drain at the top of the pipe will be repaired promptly

Vegetation Filters

Vegetation filters are the existing vegetated areas of land that will be used to accept surface water runoff from upgradient areas. The selection of suitable areas to use as vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.

Vegetation filters will carry outflow from the level spreaders as overland sheet flow, removing any suspended solids and discharging to the groundwater system by diffuse infiltration.

Vegetation filters will not be used in isolation for waters that are likely to have higher silt loadings. In such cases, silt-bearing water will already have passed through stilling ponds prior to diffuse discharge to the vegetation filters via a level spreader.

Stilling Ponds

Stilling or settlement ponds will be used to attenuate runoff from works areas of the site of the Proposed Development during the construction phase and will remain in place to handle runoff from roads and hardstanding areas of the Proposed Development during the operational phase. The purpose of the stilling ponds is to intercept runoff potentially laden with sediment and to reduce the amount of sediment leaving the disturbed area by reducing runoff velocity. Reducing runoff velocity will allow larger particles to settle out in the stilling ponds, before the run-off water is redistributed as diffuse sheet flow in filter strips downgradient of any works areas.

Stilling ponds will be excavated/constructed to the appropriate size at each required location as shown on the drainage design drawings included in Appendix 4-4 of this document. The points at which water enters and exits the stilling ponds will be stabilised with rock aprons, which will trap sediment, dissipate the energy of the water flowing through the stilling pond system, and prevent erosion. The stilling ponds will reduce the velocity of flows in order to allow settlement of silt to occur. Water will flow out of the stilling pond through a stone dam, partially wrapped in geo-textile membrane, which will control flow velocities and trap any sediment that has not settled out.

Water will flow by gravity through the stilling pond system. The stilling ponds have been sized according to the size of the area they will be receiving water from and are large enough to accommodate a 10-year return rainfall event. The settlement ponds are designed for 11hr and 24hr retention times used to settle out medium silt (0.006mm) and fine silt (0.004mm) respectively (EPA, 2006)[3]. The stilling ponds will be

[3] *Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006)*

dimensioned so that the length to width ratio will be greater than 2:1, where the length is the distance between the inlet and the outlet. Where ground conditions allow, stilling ponds will be constructed in a wedge shape, with the inlet located at the narrow end of the wedge. Each stilling pond will be a minimum of 1-1.5 metres in depth. Deeper ponds will be used to minimise the excavation area needed for the required volume.

The embankment that forms the sloped sides of the stilling ponds will be stabilised with vegetated turves, which will have been removed during the excavation of the stilling ponds area.

Stilling ponds will be located towards the end of swales, close to where the water will be reconverted to diffuse sheet flow. Upon exiting the stilling pond system, water will be immediately reconverted to diffuse flow via a fan-shaped rock apron if there is adequate space and ground conditions allow. Otherwise, a swale will be used to carry water exiting the stilling pond system to a level spreader to reconvert the flow to diffuse sheet flow.

A water level indicator such as a staff gauge will be installed in each stilling pond with marks to identify when sediment is at 10% of the stilling pond capacity. Sediment will be cleaned out of the still pond when it exceeds 10% of pond capacity. Stilling ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and anything else that might interfere with flows.

Siltbuster

A “siltbuster” or similar equivalent piece of equipment will be available to filter any water pumped out of excavation areas if necessary, prior to its discharge to stilling ponds or swales.

Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction sites.

The unit stills the incoming water/solids mix and routes it upwards between a set of inclined plates for separation. Fine particles settle onto the plates and slide down to the base for collection, whilst treated water flows to an outlet weir after passing below a scum board to retain any floating material. The inclined plates dramatically increase the effective settling area of the unit giving it a very small footprint on site and making it highly mobile.

The Siltbuster units are now considered best practice for the management of dirty water pumped from construction sites. The UK Environment Agency and the Scottish Environmental Protection Agency have all recommended/specified the use of Siltbuster units on construction projects

Silt Bags

Dewatering silt bags allow the flow of water through them while trapping any silt or sediment suspended in the water. The silt bags provide a passive non-mechanical method of removing any remaining silt contained in the potentially silt-laden water collected from works areas within the site.

Dewatering silt bags are an additional drainage measure that can be used downgradient of the stilling ponds at the end of the drainage swale channels and will be located, wherever it is deemed appropriate, throughout the site. The water will flow, via a pipe, from the stilling ponds into the silt bag. The silt bag will allow the water to flow through the geotextile fabric and will trap any of the finer silt and sediment remaining in the

water after it has gone through the previous drainage measures. The dewatering silt bags will ensure that there will be no loss of peaty silt into the stream.

The dewatering silt bag that will be used will be approximately 3 metres in width by 4.5 metres in length and will be capable of trapping approximately four tonnes of silt. The dewatering silt bag, when full, will be removed from site by a waste contractor with the necessary waste collection permit, who will then transport the silt bag to an appropriate, fully licensed waste facility.

Sedimats

Sediment entrapment mats, consisting of coir or jute matting, will be placed at the outlet of the silt bag to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.

Culverts

All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse.

Some culverts may be installed to manage drainage waters from works areas of the Proposed Development, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the road or road sub-base. In some cases, two or more smaller diameter culverts may be used where this depth is limited, though this will be avoided as they will have a higher associated risk of blockage than a single, larger pipe. In all cases, culverts will be oversized to allow mammals to pass through the culvert.

Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling doesn't occur above or below the culvert and water can continue to flow as necessary.

All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.

Silt Fences

Silt fences will be installed as an additional water protection measure around existing watercourses in certain locations, particularly where works are proposed within the 50-metre buffer zone of a natural watercourse, which is inevitable where existing roads in proximity to watercourses are to be upgraded as part of the Proposed Development. These areas include around existing culverts, around the headwaters of watercourses, and the proposed locations are indicated on the detailed drainage design drawings included in Appendix E.

Silt fences will be installed as single, double or a series of triple silt fences, depending on the space available and the anticipated sediment loading. The silt fence designs follow the technical guidance document 'Control

of Water Pollution from Linear Construction Projects' published by CIRIA (Ciria, No. C648, 1996). Up to three silt fences may be deployed in series. All silt fencing will be formed using Terrastop Premium or equivalent silt fence product. Site fences will be inspected regularly to ensure water is continuing to flow through the fabric, and the fence is not coming under strain from water backing up behind it.

Hydrocarbon Interceptors

A hydrocarbon interceptor is a trap used to filter out hydrocarbons from surface water runoff. A suitably sized hydrocarbon interceptor will be installed wherever it is intended to store hydrocarbons and oils (*i.e,* construction compounds and substation compound) or where it is proposed to park vehicles during the construction and operational phases of the Proposed Development (*i.e.*, construction compounds, substation compound and visitor car park).

Drainage Management and Maintenance

An inspection and maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Inspections will also be undertaken after tree felling.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for each primary watercourse, and specifically following heavy rainfall events (as per the CEMP is included in Appendix 4-3 of this EIAR).

Surface water quality monitoring will also be completed before, during (if the operation is conducted over a protracted period of time) and after the clear-felling activities. The 'before' sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The "during" sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e. where an impact has been shown).

All proposed drainage management, maintenance and monitoring are detailed in the CEMP

Peat and Spoil Management

The quantity of peat and non-peat material (spoil), requiring management on the site of the Proposed Development has been calculated, as presented in Table 2-1 below. These quantities were calculated by Gavin and Doherty Geosolutions Ltd (GDG) as part of the *Peat and Spoil Management Plan* that has been submitted as part of the planning application for the Proposed Development.

Table 2-1. Peat and Spoil Volumes Requiring Management

Infrastructure Item		Excavated Volume (m^3)		Peat Reinstatement Capacity (m^3)	Fill Volume (m^3)
		Total Volume of Peat	Total Volume of Stone		
Access Roads	Existing Roads (Floating and Founded)	10,180	64,480	15,840	117,780
	New Roads (Founded)	3,330	21,800	2,000	4,770
Turbine Foundations and Hardstands (Floated and Founded)		40,520	99,060	5,320	164,230
2 no. Temporary Construction Compounds		3,010	0	1,170	22,320
Borrow Pit		3,040	184,190	38,880	0
Existing Hardstands		0	0	7,380	0
Total		**60,080**	**369,530**	**70,590**	**309,100**

Once the required volume of rock has been extracted from the borrow pit areas, it is intended to reinstate this area with peat and overburden excavated from the works areas of the Proposed Development.

The contractor excavating the rock will be required to develop the borrow pit to allow the excavated peat and spoil to be placed safely. The final profile of the peat and spoil will vary across the base of the borrow pit. The volumes assessment carried out at the borrow pit suggests that the available stone fill capacity is in excess of the stone requirements at the site, allowing for contingency should any design changes be required following detail design. Only the stone volumes required for the Proposed Development will be extracted from the borrow pit. The contractor will develop the proposed extension to the existing borrow pit to ensure that peat placement capacity is maintained.

It may be necessary to construct cells/rock buttresses or leave upstands of intact bedrock within the proposed borrow pit to contain the reinstated peat and overburden. This will allow for the safe placement and grading of the materials using dumper trucks and excavators. The buttresses will be wide enough to allow construction traffic access for the tipping of peat into the individual cells.

A geogrid or geotextile material may be used to aid in the strengthening of the upper surface of the deposited material within the proposed borrow pit and to aid in the promotion of growth and rehabilitation of the borrow pit area.

A rock buttress will be constructed at the downslope edge of the borrow pit to safely retain the infilled peat and spoil. The height of the rock buttresses constructed will be greater than the height of the infilled peat and spoil to prevent any surface peat and spoil run-off. A buttress up to 6m (approx.) in height will be required.

The rock buttress will be constructed as follows:

- The rock buttress will be founded on mineral soil or bedrock i.e. competent strata. The founding stratum for the rock buttress will be inspected and approved by the Project Geotechnical Engineer.

- In order to prevent water retention occurring behind the buttresses, the buttresses will be constructed of coarse boulder fill with a high permeability. The buttress will be constructed of well graded granular rock fill of about 100mm up to typically 500mm in size. Alternatively, drains will be placed through the
- Buttresses to allow excess water to drain.
- The side slopes of the rock buttress will be constructed between 45 to 60 degrees.

These works will be supervised by the project geotechnical engineer.

Where possible, the acrotelm peat that has been excavated and not retained for reinstatement and landscaping works will be stored with the vegetated side facing up so as to promote the growth of vegetation across the surface of the peat within the borrow pit area.

It is proposed that any excess peat and spoil generated through construction activities, not used to reinstate the borrow pit will be used for landscaping, or be placed around selected turbines bases and hardstands. The areas around 11 no. turbine bases and hardstands have been assessed as suitable locations for peat and spoil placement due to suitable ground conditions including peat depths and slope angles.

Placement or any reinstatement of excavated peat material will be carried out in a fashion which ties in with the existing natural topography and facilitates the reduction of the visual impact on the structures of the Proposed Development. This will be done by landscaping the placed peat with shallow slopes, promoting natural vegetation growth, and allowing for controlled drainage from all structures.

All reinstatement works will be carried out with consideration to potential peat instability, having completed a diligent design and giving consideration to the findings of the associated Peat Stability Risk Assessment Report which has been submitted as part of the planning application for the Proposed Development. Works will be carried out under the supervision of an appropriately experienced geotechnical engineer and ecological Clerk of Works (ECoW).

Borrow Pit

It is proposed to develop 1 no. borrow pit as part of the Proposed Development. The proposed borrow pit is an extension to the existing onsite borrow pit which was used to facilitate the Existing Kilgarvan Wind Farm. The borrow pit will provide the majority of all rock and hardcore material required during construction of the Proposed Development. Usable rock may also be won from other infrastructure construction, including the turbine base excavations.

The borrow pit measures approximately 22,650m^2. It is located alongside an existing access road leading to T9 in the centre of the site (See Appendix E).

Post-construction, the borrow pit area will be permanently secured. A stock-proof fence will be erected around the borrow pit perimeters to prevent access. Appropriate health and safety signage will also be erected on the fencing and at locations around the fenced area.

At certain turbine foundation and hardstand locations, depending on local ground conditions, the extraction of rock may be required in order to obtain a level construction area. Any rock obtained from a turbine location will be used to supply the hardcore materials requirement for that turbine's hardstand and access road.

Hardcore materials will be extracted from the borrow pit (and some turbine locations, if necessary), principally by means of rock blasting.

The estimated volume of crushed stone to be extracted from the borrow pit and required for the construction of the Proposed Development is 369,530m^3.

Rock Breaking

Weathered or brittle rock can be extracted by means of a hydraulic excavator and a ripper attachment. This is a common extraction methodology where fragmented rock is encountered as it can be carefully excavated in layers. In areas where stronger rock is encountered and cannot be removed by means of excavating then a rock breaking methodology may be used. Rock breaking equipment comprises a large hydraulic 360-degree excavator with a rock breaker attachment. Given the power required to break out tight and compact stone at depth, the machines are generally large and in the 40-60 tonne size range. Even where rock might appear weathered or brittle at the surface, the extent of weathering can quickly diminish with depth resulting in strong rock requiring significant force to extract it at depths of only a few metres.

A large rock breaking excavator progressively breaks out the solid rock from the ground in the borrow pit area. A smaller rock breaker, in the 30-40 tonne size range, then breaks the rocks down to a size that can then be fed into a crusher.

The extracted, broken rock is loaded into a mobile crusher using a wheeled loading shovel and crushed down to the necessary size of graded stone required for the on-site civil works. The same wheeled loader takes the stone from the crusher conveyor stockpile and stockpiles it elsewhere within the borrow pit, away from the immediate area of the crusher, until it is required elsewhere within the site

Rock Blasting

Where blasting is used as an extraction method, a mobile drilling rig is used to drill vertical boreholes into the area of rock that is to be blasted. A drilling rig will drill the necessary number of boreholes required for a single blast in approximately 3 to 4 days. The locations, depth and number of boreholes are determined by the blast engineer. This is a specialist role fulfilled by the blasting contractor.

The blast engineer will arrange for the necessary quantity of explosive to be brought to site to undertake a single blast. The management of explosives onsite and the actual blasting operation will be agreed in advance with and supervised by An Gardaí Siochána. The blast engineer sets the explosives in place in the boreholes, sets the charges, and fires the blast.

A properly designed blast should generate rock of a size that can be loaded directly into a mobile crusher, using the same wheeled loader outlined above. The same method is used for processing the rock generated from a blast, as would be used to process rock generated by rock breaking. Generally, the drilling rig will recommence drilling blast holes for the next blast as soon as one blast is finished. Any blasting will be carried out in accordance with the *Guidance on the Safe Use of Explosives in Quarries* (Safety and Health Commission

for the Mining and Other Extractive Industries, 2002)[4] and the British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise*[5].

Upgrade of Existing Site Access Roads

It is proposed to utilise existing roads at the site where possible (approximately 17.9km will be upgraded). These roads will require upgrading which will comprise widening of the roadway to a total running width of approximately five metres, with wider sections at corners and on the approaches to turbine locations and the laying of a new surface dressing on the existing section of roadway where necessary. The road upgrades will be undertaken as follows:

- If it is considered that the current road formation level is adequate to support required bearing, then no upgrade or widening works will be completed;
- Otherwise, where required, the subsoil in the existing road verge will be excavated down to a suitable formation layer.
- All spoil excavated will be placed alongside access roads with cross slopes of less than 10 degrees. As detailed in Section 4.3.3.2 of the EIAR, placement of spoil alongside access roads will take place outside of the site-specific flood modelled zones within the Wind Farm Site. Spoil placed alongside access roads will be restricted to a maximum height of 1.0m over a 3m wide corridor on both sides of the access roads.
- All drainage measures prescribed in the detailed drainage design for the Proposed Development will be implemented around the works area;
- Well-graded imported granular fill will be spread and compacted in layers up to 200mm to provide a homogeneous running surface. The thickness of layers and amount of compaction required will be decided by the Construction Manager based on the characteristics of the material and the compaction plant to be used. These layers of granular fill will be brought to the same level as the top of the existing road surface;
- Excavations side slopes shall not generally be greater than 1(V): 2 (H), . Design slopes will be informed by the Geotechnical Engineer;
- At bends or steep inclines from the road, reflective snow poles will be erected to warn traffic on dark mornings and evenings that there is a turn in the road or a sharp incline beyond the site road.

Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light.

Construction of New Roads

New roadways will be required in areas where existing roads are not already present. Use has been made of the existing roads where practicable. There are approximately 1.1km of new access roads to be installed at the site. The typical make-up of the founded access roads will be a stone thickness of 500mm. The requirement for a layer of geotextile and geogrid and the necessary stone thickness will be confirmed by the Site Engineer.

[4] https://www.hsa.ie/eng/Publications_and_Forms/Publications/Mines_and_Quarries/Guidance%20on%20the%20Safe%20Use%20of%20Explosives%20in%20Quarries.pdf

[5] https://www.thenbs.com/PublicationIndex/documents/details?Pub=BSI&DocID=305965

The new access roads will be constructed as follows using an excavated site road methodology which is summarised below.

- Establish alignment of the new site road from the construction drawings and mark out the centrelines with ranging rods or timber posts;
- All drainage measures prescribed in the detailed drainage design for the Proposed Development will be implemented around the works area;
- The road layout has been designed to avoid crossings of natural watercourses where possible;
- Where existing culverts are to be upgraded or extended, the works will be carried out to follow a method statement to be prepared in consultation with Inland Fisheries Ireland;
- The subsoil will be excavated down to a suitable formation layer of either firm clay or bedrock and managed on-site in the spoil management areas
- The road will be constructed using well-graded imported granular fill, spread and compacted in layers typically of 200mm and a suitable capping layer to provide a homogeneous running surface. The thickness of layers and amount of compaction required will be subject to detailed design by Project Engineer in consultation with the Construction Manager based on the characteristics of the material and the compaction plant to be used;
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- Road construction will be carried out in sections of approximately 50m lengths i.e. no more than 50m of access road to be excavated without re-placement with stone fill. This is outlined in further detail in the Chapter 4 of the EIAR.
- The surface of the excavated access roads will be overlaid with approximately 500mm of selected granular fill. Granular fill to be placed in layers in accordance with the designer's specification.
- Access roads to be finished with a layer of capping material across the full width of the road.
- The access roads will be of single-road design with an overall running width of c.5m. There will be some local widening on the bends, junctions and around turbine bases for the safe passage of large vehicles;
- All excavated material will be managed on-site. Some topsoil will be temporarily stockpiled locally for reuse for landscaping purposes.
- All new roadways will be constructed with a camber to aid drainage of surface water;
- For excavations, side slopes will generally be 1(V): 2 (H), respectively. Design slopes will be informed by the Geotechnical Engineer;
- At bends or steep inclines from the roads, reflective snow poles will be erected to warn traffic on dark mornings and evenings that there is a turn in the road or a sharp incline beyond the site road.
- The granular fill used to complete the final running surface of the roads on site will be tested to BS812-111:1990 "Ten percent fines value".
- Interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area.
- The passing bays will be approximately 5m in width and 40m in length where it meets the road network, tapering to 18m in length at the furthest point from the road.
- Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light;
- No excavated material will be removed from site with excavated spoil being managed within the site.

Road upgrades are proposed over a total of 10 no. existing watercourse crossings, including 1 no. crossing located on the Inchamore Stream within the Sullane River catchment, 5 no. existing crossings located on the following tributaries of the Roughty River:

- An unnamed stream *c*. 500m northeast of T3;
- An unnamed stream *c*. 250m southwest of T4;
- An unnamed stream *c*. 150m southeast of T6;
- An unnamed stream *c*. 280m northeast of T7; and,
- An unnamed stream *c.* 220m east of T8.

An additional 4 no. crossings located on the following tributaries of the Flesk River:

- 1 unnamed stream in the townland of Coomacullen;
- Coomacullen stream;
- Cloonkeen stream; and,
- An unnamed stream in the vicinity of Clonkeen substation.

All of the existing watercourse crossings are culverted. Existing culverts will be lengthened where necessary to facilitate access road widening. This includes access road widening near the site access road entrance from the N22, which will require the extension of a culvert on the Cloonkeen tributary of the Flesk.

There is 1 no. new proposed watercourse crossing *c*. 190m north of T11, located on an ephemeral, upper headwater reach of the Lettercannon stream, a tributary of the Rough River.

Keyhole Forestry Felling

As part of the Proposed Development, keyhole felling of forestry will be required within and around the Proposed Development footprint to enable the construction of turbine bases, access roads and the other ancillary infrastructure. Felling is also required around turbine bases for the reduction of potential effects on bats. A total of 5.75 hectares will be felled within the wind farm site with an additional 3.15 hectares of felling along the site access road. A total of 8.9 hectares of forestry will therefore be permanently felled in order to facilitate turbine delivery, construction and turbine erection.

The proposed methodology for the forestry felling activities is as follows:

Felling works will conform to current best practice Forest Service policies and strategic guidance documents as well as Coillte produced guidance documents, to ensure that the felling works provides minimal potential impacts to the receiving environment.

- '*Standards for Felling and Reforestation'* (Department of Agriculture, Food and the Marine, 2019)
- '*Forest Operations & Water Protection Guidelines'* (Coillte, 2009)
- '*Methodology for Clear Felling Harvesting Operations'* (Coillte, 2009)
- '*Forestry and Water Quality Guidelines'* (Forest Service, 2000)
- '*Forestry Biodiversity Guidelines'* (Forest Service, 2000)
- '*Forestry Protection Guidelines'* (Forest Service, 2002)
- '*Forestry Harvesting and Environmental Guidelines'* (Forest Service, 2000)

The proposed methodology for the forestry felling activities is as follows:

- The extent of all necessary forestry felling areas will be identified and demarcated with markings on the ground in advance of any felling commencing.
- All roads and culverts will be inspected by the ECoW and contractor prior to any machinery being brought on site to commence the felling operation.
- Existing drains that drain an area to be felled towards surface watercourses will be blocked, and temporary silt/sediment traps (ie. check dam / silt fence) will be constructed to ensure collection of all silt within felling areas. These temporary silt traps will be cleaned out and backfilled once felling works are complete. This ensures there is no residual collected silt remaining in blocked drains after felling works are completed.
- New collector drains and sediment traps will be installed during ground preparation to intercept water upgradient of felling areas and divert it away. Collector drains will be excavated at an acute angle to the contour (0.3%-3% gradient), to minimise flow velocities.
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated.
- Sediment removed from traps will be carefully disposed of in the peat repository areas.
- Machine combinations (i.e. hand-held or mechanical) will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance; however, the general proposed machine combination will comprise a harvester and a low-ground pressure harvester with a 14-tonne bunk capacity.
- Trees will be cut manually inside the 50m construction watercourse buffer and using machinery to extract whole trees only;
- Brash mats will be put in place to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur.
- Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting.
- No tracking of vehicles through watercourses will occur. Vehicles will only use existing road infrastructure and established watercourse crossings.
- Brash which has not been pushed into the soil may be moved to facilitate the creation of mats elsewhere within the site.
- Extraction routes, and hence brash mats, will be aligned parallel to the ground contours where possible.
- Harvested timber will be stacked in dry areas, and outside any 50-metre watercourse buffer zone prior to removal off site to authorised saw mills

<u>Proposed Turbine Foundations</u>

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use different shaped turbines foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. The turbine foundation transmits any load on the wind turbine into the ground. The proposed horizontal and vertical extent of the turbine foundation will be 25m and 4m respectively.

After the foundation level of each turbine has been formed using piling methods or on competent strata (*i.e*, bedrock or subsoil of sufficient load bearing capacity), the “Anchor Cage” is levelled and reinforcing steel is

then built up around and through the anchor cage. The outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete and is backfilled accordingly with appropriate granular fill to finished surface level following completion of the foundation.

It is anticipated that the formation level of the turbine foundations will be on the lower mineral subsoil or bedrock. They will be formed at a suitable level directed by the Geotechnical Engineer/Designer. The foundations will be constructed as follows:

- The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter;
- Where practical, the soil will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished turbine;
- No material will be removed from site with excavated spoil being transported and stored in the identified spoil management areas within the Wind Farm Site.
- All groundwater and surface water arising from turbine base excavation will be pumped to the dirty water system prior to discharge from the works area;
- Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light;
- The foundations excavation will be raised to formation level by compacted layers of well graded granular material will be spread and compacted to provide a hard area for the turbine foundation;

Standard excavated reinforced concrete bases will be completed as follows:

- A layer of lean-mix blinding will be laid approximately 75mm thick directly on top of the newly exposed formation, tamped and finished with a screed board to leave a flat level surface. The concrete should be protected from rainfall during curing and all surface water runoff from the curing concrete should be prevented from entering surface water drainage directly;
- High tensile steel reinforcement will be fixed in accordance with the designer's drawings & schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools;
- Ductwork will be installed as required, and formwork erected around the steel cage and propped from the backside as required;
- The foundation anchorage system will be checked both for level and line prior to the concrete being installed in the base. These checks will be passed to turbine manufacturer for their approval;
- Concrete will be placed using a concrete pump and compacted when in the forms using vibrating pokers to the levels and profile indicated on the drawings. Upon completion of the concreting works the foundation base will be covered and allowed to cure;
- Steel shutters will be used to pour the circular chimney section;
- Earth wires will be placed around the base;
- The foundation will be backfilled with a cohesive material, where possible using the material arising during the excavation or imported material and landscaped using the soil set aside during the excavation;
- Any excess overburden excavated during construction shall be managed in line with the recommendations/ best practice guidelines.

Reinforced concrete piled foundations will be completed as follows:

- The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter;
- No excavated material will be removed from site with excavated spoil being transported and stored in the identified spoil management areas within the Wind Farm Site.
- No material will be removed from site and placement areas will be stripped of vegetation prior to stockpiling in line with best working practices;
- A piling platform for the piling rig will be constructed by excavating to a suitable intermediate mineral subsoil and backfilling to formation level by compacted layers of well graded granular material spread and compacted to provide a hard area for the piling rig;
- The piling rig, fitted with an auger, will then bore through the soft material with a sleeve fitted around the auger to prevent the sidewalls of the soil and overburden from collapsing. The borehole is then extended to a suitable depth into the subsoil/bedrock.
- When the auger and the sleeve are removed high tensile steel cages will be lowered into the boreholes. These steel cages will extrude above the level of the top of the concrete pile.
- As the auger is removed concrete is pumped into the borehole.
- Reinforcing steel on the top of the pile will tie to the foundation base steel.
- The procedure for standard excavated reinforced concrete bases as outlined above can be applied from here.

Proposed Hardstanding Areas

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. It is proposed that 7 no. new hardstanding areas will be required as part of the Proposed Development. The hardstands for the remaining 4 no. turbines will utilise areas of existing hardstanding which will be upgraded and extended. The hard-standing areas are used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. All crane hardstand areas will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure. The crane hardstands will be constructed in a similar manner to the excavated site roads and will measure approximately 40m x 110m. The sizes, arrangement and positioning of hard standing areas are dictated by turbine suppliers. The extent of the required areas at each turbine location may be optimised on-site depending on topography, position of the Wind Farm Site access road, the proposed turbine position and the turbine supplier's exact requirements.

Onsite Electricity Substation and Control Building

The Proposed Development will be utilising the existing onsite Coomagearlahy 110kV substation and overhead line to Clonkeen 110kV Substation. There are no works proposed to alter or upgrade the overhead line to Clonkeen 110kV Substation, or the substation itself. There will be minor upgrades needed to the existing onsite Coomagearlahy 110kV substation in order to ensure that it is up to date with current EirGrid specifications. The construction methodology for these proposed upgrades are as follows:

- Replacement of existing M switchgear, control and protection equipment in the Coomagearlahy 3 control building to accommodate the change in the numb
- r of turbines and the reconfigured export capacity of the repowered site;
- Replacement of the existing MV/110kV 50MVA grid transformer in Coomagearlahy 3 HV compound with an MV/110kV 80MVA grid transformer to accommodate the reconfigured export capacity of the repowered site;
- Installation of a 110kV line/earth disconnector in Coomagearlahy 3 HV compound to EirGrid specification, and
- Installation of a capacitor bank and harmonic filter in Coomagearlahy 3 HV compound to achieve compliance with the EirGrid Grid Code.

Site Cabling

Each turbine will be connected to the on-site electricity substation via an underground 33kV (kilovolt) electricity cable. Fibre-optic cables will also connect each wind turbine to the wind farm control building at the onsite substation compound. The electricity and fibre-optic cables running from the turbines to the onsite substation compound will be run in trenches that will be approximately 1.2 metres in depth and 0.6metres in width, within the verge of the wind farm access roadways. The route of the cable ducts will follow the access road to each turbine location.

Clay plugs will be installed at regular intervals of not greater than 50 metres along the length of the trenches to prevent the trenches becoming conduits for runoff water. While the majority of the cable trenches will be backfilled with locally sourced material. Clay subsoils of low permeability will be used to prevent conduit flow in the backfilled trenches. This material will be imported onto the site from local, authorised quarries, such as Doyle's Quarry (sand and gravel), MC Group Quarry, and Gloun Stone Quarries, should sufficient volumes not be encountered during the excavation phase of roadway and turbine foundation construction.

Meteorological Mast

One meteorological (met) mast is proposed as part of the Proposed Development. The met mast will be equipped with wind monitoring equipment at various heights. The proposed met mast will be located at E506648 N576414 (ITM). The mast will be a free-standing slender lattice structure 100 metres in height. The met mast will be constructed on an area of existing hardstanding upon which an existing turbine, which will be decommissioned as part of the Proposed Development, is situated. This area of hardstanding is sufficiently large to accommodate the equipment that will be used to erect the mast.

Turbine Delivery Route

It is intended that the port of entry for large turbine components will be Ringaskiddy Port. As detailed in Chapter 3 of the EIAR, Ringaskiddy Port was deemed to be the most suitable delivery port due to its proximity to the Proposed Development site and the road network and existing infrastructure that exist between Ringaskiddy port and the Proposed Development site. Vehicles delivering large turbine components and other abnormal loads to the site will depart from Ringaskiddy Port and travel northwest on the M28 towards Cork City, further west along the N25, and subsequently merging onto the N22 heading west towards the site entrance in the townland of Cloonkeen, along the N22.

A route assessment was undertake covering the proposed turbine delivery route, with the route assessment location shown in Figure 15-2a of Chapter 15.

- Location 1 - N28 Pfizer Roundabout, Ringaskiddy
- Location 2 – N28/R611 roundabout
- Location 3 – N22 Macroom Bypass/R584 roundabout
- Location 4 – N22/Kilgarvan Wind Farm Access Junction

Following assessment of the above locations, it was found that no accommodation works would be needed in order to facilitate the turbine delivery vehicles.

It is also envisaged that some general construction traffic (including materials and staff) will travel to the site via the N22 to the north of the site.

Traffic movements generated by the Proposed Development in relation to the above, are discussed in Section 15.1 of Chapter 15, Material Assets.

This option includes placement of turbine blades on a blade adaptor vehicle as they are being transported from Ringaskiddy Port to the Proposed Development site. This strategy would not require any facilitation or upgrade works along the turbine delivery route. Another option which is being considered is to utilise a section of the old N22 approximately 4km from the existing entrance to the Proposed Development, to switch the blade over from the blade trailer to a blade adapter in order to transport the blade from the site entrance to their intended set-down area within the site. While there are no enabling works being applied for as part of this strategy, any potential impacts associated with this strategy will be assessed within this EIAR. In order to utilise this method, existing soil berms, fences, gates and some vegetation will need to be removed. It may also be the case that the turbine transport vehicles may reverse back into this section of the old N22 from the Killarney side. In this case, it will also be necessary to remove some soil berms and place some hardcore surfacing on the verge of the new road section. The removal of these elements is assessed within Chapters 5-15 of this EIAR as appropriate.

If the strategy of swapping the blade in the set down area off the N22 is to be utilised, it will be subject to a separate future planning application.

Upgrade works that will be needed in order to facilitate the operation of the set-down area include the following:

- Removal of sheep-wire fencing and 1 no. set of double gates
- Removal of soil and vegetation from the surface of the road;
- Laying of stone on the surface of the road, and
- Removal of soil berms.

It is intended to reinstate these berms, fences and gates once all turbine components have been delivered to site. While these works are being assessed as appropriate within the EIAR, they are not being applied for under the currently Planning Application

Decommissioning

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 35 years. Following the end of the operational life of the wind farm, the wind turbines may be retained and the operational life extended or replaced with a new set of turbines, subject to planning permission being obtained. In the event that neither of the above options are implemented, the Proposed Development will be decommissioned fully as agreed with the Planning Authority. The existing onsite 110kV Coomagearlahy substation will remain in place as it will be under the ownership of the ESB and will continue to form a permanent part of the national electricity grid.

Upon decommissioning of the Proposed Development, the wind turbines would be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and will be 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 environment nuisances such as noise, dust and/or vibration. Site roadways will be left in situ, for future forestry operations and for local landowners to access their lands. Underground cables will be removed and the ducting left in place.

A Decommissioning Plan has been prepared and submitted as part of the planning application for the Proposed Development, which will be agreed with the local authority prior to any decommissioning (Appendix F). The plan provides details of the methodologies that will be adopted, throughout decommissioning, the environmental controls that will be implemented, the Emergency Response Procedure to be adopted, methods for reviewing compliance and an indicative programme of decommissioning works.

The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time.

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 approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to 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".*

Please refer to Appendix F of this document for further information on decommissioning proposals for the Proposed Development.

2.1.5 Ecology Survey Results

Habitat/Botanical Survey Results

The site contains habitats of lower importance (lower value) such as the network of existing gravel roads and areas of existing turbine hardstands (BL3). Coniferous plantation (WD4) areas, with Sitka spruce (*Picea sitchensis*) and Lodgepole pine (*Pinus contorta*) the main species planted, are located along the main wind farm entrance road and within the wind farm area. There are areas of Scrub (WS1) habitat that are best developed close to the existing wind farm entrance gate at Cloonkeen. The east section of the study area comprising mainly species-poor wet grassland (GS4) dominated by soft rush (*Juncus effusus*).

There are also areas of habitat within the study site marked as being of County level importance as they have links with Annex I habitats. Extensive areas of Wet heath (HH3) dominated by purple moor-grass (*Molinia caerulea*) typically occurring in intimate mosaic with upland blanket bog (PB2), outcropping sandstone bedrock (ER1) and dry siliceous heath (HH1), particularly in the west section of the study site. There are a number of narrow, 1st order streams occurring throughout the site, which have been classified as Eroding/upland rivers (FW1).

No invasive species listed on the Third Schedule of the 2011 European Communities (Birds and Natural Habitats) Regulations (*i.e*. species of which it is an offense to disperse, spread or otherwise cause to grow in any place) were recorded within the Proposed Development site boundary. The invasive species piri-piri bur (*Acaena* sp.), which is not listed on the Third Schedule, grows frequently in road margins and is probably still spreading in the area due to the sheep grazing.

Mammal Survey Results

The field surveys recorded a good diversity of bat species in the area, including occasional registrations of Lesser Horseshoe Bat. Lesser Horseshoe Bat is listed on Annex II and Annex IV and is a qualifying interest species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, and Kilgarvan Ice house SAC. According to the data provided by Bat Conservation Ireland, the closest of the historic Lesser Horseshoe Bat roosts to the repowering turbines is 2.7km. A total of 31 no. Lesser Horseshoe Bat registrations were recorded as part of the Passive Detector Survey 2018-2019 and over the two years of multi-season 2021-2022, 19 no. of which were recorded across five passives deployed during the Autumn season 2022 (See Appendix C). The fatality monitoring at the site did not record any fatalities of Lesser Horseshoe Bat at the existing wind farm over the course of 14-months of intensive dog-based carcass searches.

The banks of the small watercourses on site were walked on several of the site visits to record any evidence of the presence of Otter (*Lutra lutra*). No spraints, resting places or feeding signs were recorded on-site. An adult Otter was recorded at Morley's Bridge on the Roughty River (ITM 504707 575315) during a breeding bird hinterland survey on 21st April 2022. Otter is listed on Annex II and Annex IV of the EU Habitats Directive, and is a qualifying interest of the Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC.

Bird Survey Results

A number of bird species including those listed on Annex I of the Birds Directive and listed as qualifying interest species of Killarney National Parks SPA and Mullaghanish to Musheramore Mountains SPA were

recorded as part of the detailed bird surveys completed at the Proposed Development site between 2018 and 2022. This included species such as Hen Harrier (*Circus cyaneus*) which is an SCI species of Mullaghanish to Musheramore Mountains SPA, Peregrine Falcon (*Falco peregrinus*), White-tailed Eagle (*Haliaeetus albicilla*), Golden Plover (*Pluvialis apricaria*), and Merlin (*Falco columbarius*), which is an SCI species of Killarney National Park SPA. No flightlines of Greenland White-fronted Goose (*Anser albifrons flavirostris*), an SCI species of Killarney National Park SPA, were recorded within the EIAR Site Boundary during the VP surveys and there is no evidence that the site is located on a regular commuting route or migration route for this species.

Hen Harrier (*Circus cyaneus*) is listed under Annex I of the Birds Directive and is a qualifying interest of Mullaghanish to Musheramore Mountains SPA. There was one sighting of a male Hen Harrier, during VP surveys completed during the breeding seasons, on 26th August 2019. The observation was of a foraging male bird within the site below 25m above ground level. The timing of the observation would be in the post-breeding period when Hen Harriers may be dispersing away from breeding grounds. There were three sightings of Hen Harrier recorded during VP surveys completed during the winter seasons, on the 16th of December 2022. All were of single male birds within the site, two of these sightings occurring on the morning of 16th December 2022 and almost certainly involving the same individual. None of these Hen Harrier flightlines were of birds flying at Rotor Swept Height (RSH; 36.5-200m). The NBDC database holds historical records for this species within W07, W17, W18, the 10km grid squares overlapping the Proposed Development site. This species is Amber-Listed according to the Birds of Conservation Concern in Ireland (BoCCI) report (Gilbert *et al.,* 2021).

Merlin (*Falco columbarius*) is listed under Annex I of the Birds Directive and is a qualifying interest of Killarney National Park SPA. During the 2018/2019 winter season VP survey period, a single flightline for Merlin was recorded within the windfarm study area. During the 2019/2020 winter season VP survey period, Merlin was only recorded off-site, with two flightlines recorded in total. There were a number of brief sightings of a Merlin, totalling only 54 second within the wind farm study area during the 2021/2022 winter season VP survey period, totalling only 54 second within the wind farm study area, with 21 seconds at RSH. The NBDC database holds historical records for this species within W07 and W18, the 10km grid squares overlapping the Proposed Development site, and the 2km grid square W18F. This species is Amber-Listed according to the Birds of Conservation Concern in Ireland (BoCCI) report (Gilbert *et al.,* 2021).

<u>Other Taxa Survey Results</u>

Kerry Slug (*Geomalacus maculosus*) is listed on Annexes II and IV of the EU Habitat's Directive and is protected under the Wildlife Acts. This species was found to be common and widespread at the site, where they were recorded on almost every site visit, and was observed widely from areas of exposed siliceous rock on initial site visits in 2018. This species was regularly recorded on the rocky roadside verges within the existing wind farm and around the hard standing areas of the existing turbines. It was not recorded within the conifer plantation areas of the site. It is also noted that this local population of Kerry Slug at the existing wind farm appears to be in robust state and that this has persisted at a site where a considerably larger amount of construction was required to facilitate the existing development. The site is considered of County importance for the species.

Marsh Fritillary (*Euphydryas aurinia*) is listed under Annex II of the EU Habitat's Directive. No adult Marsh Fritillaries were recorded on the wing locally during any of the field surveys carried out in this area. In

addition, no larval webs were recorded during checks of areas with the larval food plant in August 2019 and September 2021.

Aquatic Survey Results

A number of sites within the Roughty_SC_010, Flesk_SC_010 and Sullane_SC_010 sub-catchments assessed as part of the aquatic survey were confirmed to have Salmonid potential as spawning and/or nursery sites. Salmon was identified as an aquatic receptor of the Flesk River, the Sullane River (upper) and the Roughty River and the lower reaches of its tributaries (Thureehouma, Lettercannon, and Glanlee). Electrofishing surveys recorded juvenile salmon at 4 no. of the 10 no. survey locations in the Roughty sub-catchment, with a very high density recorded within the Roughty River, good numbers recorded at one location on the Lettercannon Tributary, moderate density at one location on the Glanlee Tributary and low density recorded at one location in the Thureehourna Tributary.

No Lamprey were recorded during aquatic surveys and Lamprey habitat is limited (or absent) from most of the watercourses affected by the Proposed Development owing to their flashy, eroding nature.

The site lies within three Freshwater Pearl Mussel (*Margaritifera margaritifera*) catchment areas; the Laune, Lee-Sullane and the Roughty. Very few numbers of Freshwater Pearl Mussel were recorded during the dedicated aquatic surveys. Many areas of the site are unsuitable for Freshwater Pearl Mussel and no species were recorded on the Flesk river or the Sullane river. Freshwater Pearl Mussel require excellent water quality to reproduce and are sensitive to silt and sediment.

2.2 Description of the Natura 2000 Sites

The Proposed Development site is not located within any Natura 2000 sites, the nearest site being Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC located within 0.1km of the entrance from the public road at Cloonkeen, 1.6km from the nearest proposed repowering turbine location. The nearest Natura 2000 sites are listed below in Table 2-2. There are 9 SACs and 2 SPAs within 15km of the EIAR Site Boundary (See Figure 2-1).

Note that for illustrative purposes, sites within a 15km distance of the development site are shown in Figure 2-1. As previously stated in Section 1.1, it is necessary to consider the likely Zone of Influence (or Impact) for a Proposed Development and not just consider sites out to a nominal distance of 15km. Where consideration of the S-P-R model indicates that there likely significant effects which in the absence of mitigation will occur in relation to more distant sites, these are considered as part of the NIS process.

There are three additional Natura 2000 sites located at a distance outside of the Proposed Development site that are considered as part of the NIS process. Castlemaine Harbour SAC is located 18.9km to the northwest, Castlemaine Harbour SPA is located 34.1km to the northwest, and Kenmare River SAC is located 16.4km to the southwest.

Table 2-3 below provides the conservation summary of the Natura 2000 sites, including distance from the Proposed Development site.

Table 2-2 Designated sites located within 15km of the site and their distance from the site boundary.

Site Name	Site Code	Minimum Distance to EIAR Site Boundary (km)	Minimum distance to Repowering Turbine location (km)
Natura 2000 sites			
Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC	000365	0.1	1.6
Old domestic building, Curraglass Wood SAC	002041	2.8	3.1
Kilgarvan Ice House SAC	000364	3.6	4.4
Blackwater River SAC	002170	7.0	12.2
St. Gobnet's Wood SAC	000106	7.8	9.1
Mullaghanish to Musheramore Mts. SPA	004162	7.8	10.0
Glanlough Woods SAC	002315	8.0	8.9
Killarney National Park SPA	004038	9.2	9.5
Mullaghanish Bog SAC	001890	9.3	12.0
Derryclogher Bog SAC	001873	10.6	11.5
Sheheree Bog SAC	000382	13.5	13.8
Kenmare River SAC	002158	16.4	17.1
Castlemaine Harbour SAC	000343	18.9	20.9
Castlemaine Harbour SPA	004029	34.1	34.4

Table 2-3 Relevant Natura 2000 Sites Summary

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC 000365	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] • Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] • Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030] • Alpine and Boreal heaths [4060] • *Juniperus communis* formations on heaths or calcareous grasslands [5130] • Calaminarian grasslands of the *Violetalia calaminariae* [6130]	0.01km land to EIAR Site Boundary 1.6km Minimum distance to Repowering Turbine location (km)

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
	• Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] • Blanket bogs (* if active bog) [7130] • Depressions on peat substrates of the *Rhynchosporion* [7150] • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] • *Taxus baccata* woods of the British Isles [91J0] • *Geomalacus maculosus* (Kerry Slug) [1024] • *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] • *Euphydryas aurinia* (Marsh Fritillary) [1065] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Lampetra fluviatilis* (River Lamprey) [1099] • *Salmo salar* (Salmon) [1106] • *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] • *Lutra lutra* (Otter) [1355] • *Trichomanes speciosum* (Killarney Fern) [1421] • *Najas flexilis* (Slender Naiad) [1833] • *Alosa fallax killarnensis* (Killarney Shad) [5046] (After NPWS 2017a)	
Old domestic building, Curraglass Wood SAC 002041	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] (After NPWS site synopsis 2018b)	2.8km over-land to EIAR Site Boundary 3.1km Minimum distance to Repowering Turbine location (km)
Kilgarvan Ice House SAC 000364	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] (After NPWS site synopsis 2018c)	3.6km over-land to EIAR Site Boundary 4.4km Minimum distance to Repowering Turbine location (km)

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
Blackwater River SAC 002170	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Perennial vegetation of stony banks [1220] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] • Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] • *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] • *Austropotamobius pallipes* (White-clawed Crayfish) [1092] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Lampetra fluviatilis* (River Lamprey) [1099] • *Alosa fallax fallax* (Twaite Shad) [1103] • *Salmo salar* (Salmon) [1106] • *Lutra lutra* (Otter) [1355] • *Trichomanes speciosum* (Killarney Fern) [1421] (After NPWS site synopsis 2012)	7.0km over-land to EIAR Site Boundary 12.2km Minimum distance to Repowering Turbine location (km)
St. Gobnet's Wood SAC 000106	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] (After NPWS site synopsis 2021)	7.8km over-land to EIAR Site Boundary 9.1km Minimum distance to Repowering Turbine location (km)
Mullaghanish to Musheramore Mts. SPA 004162	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following Special Conservation Interests; • Hen Harrier (*Circus cyaneus*) [A082] (After NPWS site synopsis 2022a)	7.8km over-land to EIAR Site Boundary 10.0km Minimum distance to Repowering

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
		Turbine location (km)
Glanlough Woods SAC 002315	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] (After NPWS site synopsis 2018d)	8.0km over-land to EIAR Site Boundary 8.9km Minimum distance to Repowering Turbine location (km)
Killarney National Park SPA 004038	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following Special Conservation Interests; • Merlin (*Falco columbarius*) [A098] • Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] (After NPWS site synopsis 2022b)	9.2km over-land to EIAR Site Boundary 9.5km Minimum distance to Repowering Turbine location (km)
Mullaghanish Bog SAC 001890	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Blanket bogs (* if active bog) [7130] (After NPWS site synopsis 2017b)	9.3km over-land to EIAR Site Boundary 12.0km Minimum distance to Repowering Turbine location (km)
Derryclogher Bog SAC 001873	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Blanket bogs (* if active bog) [7130] (After NPWS site synopsis 2017c)	10.6km over-land to EIAR Site Boundary 11.5km Minimum distance to Repowering Turbine location (km)

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
Sheheree Bog SAC 000382	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Active raised bogs [7110] • Degraded raised bogs still capable of natural regeneration [7120] (After NPWS site synopsis 2015)	13.5km over-land to EIAR Site Boundary 13.8km Minimum distance to Repowering Turbine location (km)
Kenmare River SAC 002158	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Large shallow inlets and bays [1160] • Reefs [1170] • Perennial vegetation of stony banks [1220] • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] • Mediterranean salt meadows (Juncetalia maritimi) [1410] • Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] • European dry heaths [4030] • Juniperus communis formations on heaths or calcareous grasslands [5130] • Calaminarian grasslands of the Violetalia calaminariae [6130] • Submerged or partially submerged sea caves [8330] • *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014] • *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] • *Lutra lutra* (Otter) [1355] • *Phoca vitulina* (Harbour Seal) [1365] (After NPWS site synopsis 2013)	16.4km over-land to EIAR Site Boundary 17.1 Minimum distance to Repowering Turbine location (km)
Castlemaine Harbour SAC 000343	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210] • Perennial vegetation of stony banks [1220] • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	18.9km over-land to EIAR Site Boundary 20.9km Minimum distance to Repowering

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
	• Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] • Mediterranean salt meadows (Juncetalia maritimi) [1410] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] • Dunes with Salix repens ssp. argentea (Salicion arenariae) [2170] • Humid dune slacks [2190] • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra fluviatilis* (River Lamprey) [1099] • *Salmo salar* (Salmon) [1106] • *Lutra lutra* (Otter) [1355] • *Petalophyllum ralfsii* (Petalwort) [1395] (After NPWS site synopsis 2011)	Turbine location (km)
Castlemaine Harbour SPA 004029	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following Special Conservation Interests; • Red-throated Diver (*Gavia stellata*) [A001] • Cormorant (*Phalacrocorax carbo*) [A017] • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Wigeon (*Anas penelope*) [A050] • Mallard (*Anas platyrhynchos*) [A053] • Pintail (*Anas acuta*) [A054] • Scaup (*Aythya marila*) [A062] • Common Scoter (*Melanitta nigra*) [A065] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Sanderling (*Calidris alba*) [A144] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Redshank (*Tringa totanus*) [A162] • Greenshank (*Tringa nebularia*) [A164] • Turnstone (*Arenaria interpres*) [A169] • Chough (*Pyrrhocorax pyrrhocorax*) [A346] • Wetland and Waterbirds [A999] (After NPWS site synopsis 2011)	34.1km over-land to EIAR Site Boundary 34.4km Minimum distance to Repowering Turbine location (km)

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC is located at a minimum distance of 0.1km from the EIAR Site Boundary and 1.6km from the nearest repowering turbine location. There are a number of qualifying interest species (e.g., Salmon and Lamprey) and habitats within the SAC which are sensitive to water quality deterioration. The SAC is also designated for mobile species such as Otter (*Lutra lutra*) and Lesser Horseshoe Bat (*Rhinolophus hipposideros*) which are also listed as Annex IV species, requiring protection both inside and outside of the SAC. See Table 2-3 for a complete list of the qualifying interests of this SAC. As described in Section 2.1.1, one small tributary near the Cloonkeen sub-station and three small headwater streams of the Owgarriv Tributary of the Flesk River are crossed by the Existing Kilgarvan Wind Farm access road. The Owgarriv watercourse is a tributary of the Flesk River, located to the north less than *c*. 3.5km from the existing Cloonkeen crossing, which is part of the Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC. Given the proximity of this designated site to the Proposed Development boundary and the hydrological connection via the existing watercourse crossings flowing into the Flesk River, the potential for impacts upon Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC will be considered further in this NIS.

Killarney National Park SPA is at a minimum distance of 9.2km from the EIAR Site Boundary and 9.5km from the nearest repowering turbine location. This SPA is designated for Merlin (*Falco columbarius*) and Greenland White-fronted Goose (*Anser albifrons flavirostris*). As outlined above, the watercourses crossed by the existing access road flow into the Flesk River. The Flesk River flows west and northwest before finally discharging into Lough Leane, which makes up part of the Killarney National Park SPA, a further 23.4km downstream. While there is a hydrological connection (the Flesk) linking the EIAR Site Boundary to the SPA, it is not predicted that there is any likelihood of significant effects on the water quality within this downstream European site due to distance and dilution/settlement effect and will therefore not be considered further in this NIS. Additionally, the distance from Killarney Park SPA (>9km) is greater than the published foraging ranges for the associated SCI species, Merlin and Greater White-fronted Goose (SNH, 2016) and well beyond the core foraging range at which potential connectivity with the SPA network is considered relevant. It has been concluded that potential effects on Killarney Park SPA need not be considered further as part of the NIS.

Along with Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, there are three additional SACs within 15km of the EIAR Site Boundary where Lesser Horseshoe Bat is a qualifying interest species. Old domestic building, Curraglass Wood SAC is located at a minimum distance of 2.8km from the EIAR Site Boundary and 3.1km from the nearest repowering turbine location. Kilgarvan Ice House SAC is located at a minimum distance of 3.6km from the EIAR Site Boundary and 4.4km from the nearest repowering turbine location. Glanlough Woods SAC at a minimum distance of 8km from the EIAR Site Boundary and 8.9km from the nearest repowering turbine location. The Conservation Objectives for all three SACs share the same supporting document which references that Lesser Horseshoe Bats typically forage within 2.5km of their roosts within woodland/scrub and that this area has a significant influence on the resilience of a colony (NPWS, 2018a). This 2.5km area around each roost identified Conservation Objectives document for each SAC is taken as the core foraging range for this species. Previous studies have indicated a maximum foraging range from roost sites of *c*. 6 km for Lesser Horseshoe Bat (BCIreland, 2012). The EIAR Site Boundary is outside the core foraging range of the Lesser Horseshoe Bat roosts within all three SACs but is within the *c.* 6km maximum foraging range for at least one of the known roost sites within Kilgarvan Ice House SAC, and the known roost site within Old domestic building, Curraglass Wood SAC. On a precautionary basis, the potential for impacts on the conservation objectives for both of these Natura 2000 sites will be taken forward for further consideration as part of the NIS. Given the intervening distance between the Proposed

Development site and Glanlough Woods SAC, no significant impacts to the Conservation Objectives of this designated site are expected and this SAC will not be considered further as part of this NIS.

Mullaghanish to Musheramore Mountains SPA is designated for the conservation of Hen Harrier and is located *c*. 7.8km from EIAR Site Boundary and *c*. 10km from the nearest of the proposed repowering turbines. This is well outside of the core foraging range of Hen Harrier (*e.g.* SNH 2016) but given that foraging distances of over 10km have been recorded on occasion in Ireland (*e.g.* Irwin *et al*. 2012) the potential effects of the Proposed Development on Hen Harriers associated with the SPA are considered further as part of the NIS.

The site of the Proposed Development is located at a minimum distance of 7km from the Blackwater River SAC and 12.2km from the nearest of the proposed repowering turbines. There is no hydrological connection linking the Proposed Development to this SAC. Given the distance from the Proposed Development and lack of hydrological pathway there is considered to be no likelihood of significant effects on Blackwater River SAC.

There are a number of SACs within 15km of the Proposed Development that are designated for terrestrial habitats. These are St. Gobnet's Wood SAC, which is designated for oak woods, and Mullaghanish Bog SAC, Derryclogher Bog SAC and Sheheree Bog SAC which are all designated for bog habitat. None of these sites share a hydrological connection with the Proposed Development site. Given the distance from the Proposed Development and lack of hydrological pathway there is also no likelihood of significant effects on St. Gobnet's Wood SAC, Mullaghanish Bog SAC, Derryclogher Bog SAC and Sheheree Bog SAC arising in relation to the Proposed Development.

Natura 2000 sites located outside 15km of the Proposed Development where a potential source-pathway-receptor (SPR) link exists were also considered. As outlined in Section 2.1.1, the Proposed Development is drained by three sub-catchments, one of which is the Roughty sub-catchment which ultimately discharges to Kenmare Bay and the associated Kenmare River SAC. Kenmare River SAC is located 16.4km overland and 17.1km from the nearest turbine repowering location. The SAC is hydrologically connected (at a *c*. 21km distance via watercourses) to the Proposed Development site via Glanlee, Lettercannon and Thureehouma streams, all tributaries of the Roughty River that drain the Proposed Development site. As outlined in Table 2-3, the SAC is primarily designated for a mix of marine and terrestrial habitats and includes a number of highly mobile species that rely on the aquatic environment including Otter. Given the hydrological connection, albeit at a considerable distance, the potential for impacts upon Kenmare River SAC will be considered further in this NIS.

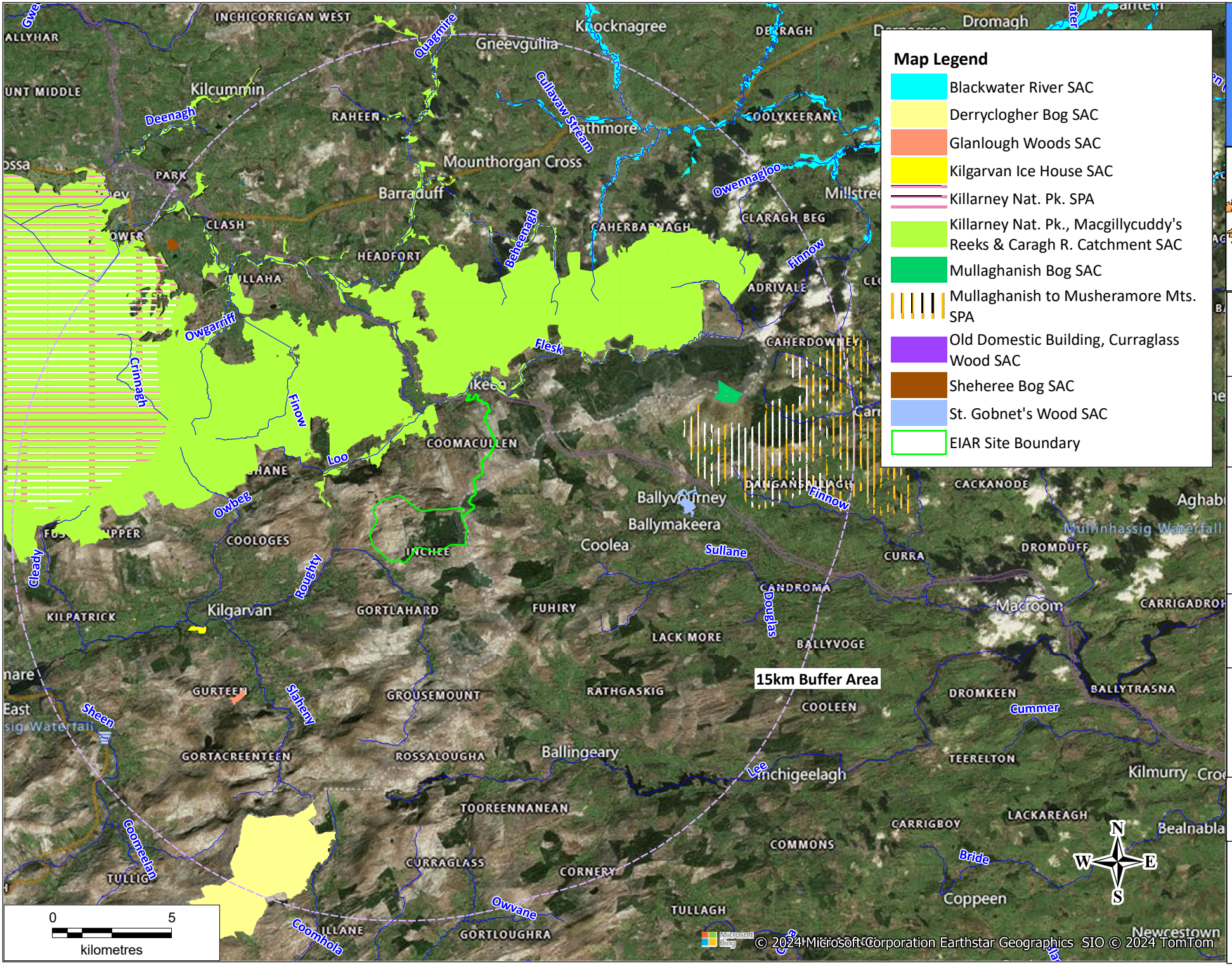
As previously stated the Proposed Development site drains to the Flesk via the one small tributary near the Cloonkeen sub-station and three small headwater streams of the Owgarriv Tributary of the Flesk River. The Flesk River ultimately flows into Lough Leane over 27km from the Proposed Development site. Waters from Lough Leane flow into Castlemaine Harbour and associated SAC (*c.* 34.5km via watercourses) and SPA (*c.* 53km via watercourses) a great distance from the Proposed Development site. The SAC is designated for a variety of marine, estuarine and terrestrial habitats and a number of aquatic species such as Salmon, Otter and Lamprey species. Give the distance of the Proposed Development site from these Natura 2000 sites, and the nature of the intervening environment (e.g., Lough Leane), there is considered to be no likelihood of significant effects to these Natura 2000 sites.

As outlined in Section 2.1.1 the Proposed Development site is also connected to the Sullane sub-catchment. The Sullane joins the River Lee at Carrigadrohid Reservoir before discharging to Cork Harbour SAC >65km

downstream. Given the distance involved there is no likelihood of significant hydrologically mediated effects on this SAC.

In summary, the following Natura 2000 sites require further consideration as part of this screening assessment:

- Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC
- Old Domestic Building Curraglass Wood SAC
- Kilgarvan Ice House SAC
- Mullaghanish to Musheramore Mountains SPA
- Kenmare River SAC



Client Name:
Orsted

Project Title:
Kilgarvan Wind Farm Repowering

Figure Name:
Natura 2000 sites within 15km of EIAR Study Area

Date:
29/04/2024

Rev: B

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3 Stage 1: Assessment Criteria

3.1 Elements of the Project Likely to Impact on the Natura 2000 Sites

Consideration of the following potential impacts are assessed here in respect of the Natura 2000 sites identified as requiring further consideration in this screening assessment;

- Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC
- Old Domestic Building Curraglass Wood SAC
- Kilgarvan Ice House SAC
- Mullaghanish to Musheramore Mountains SPA
- Kenmare River SAC,

3.1.1 Direct Habitat Loss

The development site is not part of any designated site, nor does it require any resources from them; thereby ruling out any direct habitat loss at the conservation sites in question. However, the existing access road lies within close proximity to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC (0.1km) which will be considered further in this report.

3.1.2 Indirect Habitat Loss or Deterioration

Construction Phase

During the construction phase, which includes the removal of the existing 28 no. turbines within the Existing Kilgarvan Wind Farm, habitat loss or deterioration of designated sites within the surrounding area can occur from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination. This requires connectivity between the site and the designated site in question through watercourses and/or drainage ditches. Construction phase elements associated with earthworks, the upgrading access roads (*i.e.*, road widening works, culvert extensions, etc.) and forestry felling activities could result in water quality deterioration in the receiving waters within the Proposed Development s site and further downstream. In particular, these elements can result in the release of considerable volumes of sediment to receiving waters, resulting in increased suspended solid concentrations within the aquatic environment. This can have a detrimental effect on a variety of aquatic species by reducing light in the water column, the release of organic sediment resulting in nutrient enrichment and a reduction in oxygen availability and the smothering of aquatic plants and invertebrates. The release of toxic contaminants such as hydrocarbons and concrete to the aquatic environment, could also negatively impact upon water quality.

As outlined in Section 2.2, there is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River. This Natura 2000 site is designated for a wide range of habitats, as listed in Table 2-3 above, including a number of aquatic habitats. The SAC is located 0.1km from the existing access road to and *c.* 1.6km from the closest proposed repowering turbine location. The construction phase of the Proposed Development could result in hydrologically-mediated effects on the aquatic habitats within Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC. As outlined in Table 2-3, The SAC is designated for Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110], Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-

Nanojuncetea [3130], Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] and Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]. Individually, the construction phase elements of the Proposed Development are not considered to have the potential to result in significant negative effects within the Flesk. Combined, there is potential for these elements to cause the generation of suspended solids wash out to drains and watercourses, resulting in moderate negative cumulative effects locally on aquatic receptors in the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development to further minimize negative effects to these QI habitats.

There is a hydrological connection linking the Proposed Development site to Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements of the Proposed Development has the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment through the generation of suspended solids wash out to drains and watercourses. Kenmare River SAC is located 16.4km from the existing access road to and 17.1km from the closest proposed repowering turbine location. As outlined in Section 2.2, this Natura 2000 site is designated for marine habitats within Kenmare Bay as well as a number of terrestrial and coastal habitats (See Table 2-3). Any potentially adverse effects to water quality arising from the construction phase elements of the Proposed Development will be diminished by the location of the Proposed Development site at a considerable distance upstream of this SAC (*c.* 21 km), coupled with the dilution factor occurring within the tidally influenced Kenmare Bay. However, on a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development to further minimize negative effects on the QI habitats of this SAC.

Salmon, a QI of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, was identified as an aquatic receptor of the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development to further minimize negative effects to this species.

Sea Lamprey, Brook Lamprey and River Lamprey are QI species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC. Lamprey habitat is limited or absent from most of the watercourses affected by the Proposed Development owing to their flashy eroding nature. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development to further minimize negative effects to these species.

Freshwater Pearl Mussel is a QI species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC. The conservation of objects for this QI species applies to the Caragh, Currane and Gearhameen freshwater pearl mussel populations which are distributed through Owenroe, Caragh, Glashawee, Caraghbeg and Meelagh Rivers, and Loughs Cloon and Acoose. As part of the aquatic surveys conducted for Freshwater Pearl Mussel within the Flesk sub-catchment, it was assessed that the instream habitat for this species was at least 90% unsuitable owing to long sections of sculpted bedrock with bare chutes, cascades, rapids and vertical drops. There were deemed to be very limited patches of stable cobble/gravel at channel margins in the lower survey reaches which could have supported mussels historically, but the channel appeared to be deepened by historical drainage and was too compacted and/or scoured for the species. No Freshwater Pearl Mussels were observed in the surveyed reach which spanned

1.3km of the River Flesk downstream of Poulgorm Bridge (N22 crossing). This reach encompasses input from the Owgarriv tributary (which drains the Proposed Development site access road). No significant effects on this QI species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC are expected as a result of the Proposed Development.

Otter is a QI species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC and Kenmare River SAC. While Otter was not recorded on-site during the surveys for the Proposed Development, they are widespread throughout the area and could also be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality. Due to the potential for impacts on Otter, adequate environmental controls (including drainage design) and mitigation associated with water quality will be required.

Narrow-mouthed Whorl Snail (*Vertigo angustior*), a QI species of Kenmare River SAC, associated with a coastal site on the north side of Kenmare Bay that is comprised of Annex I dune systems. Given the distance of the Proposed Development site and the nature of the proposed works, there is no likelihood for significant impacts on this species.

As outlined in Section 2.1.4, the site is considered to be of County importance for a local population of Kerry Slug. Kerry Slug is a QI species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC. The distribution of this species within the EIAR Site Boundary is restricted to areas with exposed rock and boulders, along the edges of the existing internal road network, and around the hard standing areas of the existing turbines. The construction phase of the Proposed Development will require the upgrade of 17.9km of existing internal road network. Furthermore, the majority of the existing turbine hardstanding areas, associated with the 28 no. turbines to be removed, will be covered over and left to reseed. During the construction phase, it is proposed to upgrade 4 existing turbine hardstandings for use, utilise 1 no. existing hardstanding for the temporary site compounds, as well as construct 7 no. new turbine hardstandings. Additionally, 17.9km of the existing road network will be upgraded which will involve excavation works along the edges of the existing network. These artificial habitats *i.e.,* the existing internal roads and turbine hard standings, are not considered optimal for this species, the construction phase of the Proposed Development will result in the habitat loss for Kerry Slug, albeit outside of the SAC. While such impacts would be temporary in duration and localised to the development footprint, the abundance of Kerry Slug (in particular) at the site increases the potential for significant effects on this local population during the construction phase.

The Proposed Development site is within 15km of Old Domestic Building Curraglass Wood SAC, and Kilgarvan Ice House SAC, both of which are designated for Lesser Horseshoe Bat, and Mullaghanish to Musheramore Mountains SPA which is designated for Hen Harrier. It is considered that the construction phase of the Proposed Development will not result significant effects on these Natura 2000 sites, arising from habitat loss or degradation.

As outlined in Section 2.1.3, compensatory replanting in order to replace forestry permanently felled will be carried out and can occur anywhere in the State subject to licence. The Forest Service is required to apply an Appropriate Assessment procedure to applications for licensing for various forestry activities in order to evaluate the forestry activity within the context of any potentially relevant European Site, meaning that the replacement forestry planting lands will be subject to the Appropriate Assessment process. Therefore, there is no likelihood that the replacement planting will result in significant negative impacts on the Natura 2000 sites within the zone of potential impact influence of the Proposed Development.

High impact invasive plant species Japanese Knotweed and Rhododendron have been recorded off-site but in the wider local area. Both species represent a risk that machinery associated with tree felling and construction could act as a vector for introducing or dispersing non-native invasive species within the Proposed Development working areas (including intersecting watercourses) and to adjacent lands/ watercourses.

Operational Phase

As outlined in Section 2.1.3, the Proposed Development is expected to have a lifespan of approximately 35 years. Planning permission is being sought for a 35-year operation period commencing from the date of full operational commissioning of the wind farm. Each turbine will be subject to a routine maintenance programme involving a number of checks and changing of consumables, including oil changes. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. In relation to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC and Kenmare River SAC, downstream connectivity and the contamination of in-situ watercourses may contribute to negative effects on water quality immediately downstream. However, operational wind farms are not normally considered to have the potential to significantly impact on the aquatic environment. One of the main risk to watercourses is where contaminants such as oils and lubricants are used on the site such as during maintenance works, or leaks occur from the turbines, or where contaminants are disposed of inappropriately. This creates a risk of water contamination and subsequent water quality degradation downstream. However, the likelihood of this occurring is very low, and the potential significance of this impact can be mitigated through effective mitigation and appropriate management. Spills of any oil or fuels from site vehicles onto access roads may leach to adjacent watercourses. Operational wind farms are not normally considered to have the potential to significantly impact on the aquatic environment and it is considered that there is unlikely to be a significant impact considering the low volumes of vehicular traffic involved in typical wind farm operations and the paucity of watercourses or surface water pathways within the proposed wind farm site and adjacent to access roads.

The operational phase of the Proposed Development will have a reduction in turbine hardstandings overall, as it is proposed to upgrade 4 existing hardstandings for use as turbine hardstands as well as construct 7 no. new turbine hardstandings during the construction phase. The remaining hardstandings will have been covered with local topsoil and allowed to re-vegetate naturally during the construction phase. Road surfaces, including both the upgraded existing roads and the proposed new roads, will bed in and exposed roadside swales will revegetate within 1 or 2 summer seasons. This will greatly reduce the risk of sediment wash out, but there may be intermittent low levels of sediment contaminated run-off from gravel road surfaces to drains and water courses over the 35-year operational period. It would be expected that any measurable impact on aquatic receptors would be very localised to the very upper reaches of the headwater streams, evident as a slight disturbance in macroinvertebrate communities compared to unaffected reaches. Heavy rainfall events may, over time, cause erosion of gravel road surfaces, but again, this would slightly increase the potential for localised impacts on instream fauna. Therefore, there is considered to be no likelihood of significant impacts on the downstream Natura 2000 sites during the operational phase.

As part of the routine and unscheduled maintenance programmes required during the operational phase of the Proposed Development, there will be an increase in the number and activity of machinery and personnel along the internal roads and on the turbine hardstands. Any habitat loss that occurs as a result of the works scheduled during these programmes will be highly localised and is not expected to result in any significant

impacts to the local population of Kerry Slug within the Proposed Development site. Furthermore, while there will be a reduction in turbine hardstands as a result of the Proposed Development, the construction of the c. 1.5km of additional internal road will result in the creation of some suitable habitat for the species *e.g.* along the margins of roads.

As is the case with the construction phase, it is considered that the operational phase of the Proposed Development will not result in habitat loss or degradation in a way that has a significant impact on the Conservation objectives of the QI/SCI species listed for Old Domestic Building Curraglass Wood SAC, Kilgarvan Ice House SAC, and Mullaghanish to Musheramore Mountains SPA.

Decommissioning Phase

No other potential impacts other than those already discussed above for the construction and operational phases are likely to occur during the decommissioning phase of the Proposed Development. As part of the decommissioning phase, cranes will disassemble each turbine section which is then removed from the site. The upper sections of the foundations projecting above ground will be removed, and the remainder of the foundations and hardstands will be covered with soil/peat previously stripped and used for landscaping purposes during the construction stage and left to revegetate naturally. Underground cables will be cut back at the turbine termination and either be recycled or left buried in situ (de-energised). Site materials will be recycled where practicable, or disposed of in accordance with current waste legislation and best practice guidelines. Decommissioning activities are assumed to be similar to construction activities, having similar type risks and sensitive receptors associated with them. However, they are considerably less intrusive. No additional measures other than those outlined for the construction or operational phase will be required.

3.1.3 Disturbance / Displacement of Fauna

Construction Phase

Activities associated with the construction of the Proposed Development could disturb and/or displace faunal species associated with designated conservation sites through noise and/or visual cues. Direct disturbance/displacement effects within the relevant Natura 2000 sites in relation to noise and/or visual cues on the qualifying interest (QI) species/Special Conservation Interest (SCI) species is not of relevance here given the distances (minimum 0.1km). However, ex-situ disturbance/displacement effects need to be considered in relation to highly mobile fauna associated with designated sites that can occur outside of the designated site itself, such as the Proposed Development site.

As outlined in Section 2.2, the Proposed Development site is located outside the core foraging range (2.5km) of the known Lesser Horseshoe Bat roosts within Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old Domestic Building Curraglass Wood SAC, and Kilgarvan Ice House SAC but is within the maximum foraging range (*c.* 6km) of several of these known roost sites. The detailed field assessments show that while Lesser Horseshoe Bats do occur within the existing wind farm on occasion, that they do so very infrequently. However, during the construction phase, there will be a localised and temporary increase in disturbance within the Proposed Development site due to the operation of machinery and plant such as cranes, resulting in a change in the size and location of above ground obstacles. While the works will be carried out during daylight hours when Lesser Horseshoe Bats are not active, there could be security lighting set up during the construction phase, particularly around the temporary site compounds. Therefore, without mitigation there is some likelihood of temporary disturbance and displacement effects of Lesser Horseshoe Bat during the construction phase. Lesser Horseshoe Bat is a QI species of Kenmare River SAC. Given that the

Proposed Development site is located at a considerable distance from the known roost sites within the SAC (namely the Dunkerron souterrain roost and Foley's cottage Killaha roost), no disturbance and displacement impacts to Lesser Horseshoe Bat within or in the vicinity of these roosting sites as a result of the Proposed Development is expected.

As outlined in Section 2.1.4, no signs of Otter activity were recorded within or in proximity to the EIAR Site Boundary. Otter is a QI species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC and Kenmare River SAC. Given the proximity of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC in particular, there is potential for Otter to occur here, utilising the watercourses within and in proximity to the Proposed Development site. However, it is likely that should Otter occur here, it will be on an occasional basis only as the streams within the site are not considered to be optimal habitat for this species where Otter occurrence significantly declines in watercourses less than 2m in width (Bailey and Rochford, 2006). The construction phase of the Proposed Development has the potential to cause disturbance to Otters occurring in the area through the movement of vehicles (noise) and site workers. Otter is primarily a nocturnal species and is therefore much more likely to be active during times when noise and construction activity levels at the development site are low. Otter will also more likely be associated with the riparian corridor of the greater order streams and rivers present further downstream into the Flesk sub-catchment where there is more optimal habitat available. Taking the above into consideration, no significant disturbance/displacement impacts on Otter are considered to be of concern in relation to the Proposed Development.

Harbour Seal (*Phoca Vitulina*) is a QI species of Kenmare River SAC. Given the considerable distance of the Proposed Development site from the known breeding, moulting and resting sites for this species within Kenmare Bay, there is considered to be no likelihood for any disturbance or displacement effects resulting in significant negative effects arising from the Proposed Development.

During the construction phase, there will be works (excavation, movement of machinery, vegetation clearance, *etc*.) associated with the construction of the proposed turbine hardstandings and internal road upgrades *i.e.,* where Kerry Slug was regularly recorded within the site. These works could lead to the disturbance of, or direct loss of Kerry Slug (i.e., the local population within the Proposed Development site), resulting in locally significant negative impacts on this species.

Hen Harrier, the SCI species of Mullaghanish to Musheramore Mountains SPA, was very infrequently recorded in the vicinity of the proposed repowering site. During the construction phase, the existing 28 no. turbines will be removed and replaced by 11 no. turbines. The activity will see a localised and temporary increase in the movement of plant and personnel and associated disturbance to habitats associated with vegetation clearance, digging of turbine foundations *etc*. There will be associated noise and visual disturbance and a change in the size and location of above ground obstacles. Without mitigation there is some likelihood of temporary disturbance and displacement effects of Hen Harrier during construction.

<u>Operational Phase</u>

While the operational phase of the Proposed Development will see an overall reduction in the number of turbines on site from 28 no. to 11 no., the operational phase could result in disturbance and/or displacement effects on the QI and SCI species for several Natura 2000 sites within the zone of influence of the Proposed Development.

Operational phase impacts on birds can be related to disturbance, displacement or collision impacts. Increased human presence (*e.g.,* post construction maintenance), turbine presence and turbine noise can result in the displacement of bird communities. Current studies have provided somewhat inconsistent and inconclusive results that have indicated that the scale of disturbance varies greatly between and within species, and that the impact is dependent on a range of issues including seasonal and diurnal bird use, location, availability of alternative habitats, bird life cycle, flock size, habituation, and turbine and wind farm specifications (Langston & Pullan 2003 & 2004, Drewitt & Langston 2006, Kingsley & Whittam 2005). As outlined in Section 2.1.4, there were four sightings of Hen Harrier, the SCI species listed for Mullaghanish to Musheramore Mountains SPA overall, all of single male birds. Three of these occurred in the winter months and there was a single sighting of an adult male in late summer (August 2019). None of these were associated with a time of year when male birds would be actively provisioning young and the observations appeared to be of birds passing through outside of the breeding season. Bird mortality or injury at wind farms can occur through collision with rotors, towers, nacelles, cables, power lines and meteorological masts (Drewitt & Langston, 2006, Kingsley & Whittam, 2005). While most wind farm collision studies indicate low levels of bird mortality per turbine, these levels could still be significant for some bird species populations such as those with a low annual productivity, slow maturity and in cases of very large wind farms with tens of turbines (Langston & Pullan 2003, Drewitt & Langston, 2006). Collisions with wind turbines are most likely to occur where birds fly regularly at turbine blade height and do not demonstrate an effective avoidance response. Hen Harriers typically fly below the height of wind turbine rotor blade sweep at heights of less than 25m (Smallwood & Thelander, 2004, Drewitt & Langston, 2006, Whitfield & Madders, 2006). This typically low flight height coupled with the observed avoidance of wind turbines shown by Hen Harriers, suggests that collision risk will be low for this species (Whitfield & Madders, 2006). None of the Hen Harrier sightings involved a bird flying at Rotor Swept Height (RSH; 36.5-200m). It is also noted that the EIAR Site Boundary is an existing operational wind farm and no Hen Harrier fatality was recorded during the fatality monitoring surveys. Furthermore, no breeding sites were recorded within the vicinity of the wind farm development study area during the 4 years of surveys and no displaying ('sky dancing') was observed on or adjacent to the Proposed Development site. The occurrence Hen Harrier recorded during the four years of surveys on the site was considered to be low overall. Furthermore, the evidence from the available literature and field studies at several other operational wind farms in Ireland (Gavin Fennessy pers obs.) indicates that the risk of significant fatalities of birds at the operational wind farm is extremely low. Finally, the Proposed Development will result in a reduction in the number of turbines present, 28 no. turbines will be removed and replaced by 11 no. turbines, further reducing disturbance and collision risk within the boundary of the site. While it is considered that there is no likelihood for significant impacts on the Conservation Objectives relating to Hen Harrier, on a precautionary basis, there is mitigation for birds, including Hen Harrier, as part of the operational phase of the Proposed Development.

The operation of the Proposed Development has the potential to result in disturbance to commuting and foraging bats. As mentioned with regard to the construction phase, Lesser Horseshoe Bat did not occur within or in proximity to the EIAR Site Boundary on a regular or frequent basis, and the site itself does not contain any significant habitat for this species. Furthermore, as mentioned with regard to Hen Harrier collision, there will be a reduction in the number of turbines operating within the site, from 28 to 11. The collision vulnerability of Lesser Horseshoe Bat on Wind Farms is considered to be 'Low'. This species collision risk categorisation is adapted from the collision risk scheme provided in SNH (2019) and is used in combination with relative abundance to indicate the potential vulnerability of bat populations. Relative abundance for Lesser Horseshoe was determined in accordance with a scheme for rarity of bat species provided in Wray *et*

al. (2010) in combination with best available population data provided in recent Article 17 reports (NPWS, 2019; www.npws.ie). The limitations in terms of Irish bat population data is acknowledged in the latter report. While activity levels of the above species varied between survey locations it is not possible to determine with any accuracy the different levels of collision risk presented by individual turbines. Changes made to landscape locally as a result of the Proposed Development may significantly alter flight patterns and foraging opportunities (positively and negatively) post-construction compared with pre-construction. While it is considered that there is no likelihood for significant impacts on the Conservation Objectives relating to this species, on a precautionary basis, there is mitigation for bats, including Lesser Horseshoe Bat, as part of the operational phase of the Proposed Development.

There is very limited potential for operational phase impacts on Otter and Kerry Slug. The maintenance requirement of wind farms is relatively low and there will be no permanent staff presence. No Otter breeding or resting places are known to occur within or in proximity to the EIAR Site Boundary and as such no loss of breeding sites is expected and no significant disturbance of breeding individuals is expected.

3.1.4 Potential Significant Effects: Conclusion

The Proposed Development site is not part of the Natura 2000 sites under consideration here and does not require any resources from them – thereby ruling out any direct habitat loss impacts.

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. It is considered that, combined, the construction phase elements (earthworks, the upgrading access roads (*i.e*., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River. The combined construction phase elements of the Proposed Development have the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, although such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

While not recorded within the EIAR Site Boundary, high impact invasive plant species (Japanese Knotweed and Rhododendron) have been recorded in the wider local area. The spread of these species to the downstream Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, could have a negative impact on the QI habitats within this SAC.

There is potential for significant impacts on the local population of Kerry Slug, a QI species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, within the Proposed Development site as a result of habitat loss or disturbance/direct mortality during the construction phase of the Proposed Development.

The construction phase could result in the temporary and localised disturbance of Hen Harrier and Lesser Horseshoe Bat. Without mitigation measures in place, there is some likelihood that the construction phase

could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

Therefore, the Proposed Development has the potential to result in indirect significant negative effects to the Natura 2000 sites within the project zone of potential impact influence; Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC, and Mullaghanish to Musheramore Mountains SPA.

3.2 Likely Impacts of the Project on the Natura 2000 Sites

As outlined in Section 3.1 above, it is deemed that there are construction phase and operational phase elements of the project that have the potential to impact Natura 2000 sites (*i.e.*, Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC, and Mullaghanish to Musheramore Mountains SPA) within the project Zone of Influence, without the implementation of best practice measures, a CEMP or site-specific mitigation measures.

3.2.1 Size, Scale & Land-take

The application site (red-line boundary) is *c*. 608 hectares in area.

3.2.2 Distance from or Key Features of the Natura 2000 Sites

As described in Table 2-2 above.

3.2.3 Resource Requirements (water abstraction *etc.*)

Not applicable.

3.2.4 Excavation Requirements

As outlined in Section 2.1.4, the construction phase of the Proposed Development will require will result in the excavation of 309,100m^3 of material (See Table 2-1). Construction works associated with the existing access roads will result in the extraction of 117,780m^3 of peat and spoil and works associated with the new roads will result in the extraction of 4,770m^3. The construction of turbine foundations and hardstands will result in the extraction of 164,230m^3 of peat and spoil. The construction of the two temporary site compounds will result in the extraction of 22,320m^3 of peat and spoil.

The excavation and storage of spoil associated with the construction phase works outlined above, can act as a source of suspended solids include silt and sediment. Risk of escapement of suspended solids during the construction phase is particularly relevant in upland peatsoil catchments because the organic soils are highly vulnerable to erosion when disturbed or exposed and steep topography is common. Uncontrolled solids wash out from exposed ground, such as new excavations, to watercourses during heavy rain is the primary concern.

3.2.5 Emission (disposal to land, water or air)

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (*i.e.*, road widening works, culvert extensions, etc.) and forestry

felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

While not recorded within the EIAR Site Boundary, high impact invasive plant species (Japanese Knotweed and Rhododendron) have been recorded in the wider local area. The spread of these species to the downstream Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, could have a negative impact on the QI habitats within this SAC.

Such impacts cannot be discounted without adequate environmental controls (e.g., Construction and Environmental Management Plan; Surface Water Management Plan) being implemented and/or site-specific mitigation measures being put in place during the project construction phase. Such mitigation cannot be considered as part of the Screening stage.

3.2.6 Transportation Requirements

There will be some localised increase in construction traffic, including for the delivery of turbines with a maximum blade length of 85 metres during the construction phase, however operational phase maintenance requirements are low. The facility will not require any day-to-day staffing and security will be remote and monitored via CCTV.

3.2.7 Duration of Operations

It is estimated that the construction phase of the Proposed Development will take approximately 18-24 months from starting onsite to commissioning of the electrical system. The operational lifespan of the proposed wind farm will be 35 years.

3.2.8 Cumulative and In-combination Effects

In order to fully assess the potential impact of the Proposed Development on Natura 2000 sites, the project must be assessed alone or in combination with existing activities and proposed plans for the region.

Projects in the wider hinterland were identified using various online resources including:

- Kerry County Council planning viewer[6]
- Cork County Council planning viewer[7]
- An Bord Pleanála (Strategic infrastructure development (SID) applications, Strategic Housing Development (SHD) applications and major project applications including wind farms[8]

[6] https://kerry.maps.arcgis.com/apps/webappviewer/index.html?id=33565bc13600476c8c4bae1eadb8c22d

[7] https://www.corkcoco.ie/en/resident/planning-and-development

[8] https://www.pleanala.ie/en-ie/home

- Irish Wind Energy Association (IWEA) [9]
- Department of Department of Housing, Local Government and Heritage's EIA Portal[10]

A list of projects and plans was reviewed and the potential for cumulative impacts was considered. The majority of consent applications in the wider local area pertain to one-off residential dwelling or farm buildings/structures along the regional roads. The scale of these applications is such that there is no potential for significant in-combination/cumulative effects with the Proposed Development arising from such developments. There are some agricultural projects *e.g*. intensive pig rearing facilities that are subject to EPA licensing and other project involving waste transfer. None of these projects are considered likely to result in cumulative or in-combination effects in relation to the Proposed Development due to the location, scale or nature of these projects, or the licensing and planning conditions that apply.

Land management practices (e.g., forestry, sheep farming, peat harvesting) in the wider area of the Proposed Development could potentially impact on water quality within Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC, in combination with the Proposed Development. Cumulative water quality effects could lead to negative impacts on the QI habitats and species of this SAC, without the appropriate mitigation measures in place.

As outlined in Section 2.1.3, compensatory replanting in order to replace forestry permanently felled will be carried out and can occur anywhere in the State subject to licence. The Forest Service is required to apply an Appropriate Assessment procedure to applications for licensing for various forestry activities in order to evaluate the forestry activity within the context of any potentially relevant European Site, meaning that the replacement forestry planting lands will be subject to the Appropriate Assessment process. Therefore, there is no likelihood that the replacement planting will act cumulatively or in-combination with the Proposed Development, result in significant negative impacts on the Natura 2000 sites within the zone of potential impact influence of the Proposed Development.

The main projects that require consideration in relation to potential for cumulative and in combination effects are other wind energy projects. The ecological impact assessments and reports (where available) in support of the AA process for the wind farms in the wider area were reviewed. This included the permitted and proposed projects.

There are five operational windfarms in the Roughty River catchment where the proposed turbines will be constructed as part of the Proposed Development (See Table 3-1). The largest is Grousemount Wind Farm, with 38 turbines. It is the most recent wind development in the catchment, largely completed and commissioned by 2020. The other wind farms in the catchment were constructed prior to the 2007 and 2009 periods.

Table 3-2 presents details of other constructed, permitted or in planning wind farm projects in the wider hinterland. There are a number of wind farm projects currently seeking planning permission in this area. These include Inchamore Wind Farm which is a proposed 5-turbine development located directly to the east of the Proposed Development. The EIAR for Inchamore wind farm development recorded the presence of Kerry Slug on site (Inchamore Wind DAC, 2023). The NIS for this wind farm development concluded that while

[9] https://www.iwea.com/

[10] https://www.gov.ie/en/publication/9f9e7-eia-portal/

there was potential for effects on the aquatic QI habitats and species of Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC and the Hen Harrier the only SCI species of Mullaghanish to Musheramore Mountains SPA, the Project will not adversely affect the integrity of any of the European sites concerned with the appropriate mitigation measures in place (BioSphere Environmental Services, 2023).

Each of the more recent projects (permitted and proposed) were accompanied by detailed ecological impact assessments and NIS. Detailed mitigation strategy is provided in order to minimise the risk of significant effects on sensitive habitats and species, due to the Proposed Development and in combination with other developments in the receiving environment.

Table 3-1 Other Wind Farms in the Roughty River Sub-catchment

Wind Farm	Status	Year Commissioned	No. Turbines	Relationship to Proposed Development
Inchee / Coolkoohil	Constructed	2007	6	Drains to the Inchee branch of the Glanlee tributary of the Roughty
Midas / Coolknoohil (Everwind)	Constructed	2007	11	Drains via tributary to Roughty River (c.2.3km upstream of site)
Foilgreana / Coolknoohil	Constructed	2007	6	Drains overland to Roughty River (c.1.4km upstream of site)
Sillahertane / Coomagearlaghy II	Constructed	2009	10	Drains via tributary to Roughty River (c.2.3km upstream of site)
Grousemount	Constructed	2020+	38	Drains to Roughty River (c3.7km upstream of site at nearest)

Table 3-2 Other permitted, constructed or Wind Farms in wider hinterland of EIAR Site Boundary.

Wind Farm	Status	Year Commissioned	No. Turbines	Notes
Curraglass	In Planning	n/a	7	Application for 7 wind turbines currently with An Bord Pleanála
Derragh	Constructed	2019	6	Granted permission in 2016 but not constructed.
Cleanrath	Constructed/under appeal	2019+	9-11	Site was under construction when permission was quashed. Substitute consent application under consideration by ABP.
Gneeves	Constructed	2006	11	Now in operation for 17 years.
Clydaghroe	Constructed	2012	2	Located to northwest of Ballyvourney.

Wind Farm	Status	Year Commissioned	No. Turbines	Notes
Knocknamork	Permitted	n/a	7	Located north of Ballyvourney on the Cork/Kerry border. Project also includes photovoltaic array.
Gortyrahilly	In Planning	n/a	14	SID application at further consideration stage.
Inchamore	In Planning	n/a	5	Application to Cork County Council at Further Information stage.

Each of the individual wind farms in the wider area operates and will be decommissioned on their own schedule in accordance with their planning permissions. It is noted that within the Roughty sub-catchment in which the proposed turbines will be constructed that (with the exception of Grousemount) many of the wind farms are in an advanced portion of their anticipated lifetime. Just as at Kilgarvan, even in the absence of a conditioned lifetime, the existing turbines will predictably become more costly to maintain and eventually fall out of service and be decommissioned. In the absence of extension of life permissions, or new repowering projects, the number of functional turbines within these wind farms will predictably decline in the coming years.

The Proposed Development would see a net reduction of 17 in the number of operational turbines at the site. As technology has advanced in recent years the size of turbines has tended to increase and this means that new and repowering projects are likely to result in an overall reduction in the number of operational turbines into the future. Larger turbines may have a different collision risk profile for birds and bats, but this also needs to be considered in relation to a reduction in number of turbines present at a given site.

No wind farm projects were identified which are considered likely to result in significant cumulative effects upon the local terrestrial ecology (habitats and species) in the EIAR Site Boundary. There are several wind farm projects that like the existing wind farm at Kilgarvan, are well established and deep into their scheduled lifetime. The more recent permitted and proposed projects have presented detailed mitigation strategies to minimise the risk of impact upon sensitive habitats and species and thereby minimise the risk of cumulative and in-combination effects.

3.3 Likely Changes to the Natura 2000 Sites

As outlined in Section 3.1 above, there is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (*i.e.*, road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

There is potential for significant impacts on the local population of Kerry Slug within the Proposed Development site as a result of habitat loss or disturbance/direct mortality during the construction phase of the Proposed Development.

While not recorded within the EIAR Site Boundary, high impact invasive plant species (Japanese Knotweed and Rhododendron) have been recorded in the wider local area. The spread of these species to the downstream Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, could have a negative impact on the QI habitats within this SAC.

The construction phase could result in the temporary and localised disturbance of Hen Harrier and Lesser Horseshoe Bat. Without mitigation measures in place, there is some likelihood that the construction phase could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

Therefore, the Proposed Development has the potential to result in indirect significant negative effects to the Natura 2000 sites within the project zone of potential impact influence; Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC and Mullaghanish to Musheramore Mountains SPA. Such impacts cannot be discounted without adequate environmental controls (e.g., Construction and Environmental Management Plan; Surface Water Management Plan) being implemented and/or site-specific mitigation measures being put in place during the project construction phase. Such mitigation cannot be considered as part of the Screening stage.

3.3.1 Reduction of Habitat Area

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. Hydrologically mediated effects arising from the combined impact

of the construction phase elements of the Proposed Development have the potential to cause moderate negative cumulative effects on the aquatic receptors in the Flesk River and significant negative cumulative effects on the aquatic receptors in the Roughty sub-catchment. In the case of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, these aquatic receptors include habitats sensitive to the generation of suspended solids wash out to drains and watercourses. The habitats of Kenmare River SAC that are hydrologically connected to the Proposed Development via the Roughty are marine in nature and subject to the dilution factor occurring within the tidally influenced Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

3.3.2 Disturbance to Key Species

There is potential for significant impacts on the local population of Kerry Slug within the Proposed Development site as a result of habitat loss or disturbance/direct mortality during the construction phase of the Proposed Development, without the implementation of appropriate mitigation measures.

The construction phase could result in the temporary and localised disturbance of Hen Harrier and Lesser Horseshoe Bat. Without mitigation measures in place, there is some likelihood that the construction phase could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

3.3.3 Habitat or Species Fragmentation

The local Kerry Slug population occurring within the Proposed Development site is outside the boundary of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC. The local population of this species occurring within the Proposed Development site could be significantly impacted during construction works as a result of habitat loss or disturbance/direct mortality, without the implementation of appropriate mitigation measures.

3.3.4 Reduction in Species Density

Not Applicable.

3.3.5 Changes in Key Indicators of Conservation Value (water quality *etc*.)

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

3.4 Likely Impacts on the Natura 2000 Sites as a Whole

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

There is potential for significant impacts on the local population of Kerry Slug within the Proposed Development site as a result of habitat loss or disturbance/direct mortality during the construction phase of the Proposed Development, without the implementation of appropriate mitigation measures.

While not recorded within the EIAR study boundary, high impact invasive plant species (Japanese Knotweed and Rhododendron) have been recorded in the wider local area. The spread of these species to the downstream Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, could have a negative impact on the QI habitats within this SAC.

The construction phase could result in the temporary and localised disturbance of Hen Harrier and Lesser Horseshoe Bat. Without mitigation measures in place, there is some likelihood that the construction phase could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

Therefore, the Proposed Development has the potential to result in indirect significant negative effects to the Natura 2000 sites within the project zone of potential impact influence; Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC, and Mullaghanish to Musheramore Mountains SPA. Such impacts cannot be discounted without adequate environmental controls (e.g., Construction and Environmental Management Plan; Surface Water Management Plan) being implemented and/or site-specific mitigation measures being put in place during the project construction phase. Such mitigation cannot be considered as part of the Screening stage.

3.5 Indicators of Significance as a Result of the Identification of Effects Set Out Above

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

There is potential for significant impacts on the local population of Kerry Slug within the Proposed Development site as a result of habitat loss or disturbance/direct mortality during the construction phase of the Proposed Development, without the implementation of appropriate mitigation measures.

While not recorded within the EIAR Site Boundary, high impact invasive plant species (Japanese Knotweed and Rhododendron) have been recorded in the wider local area. The spread of these species to the downstream Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, could have a negative impact on the QI habitats within this SAC.

The construction phase could result in the temporary and localised disturbance of Hen Harrier and Lesser Horseshoe Bat. Without mitigation measures in place, there is some likelihood that the construction phase could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

Therefore, the Proposed Development has the potential to result in indirect significant negative effects to the Natura 2000 sites within the project zone of potential impact influence; Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, and Mullaghanish to Musheramore Mountains SPA. Such impacts cannot be discounted without adequate environmental controls (e.g., Construction and Environmental Management Plan; Surface Water Management Plan) being implemented and/or site-specific mitigation measures being put in place during the project construction phase. Such mitigation cannot be considered as part of the Screening stage.

3.5.1 Loss

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry

felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

3.5.2 Fragmentation

Not applicable.

3.5.3 Disruption

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

3.5.4 Disturbance

There is potential for significant impacts on the local population of Kerry Slug within the Proposed Development site as a result of habitat loss or disturbance/direct mortality during the construction phase of the Proposed Development, without the implementation of appropriate mitigation measures.

The construction phase of the Proposed Development has the potential to result in the temporary and localised disturbance of Hen Harrier and Lesser Horseshoe Bat. Without mitigation measures in place, there is some likelihood that the construction phase could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

3.5.5 Change to Key Elements of the Site

Without the implementation of best practice measures (*e.g*. drainage design), a CEMP or site-specific mitigation measures, the construction phase of the Proposed Development could result in moderate negative

cumulative effects within the Flesk River which is associated with Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC and likely significant negative cumulative effects within the Roughty sub-catchment, with such effects greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. Hydrologically mediated effects associated with deterioration of water quality from the run-off of silt, hydrocarbons or other contaminants could impact on Otter indirectly through the deteriorating feeding conditions without the adequate mitigation measures for the protection of water quality in place.

While not recorded within the EIAR Site Boundary, high impact invasive plant species (Japanese Knotweed and Rhododendron) have been recorded in the wider local area. The spread of these species to the downstream Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, could have a negative impact on the QI habitats within this SAC.

The construction phase could result in the temporary and localised disturbance of Hen Harrier and Lesser Horseshoe Bat. Without mitigation measures in place, there is some likelihood that the construction phase could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

Such impacts may have the potential to contribute towards significant negative effects that may interfere with the structure and function of Natura 2000 sites within the project zone of potential impact influence; Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC and Mullaghanish to Musheramore Mountains SPA.

3.6 Elements of the Project Likely to Significantly Impact on the Natura 2000 Sites or where the Scale or Magnitude of Impacts are Unknown

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

There is potential for significant impacts on the local population of Kerry Slug within the Proposed Development site as a result of habitat loss or disturbance/direct mortality during the construction phase of the Proposed Development, without the implementation of appropriate mitigation measures.

While not recorded within the EIAR Site Boundary, high impact invasive plant species (Japanese Knotweed and Rhododendron) have been recorded in the wider local area. The spread of these species to the downstream Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, could have a negative impact on the QI habitats within this SAC.

While significant impacts resulting in the disturbance of species during the operational phase are not expected in this case, The construction phase could result in the temporary and localised disturbance of Hen Harrier and Lesser Horseshoe Bat. Without mitigation measures in place, there is some likelihood that the construction phase could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

Significant effects during the project construction phase cannot be discounted without the implementation of best practice construction design measures and the implementation of an adequate Construction & Environmental Management Plan (CEMP). Therefore, it cannot be concluded, that the Proposed Development, individually or in combination with other plans or projects, will not have a significant effect on a Natura 2000 sites, without the consideration and analysis of further information. Therefore Stage 2 NIS (AA) is required.

A Natura Impact Statement (NIS) is presented in **Section 4**, to provide scientific examination of the project to enable the competent authority to undertake an AA. The NIS will examine potential effects to Natura 2000 sites screened in as part of this Screening for Appropriate Assessment; Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC and Mullaghanish to Musheramore Mountains SPA.

4 Natura Impact Statement

This section of the report provides the necessary information to inform AA to be completed by the competent authority, An Bord Pleanála. This NIS provides the relevant scientific information to enable the competent authority in carrying out its AA to determine whether or not the Proposed Development would adversely affect the integrity of Natura 2000 sites within the project zone of potential impact influence, for which effects could not be excluded during the Screening for AA (see Section 3 for details). The Natura 2000 sites are as follows:

- Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC
- Old domestic building, Curraglass Wood SAC
- Kilgarvan Ice House SAC
- Mullaghanish to Musheramore Mountains SPA
- Kenmare River SAC

There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

While not recorded within the EIAR Site Boundary, high impact invasive plant species (Japanese Knotweed and Rhododendron) have been recorded in the wider local area. The spread of these species to the downstream Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, could have a negative impact on the QI habitats within this SAC.

The construction phase could result in the temporary and localised disturbance of Hen Harrier, an SCI (Special Conservation Interest) species of Mullaghanish to Musheramore Mountains SPA, and Lesser Horseshoe Bat, a QI (Qualifying Interest) species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC and Kilgarvan Ice House SAC. Without mitigation measures in place, there is some likelihood that the construction phase could impact on Lesser Horseshoe Bat and Hen Harrier due to temporary and localised disturbance and displacement effects. While significant impacts resulting in the disturbance of these during the operational phase are not expected in this case, there is mitigation for birds and bats as part of the operational phase of the Proposed Development, including for Hen Harrier, and Lesser Horseshoe Bat.

Not all of the habitats and species for which the Natura 2000 sites listed above are designated for will be relevant in terms of potential impacts from the Proposed Development site, as outlined below in Table 4-1, Table 4-2, Table 4-3, and Table 4-4. Only the habitats and species indicated as having a potential impact-receptor pathway to the Proposed Development site below are relevant to this assessment. Relevant mitigation measures are outlined in Section 4.2.

Table 4-1 The Qualifying Interests of the Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC and their relevance in terms of potential Impact-Receptor Pathways.

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
• Oligotrophic waters containing very few minerals of sandy plains *(Littorelletalia uniflorae*) [3110]	Yes	This habitat is likely to occur in the majority of lakes within the SAC. The Proposed Development site has hydrological connectivity with this SAC via the Flesk tributaries that drain the Proposed Development site. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130]	Yes	This habitat is likely to occur with habitat [3110] above in Lough Leane. The Proposed Development site has hydrological connectivity with this SAC via the Flesk tributaries that drain the Proposed Development site. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	Yes	This habitat is likely to occur throughout the SAC including within the tributaries of the Flesk River that flow through the site. The Proposed Development site has hydrological connectivity with this SAC via the Flesk tributaries that drain the Proposed Development site. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• Northern Atlantic wet heaths with *Erica tetralix* [4010]	No	This habitat is likely to occur in the upland regions and hillsides of the SAC in mosaic with blanket bog habitat. However, this habitat has not been mapped in detail for the SAC. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		between the Proposed Development and this particular habitat.
• European dry heaths [4030]	No	This habitat is likely to occur in the eastern part of the SAC, including much of The Paps, Tomies Mountain, Shehy Mountain, Purple Mountain and the southern slopes of the Owenreagh valley. This habitat has not been mapped in detail for the SAC. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• Alpine and Boreal heaths [4060	No	The habitat is likely to occur on most of the higher mountains and ridges within the SAC but has not been mapped in detail. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• *Juniperus communis* formations on heaths or calcareous grasslands [5130]	No	This habitat is known to occur on lake islands and headlands of the Muckross peninsula within the SAC but has not been mapped in detail. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• Calaminarian grasslands of the *Violetalia calaminariae* [6130]	No	This grassland habitat has been recorded at two locations within the SAC although further areas containing this habitat type may exist. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		between the Proposed Development and this particular habitat.
• Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]	No	The full extent of this wet meadow grassland habitat within the SAC is currently not known. No evidence of this species was recorded within the project site boundary and there is a lack of a hydrological connection linking this habitat type to the Proposed Development.
• Blanket bogs (* if active bog) [7130]	No	This habitat is documented to occur in both lowland and upland situations within the SAC but has not been mapped in detail. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• Depressions on peat substrates of the *Rhynchosporion* [7150]	No	This habitat typically occurs in the wetter areas of lowland blanket bog in the SAC but has not been mapped in detail. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	No	There are extensive areas of oak woodland habitat recorded throughout the SAC and it is likely present in areas yet to be surveyed. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat. .

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
• Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	No	This habitat type is found within the flood plains of the SAC including that of Lough Leane, at the mouth of the Flesk River. The Proposed Development site has hydrological connectivity with this SAC via the Flesk tributaries that drain the Proposed Development site. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• *Taxus baccata* woods of the British Isles [91J0]	No	This habitat is known to occur on limestone areas within the Muckross Peninsula of the SAC. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• *Geomalacus maculosus* (Kerry Slug) [1024]	Yes	Kerry Slug was recorded regularly within the Proposed Development site, outside of the SAC. It was recorded in association with the rocky roadside verges within the existing wind farm and around the hard standing areas of the existing turbines. There is potential for significant impacts on the local population of Kerry Slug, a QI species of Killarney National

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, within the Proposed Development site as a result of habitat loss or disturbance/direct mortality loss during the construction phase of the Proposed Development, without the implementation of appropriate mitigation measures.
• *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]	No	The conservation of objects for this QI species applies to the Caragh, Currane and Gearhameen freshwater pearl mussel populations which are distributed through Owenroe, Caragh, Glashawee, Caraghbeg and Meelagh Rivers, and Loughs Cloon and Acoose. The SAC is hydrologically linked to the Proposed Development site via tributaries of the Flesk River. No Freshwater Pearl Mussels were observed in the surveyed reach which spanned 1.3km of the River Flesk downstream of Poulgorm Bridge (N22 crossing). This reach encompasses input from the Owgarriv tributary (which drains the Proposed Development site access road). Instream habitat was at least 90% unsuitable for pearl mussels owing to long sections of sculpted bedrock with bare chutes, cascades, rapids and vertical drops. There were very limited patches of stable cobble/gravel at channel margins in the lower survey reaches which could have supported mussels historically, but the channel appeared to be deepened by historical drainage and was too compacted and/or scoured for the species.
• *Euphydryas aurinia* (Marsh Fritillary) [1065]	No	According to the conservation objectives for this SAC, the current distribution of this species within the

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		SAC is unknown with one colony recorded within the SAC to date. A limited amount of Marsh Fritillary, *Euphydryas aurinia* larval food plant, Devil's Bit Scabious, *Succisa pratensis*, was recorded within the wind farm during habitat and botanical assessment. The species has not been recorded in the W07 or W18 10km Grid Squares in recent decades. No adult Marsh Fritillaries were recorded on the wing locally during any of the field surveys carried out in this area. In addition, no larval webs were recorded during checks of areas with the larval food plant Given the habitat preference of this species and the current location of the only known colony within the SAC, it was determined that a source-pathway-receptor link does not exist between the Proposed Development and this particular species.
• *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Lampetra fluviatilis* (River Lamprey) [1099]	Yes	All three species of lamprey have been recorded in the lakes associated with this SAC[11] and are likely to utilise the Flesk River for spawning and commuting purposes. Lamprey habitat is limited or absent from most of the watercourses affected by the Proposed Development owing to their flashy eroding nature. The Proposed Development site has hydrological connectivity with this SAC via the Flesk tributaries that drain the Proposed Development site. The combined impact of the construction phase elements (earthworks, the

[11] https://www.npws.ie/sites/default/files/publications/pdf/KNPMP.pdf

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• *Salmo salar* (Salmon) [1106]	Yes	It is likely that this species will collectively utilise the Flesk River and Lough Leane for spawning and commuting purposes. The Proposed Development site has hydrological connectivity with this SAC via the Flesk tributaries that drain the Proposed Development site. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	Yes	This SAC is designated for Lesser Horseshoe Bat due to the presence of several internationally important

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		summer and winter roosting sites. It is typical for this species to forage in woodlands/scrub within 2.5km of their roost sites. The detailed field assessments show that while Lesser Horseshoe Bats do occur within the existing wind farm on occasion, that they do so very infrequently. However, during the construction phase, there will be a localised and temporary increase in disturbance within the Proposed Development site due to the operation of machinery and plant such as cranes. The operation of the proposed wind farm has the potential to result in disturbance to commuting and foraging bats. Therefore, without mitigation there is some likelihood of temporary disturbance and displacement effects of Lesser Horseshoe Bat. While it is considered that there is no likelihood for significant impacts on the Conservation Objectives relating to this species, on a precautionary basis, there is mitigation for bats, including Lesser Horseshoe Bat, as part of the operational phase of the Proposed Development.
• *Lutra lutra* (Otter) [1355]	Yes	Otter is recorded as being widespread in the aquatic habitats of the SAC. There is potential for Otter to occur here, utilising the watercourses within and in proximity to the Proposed Development site. However, it is likely that should Otter occur here, it will be on an occasional basis only. Otter is primarily a nocturnal species and is therefore much more likely to be active during times when noise and

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		construction activity levels at the development site are low. Otter will also more likely be associated with the riparian corridor of the greater order streams and rivers present further downstream into the Flesk sub-catchment where there is more optimal habitat available. However, Otter could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.
• *Trichomanes speciosum* (Killarney Fern) [1421]	No	According to the conservation objectives of this SAC, Recent records of Killarney Fern show that this species grows in deeply shaded, humid situations within more remote areas of the SAC. Suitable habitat for this species is not present within the project site boundary. Taking the above into consideration, it was determined that a source-pathway-receptor link does not exist between the Proposed Development and this particular species.
• *Najas flexilis* (Slender Naiad) [1833]	No	This species is known to inhabit several lakes within the SAC, including Lough Leane. The Proposed Development site has hydrological connectivity with this SAC via the Flesk tributaries that drain the Proposed Development site. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		effects locally on aquatic receptors in the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• *Alosa fallax killarnensis* (Killarney Shad) [5046]	No	According to the conservation objectives of this site, Killarney shad is considered to be unique to Lough Leane. The Proposed Development site has hydrological connectivity with this SAC via the Flesk tributaries that drain the Proposed Development site. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

Table 4-2 The Qualifying Interests of the Old domestic building, Curraglass Wood SAC and their relevance in terms of potential Impact-Receptor Pathways.

Old domestic building, Curraglass Wood SAC		
Qualifying Interests (after NPWS 2018b)	**Impact-Receptor Pathway Relevant?**	**Reason**
• *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	Yes	This SAC is designated for Lesser Horseshoe Bat due to the presence of one internationally important summer roost. It is typical for this species to forage in woodlands/scrub within 2.5km of their roost sites. The detailed field assessments show that while Lesser Horseshoe Bats do occur within the existing wind farm on occasion, that they do so very infrequently. However, during the construction phase, there will be a localised and temporary increase in disturbance within the Proposed Development site due to the operation of machinery and plant such as cranes. The operation of the proposed wind farm has the potential to result in disturbance to commuting and foraging bats. Therefore, without mitigation there is some likelihood of temporary disturbance and displacement effects of Lesser Horseshoe Bat. While it is considered that there is no likelihood for significant impacts on the Conservation Objectives relating to this species, on a precautionary basis, there is mitigation for bats, including Lesser Horseshoe Bat, as part of the operational phase of the Proposed Development.

Table 4-3 The Qualifying Interests of Kilgarvan Ice House SAC and their relevance in terms of potential Impact-Receptor Pathways.

Old domestic building, Curraglass Wood SAC		
Qualifying Interests (after NPWS 2018b)	**Impact-Receptor Pathway Relevant?**	**Reason**
• *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	Yes	This SAC is designated for Lesser Horseshoe Bat due to the presence of one internationally important summer roost. It is typical for this species to forage in woodlands/scrub within 2.5km of their roost sites. The detailed field assessments show that while Lesser Horseshoe Bats do occur within the existing wind farm on occasion, that they do so very infrequently. However, during the construction phase, there will be a localised and temporary increase in disturbance within the Proposed Development site due to the operation of machinery and plant such as cranes. The operation of the proposed wind farm has the potential to result in disturbance to commuting and foraging bats. Therefore, without mitigation there is some likelihood of temporary disturbance and displacement effects of Lesser Horseshoe Bat. While it is considered that there is no likelihood for significant impacts on the Conservation Objectives relating to this species, on a precautionary basis, there is mitigation for bats, including Lesser Horseshoe Bat, as part of the operational phase of the Proposed Development.

Table 4-4 The Special Conservation Interest of Mullaghanish to Musheramore Mountains SPA and their relevance in terms of potential Impact-Receptor Pathways.

Mullaghanish to Musheramore Mountains SPA		
Qualifying Interests (after NPWS 2022a)	**Impact-Receptor Pathway Relevant?**	**Reason**
• Hen Harrier (*Circus cyaneus*) [A082]	Yes	This SPA is designated for Hen Harrier and is located c. 7.8km from EIAR Site Boundary and c. 10km from the nearest of the proposed repowering turbines. While this is outside of the core foraging range of Hen Harrier (e.g. SNH 2016) foraging distances of over 10km have been recorded on occasion in Ireland. This species was very infrequently recorded in the vicinity of the proposed repowering site. During the construction phase, there will be a localised and temporary increase in disturbance within the Proposed Development site due to the operation of machinery and plant such as cranes. The operation of the proposed wind farm has the potential to result in disturbance to commuting and hunting individuals. Therefore, without mitigation there is some likelihood of temporary disturbance and displacement effects of Hen Harrier during the construction and operational phase of the Proposed Development.

Table 4-5 The Qualifying Interests of the Kenmare River SAC and their relevance in terms of potential Impact-Receptor Pathways.

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
• Large shallow inlets and bays [1160]	Yes	The SAC is largely comprised of this habitat type with a habitat area estimated as 3922ha using Osi data and the Transitional Water Body area as defined under the Water Framework Directive. There is a hydrological connection linking the proposed development site to Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development Proposed Development could result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment. Such effects will be greatly reduced by the intervening distance (*c*. 21km via watercourses) and the dilution factor of the marine waters of Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• Reefs [1170]	Yes	The location of this habitat type has been mapped throughout the SAC. There is a hydrological connection linking the Proposed Development site to Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions,

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		etc.) and forestry felling activities) of the Proposed Development could result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment. Such effects will be greatly reduced by the intervening distance (*c*. 21km via watercourses) and the dilution factor of the marine waters of Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• Perennial vegetation of stony banks [1220]	No	Current area unknown. It was recorded as being present but extent was not mapped. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	No	The extent of this habitat type has been mapped primarily along the southwest of Kenmare Bay as well as Lamb's Head and Dursey Island. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Yes	This habitat type and potential habitat has been mapped within sub-sites of the SAC, including in proximity to where the Roughty flows into Kenmare Bay. There is a hydrological connection linking the Proposed Development site to Kenmare River SAC via

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment. Such effects will be greatly reduced by the intervening distance (*c*. 21km via watercourses) and the dilution factor of the marine waters of Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• Mediterranean salt meadows (Juncetalia maritimi) [1410]	Yes	This habitat type and potential habitat has been mapped within sub-sites of the SAC, including in proximity to where the Roughty flows into Kenmare Bay. There is a hydrological connection linking the Proposed Development site to Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment. Such effects will be greatly reduced by the intervening distance (*c*. 21km via watercourses) and the dilution factor of the marine waters of Kenmare Bay.

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]	No	Habitat was mapped from a single site (Derrynane) during the Coastal Monitoring Project. Given the considerable distance (*c*. 21km via watercourses) between the Proposed Development site and the SAC, the location of this dynamic coastal habitat on the northwest side of Kenmare Bay (over 50km from the Proposed Development site) and the dilution factor of the marine environment, no significant effects to this Annex I habitat arising from the Proposed Development are expected.
• Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	No	Habitat was mapped from a single site (Derrynane) during the Coastal Monitoring Project. Given the considerable distance (*c*. 21km via watercourses) between the Proposed Development site and the SAC, the location of this dynamic coastal habitat on the northwest side of Kenmare Bay (over 50km from the Proposed Development site) and the dilution factor of the marine environment, no significant effects to this Annex I habitat arising from the Proposed Development are expected.
• European dry heaths [4030]	No	It is thought to cover c. 200ha in the Derrynane locality with another 100ha or more elsewhere, often in association with other habitats such as coastal grassland, wet heath and bog and exposed rock including sea cliffs.

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		This habitat has not been mapped in detail for the SAC. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• Juniperus communis formations on heaths or calcareous grasslands [5130]	No	Found in combination with European dry heaths [4030]. This habitat has not been mapped in detail for the SAC. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• Calaminarian grasslands of the Violetalia calaminariae [6130]	No	The area of this habitat at Allihies is estimated to be 3.1ha. This habitat has not been mapped in detail for the SAC. Given the distance and the lack of a hydrological connection, a source-pathway-receptor link does not exist between the Proposed Development and this particular habitat.
• Submerged or partially submerged sea caves [8330]	Yes	Sea cave distribution at this site was derived from the 1995 BioMar survey (Picton and Costello, 1997) and from an oblique aerial survey. The aerial survey only detects the presence of sea caves visible intertidally in the flight path. There is a hydrological connection linking the Proposed Development site to Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		the Proposed Development could result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment. Such effects will be greatly reduced by the intervening distance (*c*. 21km via watercourses) and the dilution factor of the marine waters of Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.
• *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]	No	There is one known site for this species in this SAC, associated with the Annex I dune systems on the northwest coast of Kenmare Bay. Given the distance of the Proposed Development site and the nature of the proposed works, there is no likelihood for significant impacts on this species.
• *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	No	This SAC is designated for Lesser Horseshoe Bat due to the presence of two internationally important roosting sites: the Dunkerron souterrain roost and Foley's cottage Killaha roost. Given that the Proposed Development site is located at a considerable distance from the known roost sites within the SAC, no disturbance and displacement impacts to Lesser Horseshoe Bat within or in the vicinity of these roosting sites as a result of the Proposed Development is expected.
• *Lutra lutra* (Otter) [1355]	Yes	Otter, listed on Annex II and Annex IV of the EU Habitats Directive, is known to use the site.

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		There is potential for Otter to occur within the Proposed Development site, utilising the watercourses within and in proximity to the Proposed Development site. However, it is likely that should Otter occur here, it will be on an occasional basis only. Otter is primarily a nocturnal species and is therefore much more likely to be active during times when noise and construction activity levels at the development site are low. Otter will also more likely be associated with the riparian corridor of the greater order streams and rivers present further downstream into the Flesk sub-catchment where there is more optimal habitat available. However, Otter could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.
• *Phoca vitulina* (Harbour Seal) [1365]	No	The SAC holds an important population of Common Seal (maximum count of 391 in the all-Ireland survey of 2003). The seals frequent rocky islets near Sneem, Templenoe and Castle Cove, as well as Brennel Island, Illaunsillagh, Kilmackilloge Harbour and Ballycrovane Harbour. Given the considerable distance of the Proposed Development site from the known breeding, moulting and resting sites for this species within Kenmare Bay, there is considered to be no likelihood for any disturbance or displacement effects resulting in

Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC		
Qualifying Interests (after NPWS 2017a)	**Impact-Receptor Pathway Relevant?**	**Reason**
		significant negative effects arising from the Proposed Development.

4.1 Impact Assessment

4.1.1 Characterising Impacts

The methodology for the assessment of impacts is derived from the Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites (EC, 2002). When describing changes/activities and impacts on ecosystem structure and function, the types of impacts that are commonly presented include the following:

- direct and indirect effects,
- short- and long-term effects,
- construction, operational and deconstruction / demolition effects, and
- isolated, interactive and cumulative effects.

Impacts that could potentially occur through the implementation of the project can be categorised under a number of impact categories as outlined in the EC 2002 document as follows:

- Loss/Reduction of habitat area,
- Disturbance to key species,
- Habitat or species fragmentation,
- Reduction in species density, and
- Changes in key indicators of conservation value such as decrease in water quality and quantity.

Meaning of 'Adversely Affect the Integrity of the Site'

The concept of the 'integrity of the site' is explained in the EU publication Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, as follows;

'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will anyway remain favourable within the European territory of the Member State.

As regards the connotation or meaning of 'integrity', this can be considered as a quality or condition of being whole or complete. In a dynamic ecological context, it can also be considered as having the sense of resilience and ability to evolve in ways that are favourable to conservation. The 'integrity of the site' has been usefully defined as 'the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified'.

A site can be described as having a high degree of integrity where the inherent potential for meeting site conservation objectives is realised, the capacity for self-repair and self-renewal under dynamic conditions is maintained, and a minimum of external management support is required. When looking at the 'integrity of the site', it is therefore important to take into account a range of factors, including the possibility of effects manifesting themselves in the short, medium and long-term.

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

4.1.2 Potential Effects from the Proposed Development to Qualifying Habitats and Species of Natura 2000 Sites within the Project Zone of Influence

Potential effects associated with the Proposed Development to the Qualifying Habitats and Species of Natura 2000 Sites within the project Zone of Influence (Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC, Mullaghanish to Musheramore Mountains SPA) are as follows:

- There is a hydrological connection linking the Proposed Development site to Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC via tributaries of the Flesk River and Kenmare River SAC via tributaries of the Roughty River. The combined impact of the construction phase elements (earthworks, the upgrading access roads (i.e., road widening works, culvert extensions, etc.) and forestry felling activities) of the Proposed Development could result in moderate negative cumulative effects locally on aquatic receptors in the Flesk River and the potential to result in likely significant negative cumulative effects on aquatic receptors within the Roughty sub-catchment, albeit such effects will be greatly reduced by the intervening distance and the characteristics of the marine environment within Kenmare Bay. On a precautionary basis, environmental controls (including drainage design) and mitigation associated with water quality will be in place during the construction phase of the Proposed Development.

- Otter, while not recorded within the site, is widespread throughout the area and could be affected indirectly through deteriorating feeding conditions associated with local deterioration in water quality, without the adequate mitigation measures for the protection of water quality in place.

- There is potential for significant impacts on the local population of Kerry Slug within the Proposed Development site as a result of habitat loss or disturbance/direct mortality during the construction phase of the Proposed Development, without the implementation of appropriate mitigation measures.

- While considered unlikely, potential impacts arising from disturbance effects to Hen Harrier, an SCI (Special Conservation Interest) species of Mullaghanish to Musheramore Mountains SPA, and Lesser Horseshoe Bat, a QI (Qualifying Interest) species of Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC and Kilgarvan Ice House SAC, are also being considered on a precautionary basis, with design and operational phase measures to be implemented as part of an overall effort to mitigate for impacts to bird and bat species in general.

4.2 Best Practice Design and Mitigation Measures

From the outset an iterative process of constraints led design was employed for the proposed windfarm project whereby independent ecological expertise was utilised at an early design stage in identifying the constraints and designing the site layout to take account of these constraints. The siting of the turbines and associated infrastructure was informed by the environmental constraints.

The mitigation measures described below are designed to address and minimize the risk of impact arising from each phase of the Proposed Development. A Construction and Environmental Management Plan (CEMP) has been prepared which describes the general mitigation strategy that will apply during the construction phase of the Proposed Development (Appendix D). The CEMP captures the mitigation commitments provided in specialist chapters including measures to protect water quality in the sub-catchments that drain the wind farm and access roads. The following mitigation measures are related to minimising the potential for negative effects on the receiving terrestrial ecology throughout each phase of the development.

4.2.1 Construction Phase Mitigation Measures

The main contractor will be required to engage a qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works, and to monitor all site works and to ensure that methodologies and mitigation are followed throughout construction to avoid negatively impacting on the receiving environment.

A suitably qualified project ecologist will be appointed for the construction phase of the Proposed Development and will report to the ECoW. The project ecologist will be responsible for the protection of sensitive habitats and species encountered during the construction phase of the proposed renewable energy development. The Project Ecologist will not be full time on site but will visit the site at least once a month during construction. The Project Ecologist will carry out ecological monitoring and survey work as may be required by the planning authority.

All of the mitigation measures outlined below, and in the CEMP (Appendix D), will be fully implemented.

Surface-Water Run-Off: Forestry felling

Felling Operations will be carried out according to the following Guidelines & Standards; Forestry & Water Quality Guidelines (DAFM, 2000a), Forest Harvesting & the Environment Guidelines (DAFM, 2000b) and Standards for Felling and Reafforestation (DAFM, 2019)

An appropriately qualified Environmental Clerk of Works (ECoW) will be appointed to monitor the project felling operations on a full-time basis. The ECoW will ensure all felling related water quality protection guidelines and standards are complied with during the pre-commencement and felling operation phases.

The ECoW will carry out daily visual checks of all measures employed to avoid or reduce impact of forestry residues, erosion, including inspections of temporary drainage infrastructure (e.g., drain crossings), silt control measures, extraction routes and log storage areas.

A detailed and comprehensive pre-felling survey of the minor drainage channels within the proposed felling areas and their proposed access routes will be undertaken by the forestry harvesting Site Manager and the ECoW. This will identify all '[12]aquatic zones' and 'relevant watercourses' / drains (as specified in Felling Standards (DAFM (2019)). Areas of very wet ground ("hotspots") will also be marked as exclusion zones as these could become damaged by machine tracking and/or become preferential surface run-off conduits following the felling.

Water exclusion zones (Section 6.1 DAFM (2019)):

- Before operations commence, a 10 m wide exclusion zone will be identified along the edge of all aquatic zones and hotspots, and this will be marked clearly on a site map.
- All operators will be made aware of the exclusion zone and its purpose, through the pre-commencement awareness process and throughout operations.
- Machine traffic and timber stacking are not permitted within exclusion zones.
- Trees within the reach of the harvester arm will be felled by harvester and stacked outside the exclusion zone.
- Trees outside machine reach will be felled manually by chainsaw operators. Felled trees will be winched out of the exclusion zone where it is appropriate and safe to do so, or removed by extended harvester arm, for subsequent snedding and processing outside the exclusion zone.
- In all cases, trees will be felled away from the water feature.
- Regarding aquatic zones, watercourse banks must not be disturbed. No branches or debris will be allowed to enter the aquatic zone during operations. Any branches that do fall in will immediately and with care be removed.

Silt & sediment control (Section 7 DAFM (2019)):

- Prior to the commencement of operations, silt traps will be installed within existing forest drains that connect with aquatic zones, either directly or indirect via relevant watercourses.
- Silt traps will be staggered along the length of the drain, and not only at the lower reaches towards its outflow.
- Silt trap designs will include log sections laid lengthways into the drain and/or the use of staked geotextile barriers.
- Silt fences will be installed where necessary, to block pathways for silt escapement where overland flow is possible.
- Once silt traps and silt fences become functional, they will be checked a minimum of twice weekly and maintained / repaired, as necessary, in order to ensure continued effectiveness throughout felling operations.

[12]**Aquatic zone:** Any natural river, stream or lake (but not an artificial drain) illustrated on an Ordnance Survey 6 inch map.
Relevant watercourse: Any other watercourse that has the potential to act as a pathway for the movement of significant amounts of sediment and/or nutrients from the site to an aquatic zone. Relevant watercourses are existing drains and channels that may contain flowing water during and immediately after rainfall

- Drainage channels which by-pass the vegetated buffer zone and provide direct connection between the felling area and the stream need to be intermittently blocked with staked plastic sheet pile to minimise the risk of silt and nutrient run-off into the receiving waters.
- Extraction and haul routes must be confined to the driest areas of the site and routed in order to minimise the amount of trafficking around the site. Wherever possible, low load bearing harvesters and forwarding machinery will be used. Thick brash mats will be used and maintained and will be removed once felling is complete. At no time will brash be allowed to accumulate in drains, no matter how small. If brash has to be stockpiled it will be in dry areas as far from drainage as possible.

Temporary water crossings (Section 8 DAFM (2019)):

- Direct crossing over stream beds will not be permitted.
- Crossing of on-site forest drains / 'relevant watercourses' and aquatic zones will be avoided.
- The crossing of drains during felling and extraction will be minimised, and machine activity will be restricted to brashed extraction racks and haulage routes.
- Where a drain crossing is needed, a method will be selected that prevents the breakdown and erosion of drain sides.
- For larger drain crossings, i.e., those with standing water or obvious water flow, a heavy-duty plastic culvert will be deployed lengthways into the channel and covered with brash material.
- For smaller drain crossings, i.e., those that have no standing water and are generally dry, log sections will be temporarily laid lengthways into the channel and overlaid with brash.
- When installing and removing the temporary crossings, it will be ensured that no additional work is carried out within the aquatic zone, and that the upstream and downstream stream bed and bankside remain undisturbed

Surface-Water Run-Off: Earthworks

The following Guidelines apply during all construction activities involving excavations and earthworks; Guidelines for the crossing of Watercourses During Construction of National Road Schemes (NRA, 2008), IFI (2016) Guidelines on protection of fisheries during construction works in and adjacent to waters, Control of water pollution from linear construction projects. CIRIA C648 (2006).

The qualified, experienced Environmental Clerk of Works (ECoW) will be responsible for daily, weekly and monthly checks that ensure all water quality protection measures and guidelines are complied with during the pre-commencement and active earthworks / excavations period of the construction phase. The ECoW will carry out daily visual checks of all measures employed to control, avoid or reduce export of suspended solids and sediment from active earthworks areas.

A detailed and comprehensive pre-commencement confirmatory audit of the existing road drainage features will be undertaken by the contractor and ECoW to identify areas where existing and additional run-off control features will be installed and/or improved in compliance with the detailed drainage design accompanying this application. This applies to the Proposed Development site and the site access road. There are numerous unmapped, small forestry and existing roadside drains that will require sediment run-off control features during the construction phase and these will all be subject to run-off control features including cut-off drains, check-dams, silt fencing and settlement pond installation.

General Sediment Control Measures:

- Before operations commence, a 10m wide 'Water Exclusion Zone' will be identified along the edge of all watercourses and active drains on access road upgrade routes. There will be no stockpiling of excavated earth and/or road / hardstand surfacing materials in this zone.
- Tracking or fording across the exclusion zone or watercourse streambeds is prohibited – the existing crossing points on access roads will be used.
- Topsoil stripping in proximity to any watercourses will be undertaken in dry weather conditions and any spoil stockpiles must be located greater than 50m from a watercourse, and/or at least 10m away from a non-flowing drain, surrounded with double lines of geotextile silt fencing to prevent escapement of suspended solids.
- Prior to the commencement of operations, silt traps and check-dams will be installed within existing swales / drains that connect with watercourses, either directly or indirectly via other drains.
- Silt traps will be staggered along the length of swales / drains, and not only at the lower reaches towards the outflow to watercourses.
- Silt fences will be installed where necessary, to intercept pathways for silt runoff where overland flow towards watercourses is possible.
- Attenuation / settlement ponds will be installed as specified in the site drainage plan on downslopes of new internal access road constructions in areas where it is difficult to control run-off, i.e., where there is steep topography.
- Once check-dams, attenuation / settlement ponds, silt traps and silt fences are installed and works commence, they will be checked a minimum of twice weekly and maintained as necessary, in order to ensure continued effectiveness throughout earthworks and excavation operations.
- Crushed rock for road resurfacing should be locally sourced with low limestone content to limit potential for pH changes linked to sediment washout to watercourses and downstream fisheries habitats.

New and Upgraded Access Roads:

Regarding internal access road upgrades, there will be limited, if any "cleaning" of existing vegetation of any existing drains, swales or ponds, as their vegetated state reduces run-off velocity and prevents scour / erosion, contributing to avoidance and reduction of solids export through scour protection, retention and attenuation function. In place where it's not possible to retain full lengths of existing swale / drain vegetation – then intermittent lengths of existing vegetation will be marked out and retained, supplemented by check dams, until after the bulk of access road upgrade works are complete. Freshly "cleaned" or excavated swales / drains will have intermittent, well-constructed check-dams installed along the length - comprised of gravel mounds and staked geotextile dams. Check-dams will then become permanent features of the swale, helping to manage run-off velocities during the operation phase.

Borrow Pit:

The relatively low gradient topography and contained nature of the proposed borrow pit location (set into the hillside) means there is good opportunity to implement silt and sediment controls on

hydrological pathways that will avoid and minimise potential for excessive suspended solids loads to reach the Thureehouma stream in the first place.

The approach to dirty water management at the borrow pit will be through a series of gravel and/or staked geotextile check dams will be installed along the main preferential flow path exiting the borrow pit area. Temporary attenuation/settlement ponds will be installed downslope from the borrow pit on surface water run-off flow paths.

Cable Trenching:

- All trenching works will be undertaken using a cut and fill procedure to ensure that only short sections of the trench (≤50m) are open at any time. The trench construction reaches will be limited to lengths that can be trenched, ducted and back-filled within the same work day.
- There will be no discharge of silt contaminated pump-out water directly to on-site drains or watercourses. Any silt contaminated water which gathers in an excavated trench will be collected and treated appropriately using Best Practice methods (e.g., silt bags, settlement systems) before being discharged. Treated water will be discharged across vegetated land to drain slowly into any nearby drain or watercourse.
- Any freshly excavated spoil will be retained in an area over 10m away from any drain or watercourse until such time as the trench is refilled. The spoil heap will be located on either a well vegetated area surrounded by silt fencing or with the use of containment measures (geotextile mat or bag) and covered to reduce potential for sediment wash out. A ready supply of these materials will be onsite to deal with such eventualities. Spoil heaps are unlikely to accumulate because trenches will be immediately back filled following ducting installation.
- At the watercourse crossings, a method of water management such as dam and pump over will be used to create a short, dry working area for cable-trenching. There is no fisheries significance at these upper headwater locations and hence no requirement for fish removal. Stony stream bed substrates will be removed and stockpiled immediately nearby, and these will be reused for reinstatement of streambed and banks to pre-existing condition once the trench is backfilled. Any additional stony streambed reinstatement material will be of a locally sourced type (e.g., from the borrow pit).

Surface-Water Run-Off: Watercourse Crossings

The following Guidelines apply during all construction activities involving watercourse crossings; Guidelines for the crossing of Watercourses During Construction of National Road Schemes (NRA, 2008), IFI (2016) Guidelines on protection of fisheries during construction works in and adjacent to waters, Control of water pollution from linear construction projects. CIRIA C648 (2006).

All of the general sediment control measures outlined for the management of surface water run-off during earthwork construction activities above will be adhered to as well as the specific measures set out below.

Measures relating to Culvert Upgrades – Instream Works

- Instream works may only occur during the period July to September (of any year).

- Culverts will be subject to Section 50 consent (Arterial Drainage Act 10945), being no less than 900mm in diameter and meeting hydraulic design standards, i.e., capable of passing a fluvial flood flow with a 1% annual exceedance probability (AEP) or 1 in 100 year flow without significantly changing the hydraulic characteristics of the watercourse.
- Culvert upgrades will utilise pre-cast concrete components to eliminate risk of wet cement wash-out.
- Although there is no fisheries significance in the upper Roughty or Flesk tributaries, IFI must be provided with details of the updated construction methodology (following planning permission) for the culvert upgrades and be notified prior to instream works commencing.
- A method of water management such as dam and pump over will be used to create a dry working area for instream culvert upgrade works.
- Pumps will remain on-hand to remove ingress water through dams and from groundwater sources. Pump-out water will be extracted from a sunken, gravelled sump area within the 'dry' work area and discharged over 20m away from the stream onto an area of low gradient, rough vegetation surrounded with a double line of silt fencing.
- There is no fisheries significance at the upper headwater culvert upgrade locations in the Roughty or the Flesk sub-catchment and hence no requirement for fish removal.
- The ECoW must be on hand when each channel is dewatered to ensure that all water management, pump-over, pump-out and sediment containment measures are operating effectively to prevent export of solids (and other pollutants) from the works area.
- Stony stream bed substrates will be removed locally and stockpiled immediately nearby, and these will be reused for reinstatement of streambed and banks to pre-existing condition once the trench is backfilled. Additional stony streambed reinstatement material will be of a locally sourced type (e.g., from the borrow pit).
- Stream bed and banks will have rock armour installed to prevent scour upstream and downstream ends of the upgraded culverts. These are steep, step-pool type watercourses and rock armour will be installed as appropriate to the pre-existing channel gradient.

Mitigation Measures for the Control of Invasive Species

A pre-construction survey will be carried out to confirm the presence/absence of Third Schedule Invasive plant species in or directly adjacent to the works footprint. In the event that any Third Schedule Invasive species are recorded in this area an Invasive Management Plan will be prepared by a suitably qualified ecologist. A suitably qualified specialist will be appointed if necessary to deliver any recommended control or eradication plans. The plan, if required, will be integrated into the contractor's CEMP.

To prevent Japanese Knotweed or other invasive species from outside the site being inadvertently being brought into the site, the contractor will be required to inspect, clean and wash down vehicles in a specific area within the site compound before using them on site.

Mitigation Measures for Kerry Slug

Due to the unavoidable disturbance to Kerry Slug habitat within the Proposed Development site, a derogation license will be sought from the NPWS prior to the commencement of construction. Works

will be carried out in compliance with any conditions set by such the license. To minimise effects on Kerry Slug areas of suitable habitat that occur outside of the footprint of the development shall be avoided during the course of construction thereby minimising the loss and disturbance of Kerry Slug habitat. Immediately prior to undertaking works in areas of suitable habitat, the ECoW, or nominated specialist, will check for the presence of Kerry Slug. The preferred method shall be hand-searching. Should slugs be discovered then they will be transferred to suitable habitat identified outside of the works footprint. Throughout construction, monitoring of suitable habitat within works areas will continue using a combination of metric traps and regular hand-searching. Hand-searching will be undertaken during periods of wet weather when slugs are most active and feeding on the surface and therefore at greater risk of impacts *e.g*. from site traffic.

Mitigation Measures for Lesser Horseshoe Bat

A passive bat monitoring programme will be carried out at the site throughout the construction phase.

All lighting systems will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible, and all non-essential lighting will be switched off during the hours of darkness.

Mitigation Measures for Hen Harrier

Standard Vantage Point Monitoring in accordance with the Survey Methods for Use in Assessing the Impacts of Onshore Wind farms on Bird Communities (Scottish Natural Heritage. 2018) will be carried out during the construction year by competent experienced ornithologists. The survey shall cover the development footprint and all areas within 500m of the works.

No clearance of vegetation will be carried out in the bird breeding season (March to August inclusive). In the unlikely event that any nesting/roosting Hen Harrier are recorded within, or in the immediate vicinity of the works footprint works will only proceed in this area on the advice of the ECoW and in consultation with NPWS.

A fatality monitoring programme for birds and bats (using dog-based searches) will be implemented during the construction phase when the old turbines are being removed and the new turbines and associated infrastructure installed. Monthly searches of turbine bases (where a turbine is present) and around met masts will be carried out throughout the construction phase with associated searcher efficiency and scavenger removal trials will also be included in the programme. A report will be prepared at the end of the construction phase and circulated for the information of the Planning Authority, Kerry County Council and NPWS.

4.2.2 Operational Phase Mitigation Measures

Mitigation measures to minimise the potential operational phase effects on the sites identified at the Screening Stage are described below.

Mitigation Measures for Kerry Slug

A Kerry Slug survey will be carried out in the first year of operation including in areas which have been translocated and a report of the survey results will be prepared for the information of the Planning Authority, Kerry County Council and NPWS.

Mitigation Measures for Lesser Horseshoe Bat

Bat activity will be monitored at the site for the first three years of operation using passive detector deployment at the same locations used to monitor activity in the construction phase. Annual reports on the occurrence and activity of Lesser Horseshoe Bat and other bats species detected will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS.

All lighting systems at the site, including at the entrance and around the existing onsite 110kV Coomagearlahy substation will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness.

As a precautionary mitigation measure, in addition to the creation of buffers between the proposed turbines and surrounding vegetation reduced rotation speed will be implemented when turbines are idling. Automatic 'feathering' of idling blades will be implemented (through SCADA) to reduce rotation speed of blades to below 2 RPM while idling. Feathering blades has been shown to be effective in reducing fatality rates of bats by up to 50% and does not result in a significant loss of energy output (SNH, 2019).

The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS.

Mitigation Measures for Hen Harrier

Vantage Point surveys (breeding and winter) will be carried out at the operational site in years 1, 2, 3, 5, 10 and 15 in accordance with guidance (e.g. SNH, 2009). Reports will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS.

The installation of warning lights on turbines can help to increase their visibility, and thereby reduce the risk of bird collision. The proposed turbines will be fitted with aviation warning lights in accordance with standard industry practice.

The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS.

4.3 NIS Summary and Conclusion

4.3.1 Integrity Of The Site

From the Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2002), the meaning of integrity is described as follows:

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

The concept of the 'integrity of the site' is also explained in the EU publication Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000), as follows:

'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will anyway remain favourable within the European territory of the Member State.

4.3.2 Integrity of the Natura 2000 Sites within the Project Zone of Influence

Potential for any significant adverse effects will be resolved through the implementation of the mitigation commitments outlined in Section 4.2 above and contained in the CEMP (Appendix D).

From the information gathered and the predictions made about the changes that are likely to result from the construction and operational stages of the project and the mitigation measures proposed to avoid impacts to the relevant Natura 2000 sites, an Integrity of Site Checklist for Natura 2000 sites considered in this Natura Impact Statement is presented in Table 4-5 below.

Table 4-5 Integrity of Site Checklist for Natura 2000 Sites within the Project Zone of Influence

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
Cause delays in progress towards achieving the conservation objectives of the site?	No	There will be no direct impacts to the QIs/SCIs of Natura 2000 sites located within the project ZoI and considered in this NIS. Potential indirect effects to the Natura 2000 sites via water quality deterioration, the spread of invasive species, the deterioration of the aquatic habitat for Otter and the disturbance/displacement of Kerry Slug, Lesser Horseshoe Bat, and Hen Harrier as a result of the Proposed Development have been considered in the above assessment. Works practices and design measures have been proposed in the Section 4.2 of the above assessment and the CEMP report (Appendix D) to address all potential impacts arising from water quality deterioration, the spread of invasive species, and all potential impacts to the relevant QI /SCI species of the Natura 2000 sites within the ZOI. The Proposed Development will therefore not cause delays in achieving the conservation objectives of Natura 2000 sites within project ZoI.
Interrupt progress towards achieving the conservation objectives of the site?	No	The Proposed Development will not interrupt the achievement the site's Conservation Objectives or those factors that help maintain the favourable conditions of the site or interfere with the distribution and density of key indicator species. Potential indirect effects to the Natura 2000 sites via water quality deterioration, the spread of invasive species, the deterioration of the aquatic habitat for Otter and the disturbance/displacement of Kerry Slug, Lesser Horseshoe Bat, and Hen Harrier as a result of the Proposed Development have been considered in the above assessment. Works practices and design measures have been proposed in the Section 4.2 of the above assessment and the CEMP report (Appendix D) to address all potential impacts arising from water quality deterioration, the spread of invasive species, and all potential impacts to the relevant QI /SCI species of the Natura 2000 sites within the ZOI *i.e.*, Killarney National
Disrupt those factors that help to maintain the favourable conditions of the site?	No	
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No	

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
		Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old Domestic Building Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC and Mullaghanish to Musheramore Mountains SPA.
Other Objectives: Does the project have the potential to:	**Yes or No**	**Comment**
Cause changes to the vital defining aspects (e.g., nutrient balance) that determine how the site functions as a habitat or ecosystem?	No	The Proposed Development will not cause changes to the defining aspects, or the dynamics of key relationships associated with Natura 2000 sites. Potential indirect effects to the Natura 2000 sites via water quality deterioration, the spread of invasive species, the deterioration of the aquatic habitat for Otter and the disturbance/displacement of Kerry Slug, Lesser Horseshoe Bat, and Hen Harrier as a result of the Proposed Development have been considered in the above assessment. Works practices and design measures have been proposed in the Section 4.2 of the above assessment and the CEMP report (Appendix D) to address all potential impacts arising from water quality deterioration, the spread of invasive species, and all potential impacts to the relevant QI /SCI species of the Natura 2000 sites within the ZOI *i.e.*, Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old Domestic Building Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC and Mullaghanish to Musheramore Mountains SPA.
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No	
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No	The Proposed Development will not interfere with predicted or expected natural changes to Natura 2000 sites. Potential indirect effects to the Natura 2000 sites via water quality deterioration, the spread of invasive species, the deterioration of the aquatic habitat for Otter and the disturbance/displacement of Kerry Slug, Lesser Horseshoe Bat, and Hen Harrier as a result of the Proposed Development have been considered in the above assessment. Works practices and design measures have been proposed in the Section 4.2 of the above assessment

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
		and the CEMP report (Appendix D) to address all potential impacts arising from water quality deterioration, the spread of invasive species, and all potential impacts to the relevant QI /SCI species of the Natura 2000 sites within the ZOI *i.e*., Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old Domestic Building Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC, and Mullaghanish to Musheramore Mountains SPA.
Reduce the area of key habitats?	No	The Proposed Development will not result in the loss, reduction or change of key features associated with Natura 2000 sites. The Proposed Development is located within an existing wind farm proximate to, but outside any designated Natura 2000 sites, nor does it require any resources from these sites; thereby ruling out any direct habitat loss at the conservation sites in question. Potential indirect effects to the Natura 2000 sites via water quality deterioration, the spread of invasive species, the deterioration of the aquatic habitat for Otter and the disturbance/displacement of Kerry Slug, Lesser Horseshoe Bat, and Hen Harrier as a result of the Proposed Development have been considered in the above assessment. Works practices and design measures have been proposed in the Section 4.2 of the above assessment and the CEMP report (Appendix D) to address all potential impacts arising from water quality deterioration, the spread of invasive species, and all potential impacts to the relevant QI /SCI species of the Natura 2000 sites within the ZOI *i.e*., Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old Domestic Building Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC, and Mullaghanish to Musheramore Mountains SPA.
Reduce the population of key species?	No	
Change the balance between key species?	No	
Reduce diversity of the site?	No	
Result in disturbance that could affect population size or density or the balance between key species?	No	The Proposed Development will not result in disturbance that will affect population size or densities of Qualifying features associated with the Natura 2000 sites within the project ZoI. The mitigation strategy will ensure that no disturbance impacts that could affect

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
		the population size or density, or the balance between key species will occur.
Result in fragmentation?	No	There will be no fragmentation of Natura 2000 sites within the project ZoI. The mitigation strategy will ensure that there is no risk of fragmentation associated with the proposed wind farm development.
Result in loss or reduction of key features (e.g., tree cover, tidal exposure, annual flooding, etc.)?	No	The Proposed Development will not result in the loss or reduction of key features of Natura 2000 Sites. The mitigation strategy will ensure that there is no risk of loss or reduction of key features associated with the proposed wind farm development.

4.4 Conclusion

The AA Screening (see **Section 3**) found that it could not be excluded, on the basis of objective scientific information that the proposed works, individually or in combination with other plans or projects, would have a significant effect on five Natura 2000 sites: Killarney National Park, Macgillycuddy's Reeks & Caragh River Catchment SAC, Old domestic building, Curraglass Wood SAC, Kilgarvan Ice House SAC, Kenmare River SAC, and Mullaghanish to Musheramore Mountains SPA. Therefore, a NIS (presented in **Section 4**) was required to ascertain whether the proposed works would have an adverse effect on the integrity of the Natura 2000 sites.

Best practice environmental control measures and mitigation measures (as outlined within **Section 4.2** and the CEMP in **Appendix D**) have been identified to minimise the risk of potential impacts arising from water quality deterioration, the spread of invasive species, and all potential impacts to the relevant QI /SCI species such that there will be no risk of adverse effects on these Qualifying Features of Natura 2000 sites within this project's ZoI.

It has been objectively concluded that the Proposed Development will not adversely affect the integrity of a Natura 2000 sites, and there is no reasonable scientific doubt in relation to this conclusion.

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APPENDIX A:

Finding of No Significant Effects Report:

Blackwater River SAC, St. Gobnet's Wood SAC, Glanlough Woods SAC, Killarney National Park SPA, Mullaghanish Bog SAC, Derryclogher Bog SAC, Sheheree Bog SAC, Castlemaine Harbour SAC and Castlemaine Harbour SPA

Name and location of the Natura 2000 sites.	• Blackwater River SAC, 7km from the Proposed Development site • St. Gobnet's Wood SAC, 7.8 km from the proposed development site • Glanlough Woods SAC,8 km from the Proposed Development site • Killarney National Park SPA, 9.2km from the Proposed Development site • Mullaghanish Bog SAC, 9.3km from the Proposed Development site • Derryclogher Bog SAC, 10.6km from the Proposed Development site • Sheheree Bog SAC, 13.5km from the Proposed Development site • Castlemaine Harbour SAC, 18.9km from the Proposed Development site • Castlemaine Harbour SPA, 34.1km from the Proposed Development site (see **Error! Reference source not found.** above).
Description of the project or plan.	The Proposed Development site is located approximately 5.5km northeast of the village of Kilgarvan Co. Kerry, and approximately 6km west of Coolea, Co. Cork. Current land use on the site comprises wind energy in relation to the Existing Kilgarvan Wind Farm, low-intensity agriculture and small areas of coniferous forestry. Land use in the wider landscape of the site comprises a mix of agriculture, low density residential areas, commercial forestry and wind energy. It is proposed to access the wind farm site via the existing wind farm entrance and 7.9km access road, off the N22 at Cloonkeen. The Proposed Development will comprise the removal of 28 no. existing wind turbines, the construction of 11 No. wind turbines with a maximum blade tip height of 199.5-200 metres and all associated works. The Proposed Development will utilise the Existing Kilgarvan Wind Farm onsite 110kV Coomagearlahy electrical substation, along with the existing 110kV overhead line to Cloonkeen 110kV Substation. The planning application will be submitted to An Bord Pleanála as a Strategic Infrastructure Development (SID), as the 11 no. turbines meet the potential generation capacity of greater than 50MW.
Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?	No.
Are there other projects or plans that together with the project of plan being assessed could affect the site (provide details)?	No.

The Assessment of Significant Effects	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.	Due to the reasons outlined in the following section, it is felt that no elements of the project are likely to impact on the Natura 2000 sites; Blackwater River SAC, St. Gobnet's Wood SAC, Glanlough Woods SAC, Killarney National Park SPA, Mullaghanish Bog SAC, Derryclogher Bog SAC, Sheheree Bog SAC.
Explain why these effects are not considered significant.	• These Natura 2000 sites are located distant from the site (>7km). • Indirect surface-water run-off impacts on Blackwater River SAC, St. Gobnet's Wood SAC, Glanlough Woods SAC, Mullaghanish Bog SAC, Derryclogher Bog SAC, Sheheree Bog SAC as a result of the Proposed Development are not relevant here as these listed Natura 2000 sites do not share a hydrological connection with the Proposed Development site. • While there is a hydrological connection linking the Proposed Development site to Killarney National Park SPA, it is not predicted that there is any likelihood of significant effects on the water quality within this downstream European site due to distance and dilution/settlement effect and will therefore not be considered further in this NIS. • There is no likelihood for disturbance/displacement impacts (including ex-situ impacts) on the SCI species of Killarney National Park SPA as the Proposed Development site is located outside the published foraging range of Merlin and Greater White-fronted Goose and well beyond the core foraging range at which potential connectivity with the SPA network is considered relevant. • There is no likelihood for disturbance/displacement impacts (including ex-situ impacts) on the QI species of Glanlough Woods SAC (Lesser Horseshoe Bat) given that the intervening distance between the Proposed Development site and this Nature 2000 site is well outside the core foraging range and maximum foraging range of this species. • Disturbance/displacement impacts (including ex-situ impacts) are not relevant to St. Gobnet's Wood SAC, Mullaghanish Bog SAC, Derryclogher Bog SAC and Sheheree Bog SAC as the conservation objectives for these sites relate to habitats and not fauna. • There is a distant hydrological connection between Castlemaine Harbour SAC (*c*. 34.5km via watercourses) and Castlemaine Harbour SPA (*c*. 53km via watercourses). Give the distance of the Proposed Development site from these Natura 2000 sites, and the nature of the intervening environment (e.g., Lough

	Leane), there is considered to be no likelihood of significant effects to these Natura 2000 sites.
List of agencies consulted.	n/a
Response to consultation.	n/a

Data Collected to Carry out the Assessment			
Who carried out the assessment	**Sources of Data**	**Level of assessment completed**	**Where can the full results of the assessment be accessed and viewed**
Athena Michaelides BSc & Marie Kearns BSc, MSc & Dr Gavin Fennessy BSc, PhD Zoology & MCIEEM on behalf of Ecology Ireland Ltd.	▪ Desk based surveys and site surveys of the Proposed Development site; ▪ The relevant Chapters of the EIAR accompanying the planning application for the Proposed Development; ▪ Information on the location, nature and design of the proposed project as provided by the client; ▪ Department of Housing, Planning, Community and Local Government (DHPCLG) online land-use mapping (www.myplan.ie/en/index.html); ▪ Office of Public Works (OPW) National Flood Hazard Mapping website (www.floodmaps.ie) ▪ Environmental Protection Agency (EPA) geoportal mapping tool (https://gis.epa.ie/EPAMaps/); ▪ National Parks and Wildlife Service protected site and species information and data (https://www.npws.ie/protected-sites); ▪ National Biodiversity Data Centre (www.biodiversityireland.ie); and ▪ Ordnance Survey of Ireland mapping and aerial photography (www.osi.ie). ▪ References (See Section 5)	Desktop study & ecological site surveys; am satisfied that this has yielded enough information to adequately complete a screening assessment.	Full results of the assessment are available in Sections 1-3 above.

APPENDIX B:

Ecological and Aquatic Survey Schedule Details

Table 1-1 Trail Camera Deployment Dates

ID	Date deployed	Date collected	Days
TC1	05/11/2018	12/11/2018	7
TC2	05/01/2019	06/04/2019	91
TC3	10/11/2018	21/11/2018	11
TC4	12/02/2019	26/08/2019	195
TC5	12/02/2019	31/03/2019	47
TC6	16/08/2018	26/03/2019	222
TC7	23/11/2018	02/12/2019	374
TC8	23/11/2018	02/12/2019	374
TC9	26/06/2019	15/08/2019	50
TC10	16/08/2018	26/03/2019	222
TC11	11/11/2018	15/12/2018	34
TC12	26/03/2019	30/11/2019	249
TC13	30/01/2022	26/03/2022	55
TC14	30/01/2022	26/03/2022	55
TC15	30/01/2022	26/03/2022	55
TC16	30/01/2022	26/03/2022	55
TC17	30/01/2022	26/03/2022	55
TC18	30/01/2022	26/03/2022	55
TC19	30/01/2022	26/03/2022	55
TC20	30/01/2022	26/03/2022	55

Table 1-1 Aquatic Ecology Survey Dates 2022

Survey Type	Survey Date	No. Sites
Biological water quality (Q-value) Roughty River Catchment	4/5 May 2022	18
Biological water quality (Q-value) Flesk / Sullane River catchments	23 September 2022 3 October 2022	7
Water chemistry sampling – Run 1	13 April 2022	19
Water chemistry sampling – Run 2	9 May 2022	19
Electrofishing (1)	19/20 August 2022	7
Electrofishing (2)	29 September 2022	3
Freshwater Pearl Mussel (Roughty)	5 July 2022	1.4km reach
Freshwater Pearl Mussel (Flesk)	3 October 2022	9km reach

Table 1-2 Aquatic Ecology Survey Sites, Types and Locations

Sub-catchment	Site			Q-value	Water	Fish	Habitat
Roughty (Thureehouma)	K3	506739	577246		√		√
	K4	506766	577119	√	√		√
	K5	506526	577031	√	√	√	√

	K27	505850	575788	√	√	√	√
Roughty (Lettercannon)	K23	506750	575270	√	√	√	√
	K25	507489	545658	√	√	√	√
	K9	509976	576170	√	√		√
Roughty (Glanlee)	K12	509149	576307		√		√
	K13	509061	576218	√	√		√
	K14	508824	576199		√		√
	K16	508928	575840	√	√	√	√
	K17A	508870	575242	√	√	√	√
	K18	507930	575117			√	√
	K18B	508078	575311	√	√	√	√
	K20A	509786	576634	√	√		√
	K19	507240	574589	√	√	√	√
	K19 US	507162	574725	√	√		√
Roughty (Main channel)	K19 DS	507213	574584	√	√		√
	K23 US	506754	575187	√			√
	K23 DS	506679	575282	√	√		√
	K27 US	506029	575696	√			√
	K27 DS	505770	575764	√			√
	K29	505909	575718		√		√
Flesk	F1	510171	582038				√
	F2	509534	581783	√			√
	F3	508595	581517	√			√
	F4	510632	582024	√			√
	F5	510560	581867	√			√
	F6	511012	581963	√			√
	F7	509714	581792	√			√
	F8	510278	581020	√			√
	F9	511583	579783				√
	F10	511418	579525				√
	F11	511177	578911				√
	F12	511160	578808				√
	F13	510797	578499				√
	F14	510846	578319				√
Sullane	S1	510608	577630	√			√
	S2	510608	577630				√

Table 1-3 Roughty and Flesk River Pearl Mussel Survey Reach

River	Reach co-ordinates ITM (X,Y)
Roughty	US: 507115, 574856
	DS: 500659, 572951
Flesk	US: 509670, 581888
	DS: 508595, 581517

APPENDIX C:

Bat Survey Results

Table 1 Deployment details of passive bat detectors (2018-2019).

ID	Deployment Date	Recorded until	No. of nights	Notes
BD1	26/06/2019	04/07/2019	8	Common Pipistrelle dominant
BD2	25/11/2018	08/12/2018	13	No bats recorded
BD3	26/06/2018	27/07/2018	31	Not recording at height
BD4a	25/10/2018	01/11/2018	7	Recorded near ground level. No bats recorded
BD4b	25/10/2018	01/11/2018	7	Recorded at height. No bats recorded
BD5a	21/11/2018	16/01/2019	56	Recorded at ground level. No bats recorded
BD5b	21/11/2018	16/01/2019	56	Recorded at height. No bats recorded
BD6	26/03/2019	28/04/2019	33	One Lesser Horseshoe Bat registered
BD7	26/06/2019	18/07/2019	22	Soprano Pipistrelle dominant
BD8a	11/10/2018	20/10/2018	9	Ground level
BD8b	11/10/2018	20/10/2018	9	At height
BD9	21/08/2019	31/08/2019	10	No bats recorded - was recording at height (lower mic disconnected)

Table 2 Results of the analysis of passive bat detector deployments at the site in 2018-2019.

Species	BD1	BD2	BD3	BD4	BD5	BD6	BD7	BD8a	BD8b	BD9
Common Pipistrelle	77					3	52	5	2	
Soprano Pipistrelle			6				228			
Leisler's Bat			138					5	1	

Species	BD1	BD2	BD3	BD4	BD5	BD6	BD7	BD8a	BD8b	BD9
Brown Long-eared Bat	3		1					2		
Daubenton's Bat	3							2		
Natterer's Bat	4									
Myotis sp.	3							1	1	
40/50 kHz Pipistrelle	1						19		2	
Lesser Horseshoe Bat						1				

Table 3 Passive bat detector deployment coverage 2021-2022.

Turbine no.	Preliminary Layout Sampling	Data coverage
T1	Between preliminary layout sampling locations 1 & 2	T1 (Autumn 2022), Location 1 (Spring, Autumn 2021; Spring, Summer 2022) Location 2 (Summer 2021; Spring, Summer 2022)
T2	West of preliminary layout sampling location 5 and south of location 6	T2 (Autumn 2022), Location 5 (Spring 2021; Spring, Summer 2022), Location 6 (Spring, Summer 2021; Spring, Summer 2022)
T3	West of preliminary layout sampling location 3 and east of location 7	T3 (Autumn 2022), Location 3 (Spring, Summer, Autumn 2021; Spring, Summer 2022), Location 7 (Spring, Summer, Autumn 2021; Spring, Summer 2022)
T4	Very close to preliminary sampling location 8	T4 (Autumn 2022), Location 8 (Summer, Autumn 2021; Spring, Summer 2022)
T5	Between preliminary layout sampling location 10 and 11 and west of location 8	T5 (Autumn 2022), Location 10 (Spring, Summer, Autumn 2021; Spring, Summer 2022), Location 11 (Spring 2021), Location 8 (Spring, Summer, Autumn 2021; Spring, Summer 2022)
T6	Very close to preliminary layout sampling location 12	T6 (Autumn 2022), Location 12 (Summer, Autumn 2021; Spring, Summer 2022)

Turbine no.	Preliminary Layout Sampling	Data coverage
T7	Very close to preliminary layout sampling location 16	T7 (Autumn 2022), Location 16 (Spring, Summer, Autumn 2021; Spring, Summer 2022)
T8	Just east of preliminary layout sampling location 9	T8 (Autumn 2022), Location 9 (Spring, Summer, Autumn 2021; Spring, Summer 2022)
T9	North of preliminary sampling location 13, south of preliminary sampling location 14	T9 (Autumn 2022), Location 13 (Spring, Summer, Autumn 2021; Spring, Summer 2022), Location 14 (Spring, Summer, Autumn 2021; Spring, Summer 2022)
T10	East of preliminary sampling location 15 and west of location 13 north of western met mast in very open area	T10 (Autumn 2022), Location 15 (Spring, Summer, Autumn 2021), Location 13 (Spring, Summer, Autumn 2021; Spring, Summer 2022). Additional recording from met mast (at height)
T11	South of preliminary layout sampling location 13 and southwest of location 9	T11 (Autumn 2022), Location 13 (Spring, Summer, Autumn 2021; Spring, Summer 2022), Location 9 (Spring, Summer, Autumn 2021; Spring, Summer 2022)

Table 4 Summer 2021 passive detector deployment details.

Deployment loc	Dep. date	Record until	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
L2	07/07/2021	03/08/2021	27	274	7	11	14th, 16th, 17th, 18th, 20th, 21st, 22nd, 23rd, 24th & 30th and 1st August	55 (19th July)

Deployment loc	Dep. date	Record until	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
L3	07/07/2021	12/08/2021	36	802	8	23	8th, 13th, 14th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 27th, 28th and 30th July and 1st, 2nd, 3rd, 8th, 9th, 11th & 12th August	255 (18th July)
L6	07/07/2021	19/07/2021	12	283	6	6	8th, 13th, 15th, 16th, 17th & 18th July	79 (8th July)
L7	07/07/2021	02/08/2021	26	503	7	20	8th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 27th, 28th, 30th & 31st July and 1st August	112 (19th July)
L8	07/07/2021	19/07/2021	12	49	7	5	8th, 14th, 15th, 16th & 17th July	27 (16th July)
L9	07/07/2021	17/08/2021	41	361	7	23	8th, 12th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 27th, 30th & 31st July and 1st, 2nd, 3rd, 4th, 8th, 13th, 15th & 16th August	62 (19th July)
L10	07/07/2021	04/08/2021	28	102	6	13	12th, 13th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th & 25th July and 4th August	36 (19th July)

Deployment loc	Dep. date	Record until	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
L12	07/07/2021	16/08/2021	40	463	8	24	8th, 13th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 28th, 30th & 31st July and 2nd, 3rd, 8th, 9th, 11th, 12th, 13th, 15th & 16th August	166 (19th July)
L13	07/07/2021	10/08/2021	34	399	8	23	8th, 9th, 12th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 27th, 28th & 30th July and 1st, 3rd, 4th, 8th, 9th & 10th of August	73 (16th July)
L14	07/07/2021	17/08/2021	41	455	6	24	8th, 13th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 30th & 31st July and 1st, 3rd, 4th, 8th, 9th, 12th, 13th, 14th & 16th August	114 (24th July)
L15	07/07/2021	16/08/2021	40	677	9	28	8th, 9th, 13th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th & 29th July and 1st, 2nd, 3rd, 5th, 8th, 9th, 10th, 11th, 12th, 13th, 14th & 15th August	218 (19th July)
L16	07/07/2021	19/07/2021	12	55	6	7	8th, 12th, 13th, 15th, 16th, 17th & 18th July	18 (16th July)

Table 5 Registrations of bats at each deployment location in Summer 2021.

Species	L2	L3	L6	L7	L8	L9	L10	L12	L13	L14	L15	L16
Myotis sp.	4	6	3	6	2	6	2	1	5	3	2	5
Common Pipistrelle	39	204	177	94	7	93	75	166	115	99	314	8
Leisler's Bat	216	410	69	353	22	185	3	241	151	309	232	18
Soprano Pipistrelle	9	134	32	28	2	49	17	24	112	36	111	15
Brown Long-eared Bat	2	8	1	6	4	7	1	21	5	6	4	
Daubenton's Bat	2	30		9	7	20	4	8	9		8	7
Natterer's Bat		8		7	5	1		1			2	2
40/50kHz Pipistrelle	2	2	1					1	1	2	3	
Lesser Horseshoe Bat									1		1	

Table 6 Autumn 2021 passive detector deployment details.

Deployment loc	Dep. date	Record until	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
L1	17/08/2021	31/08/2021	14	245	7	12	17th, 19th, 20th, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th & 30th August	65 (23rd August)
L3	17/08/2021	08/09/2021	22	1457	9	21	17th, 18th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st August and 1st, 2nd, 3rd, 4th, 5th, 6th & 7th September	450 (5th September)
L7	17/08/2021	08/09/2021	22	258	7	20	17th, 19th 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st July and 1st, 2nd, 3rd, 5th, 6th & 7th August	58 (26th August)

Deployment loc	Dep. date	Record until	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
L8	17/08/2021	08/09/2021	22	353	8	20	17th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st August and 1st, 2nd, 3rd, 4th, 5th, 6th & 7th September	49 (23rd & 26th August)
L9	17/08/2021	08/09/2021	22	283	8	20	17th, 19th, 20th, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st August and 1st, 2nd, 3rd, 4th, 5th, 6th & 7th September	57 (23rd August)
L10	17/08/2021	08/09/2021	22	120	5	18	17th, 20th, 21st, 23rd, 25th, 26th, 27th, 28th, 29th, 30th & 31st August and 1st, 2nd, 3rd, 4th, 5th, 6th & 7th September	23 (26th August)
L12	17/08/2021	08/09/2021	22	410	7	20	17th, 18th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st August and 1st, 2nd, 3rd, 5th, 6th & 7th September	65 (23rd August)
L13	17/08/2021	08/09/2021	22	444	8	22	17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st August and 1st, 2nd, 3rd, 4th, 5th, 6th & 7th September	63 (23rd & 26th August)
L14	17/08/2021	08/09/2021	22	555	8	21	17th, 18th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st August and 1st, 2nd, 3rd, 4th, 5th, 6th & 7th September	220 (26th August)

Deployment loc	Dep. date	Record until	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
L15	17/08/2021	08/09/2021	22	991	8	19	17th, 18th, 20th 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st August and 1st, 2nd, 3rd, 4th, 6th & 7th September	602 (26th August)
L16	17/08/2021	08/09/2021	22	633	7	22	17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th & 31st August and 1st, 2nd, 3rd, 4th, 5th, 6th & 7th September	105 (23rd August)

Table 7 Registrations of bats at each deployment location in Autumn 2021.

Species	L1	L3	L7	L8	L9	L10	L12	L13	L14	L15	L16
Myotis sp.	6	26	4	18	3	3	19	3	5	4	22
Common Pipistrelle	70	836	73	132	121	84	159	194	153	471	251
Leisler's Bat	110	99	109	51	55	2	89	80	234	358	109
Soprano Pipistrelle	26	255	36	53	65	29	80	123	124	136	174
Brown Long-eared Bat	17	115	16	58	17	2	13	15	27	9	27
Daubenton's Bat	14	109	18	31	15		38	19	6	10	31
Natterer's Bat	2	12	2	7	5		12	9	4		19
40/50kHz Pipistrelle		4		3				1	2	2	
Lesser Horseshoe Bat		1			2					1	

Table 8 Spring 2022 passive detector deployment details.

Deployment loc	Recorded until	Collection Date	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
L1	12/04/2022	26/04/2022	14	11	4	6	12th, 13th, 15th, 22nd, 23rd & 24th April	5 (24th April)
L2	12/04/2022	26/04/2022	14	0	0	0	None	n/a
L3	12/04/2022	26/04/2022	14	3	3	3	13th, 23rd & 25th April	1 (13th, 23rd & 25th April)
L5	12/04/2022	26/04/2022	14	152	3	9	12th, 15th, 17th, 20th, 21st, 22nd, 23rd, 24th & 25th April	106 (22nd April)
L6	12/04/2022	26/04/2022	14	38	4	9	13th, 15th, 18th, 19th, 20th, 21st, 22nd, 23rd & 25th April	10 (19th April)
L7	12/04/2022	26/04/2022	14	8	3	5	13th, 15th, 16th, 19th & 24th April	3 (16th April)
L8	12/04/2022	26/04/2022	14	8	4	6	12th, 13th, 16th, 18th, 24th & 25th April	2 (16th & 18th April)
L9	12/04/2022	26/04/2022	14	36	3	2	14th & 25th April	35 (25th April)
L10	12/04/2022	26/04/2022	14	3	2	2	17th & 19th April	2 (17th April)
L12	12/04/2022	26/04/2022	14	9	3	4	15th, 19th, 21st & 24th April	3 (19th April)
L13	12/04/2022	26/04/2022	14	11	5	8	12th, 13th, 15th, 19th, 20th, 21st, 23rd & 24th April	3 (13th April)
L14	12/04/2022	26/04/2022	14	9	3	4	15th, 19th, 21st & 24th April	3 (19th April)
L16	12/04/2022	26/04/2022	14	7	5	2	15th & 23rd April	6 (15th April)
Met Mast (East)	12/04/2022	26/04/2022	14	0	0	0	n/a	n/a
Met Mast (West)	12/04/2022	26/04/2022	14	0	0	0	n/a	n/a

Table 9 Registrations of bats at each deployment location in Spring 2022. Note there was no activity recorded at the met masts.

Species	L1	L2	L3	L5	L6	L7	L8	L9	L10	L12	L13	L14	L16
Myotis sp.	4	0			4	2	2		2	2	1	2	2

Species	L1	L2	L3	L5	L6	L7	L8	L9	L10	L12	L13	L14	L16
Common Pipistrelle	5	0		1		2				4	3	4	2
Leisler's Bat	1	0	1	148	23		2	31					
Soprano Pipistrelle	1	0					2				3		1
Brown Long-eared Bat		0		3			2			3	2	3	1
Daubenton's Bat		0	1		10	4			1		2		1
Natterer's Bat		0			1								
40/50kHz Pipistrelle			1					1					
Lesser Horseshoe Bat								4					

Table 10 Summer 2022 passive detector deployment details.

Deployment loc	Recorded until	Collection Date	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
L1	31/05/2022	21/06/2022	21	45	5	9	2nd, 6th, 11th, 12th, 13th, 14th, 15th & 16th June	15 (15th June)
L2	31/05/2022	21/06/2022	21	24	4	7	4th, 6th, 12th, 13th, 14th, 15th & 16th June	6 (14th June)
L3	31/05/2022	21/06/2022	21	15	2	6	6th, 12th, 13th, 14th, 15th & 16th June	5 (13th June)
L5	31/05/2022	21/06/2022	21	257	5	14	31st May and 3rd, 4th, 6th, 9th, 10th, 12th, 13th, 14th, 15th, 16th, 17th, 18th & 19th June	160 (19th June)
L6	31/05/2022	21/06/2022	21	438	6	16	31st May and 1st, 2nd, 3rd, 6th, 8th, 9th, 11th, 12th, 13th,	95 (14th June)

Deployment loc	Recorded until	Collection Date	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
							14th, 15th, 16th, 17th, 18th & 19th June	
L7	31/05/2022	21/06/2022	21	63	8	13	31st May and 1st, 2nd, 3rd, 6th, 9th, 11th, 12th, 13th, 14th, 15th, 16th & 19th June	10 (2nd June)
L8	31/05/2022	21/06/2022	21	234	6	12	31st May, 3rd June, 8th, 9th, 11th, 12th, 13th, 14th, 15th, 16th, 17th & 19th June	46 (31st May)
L9	31/05/2022	21/06/2022	21	49	5	9	31st May and 3rd, 9th, 11th, 12th, 13th, 14th, 15th & 16th June	22 (13th June)
L10	31/05/2022	21/06/2022	21	25	7	9	31st May and 3rd, 8th, 12th, 13th, 14th, 15th, 16th & 19th June	6 (14th June)
L12	31/05/2022	21/06/2022	21	42	6	10	31st May and 1st, 2nd, 3rd, 11th, 12th, 13th, 14th, 15th & 16th June	11 (3rd June)
L13	31/05/2022	21/06/2022	21	0	0	0	None	n/a
L14	31/05/2022	21/06/2022	21	35	6	10	31st May, 1st, 3rd, 8th, 11th, 12th, 13th, 14th, 15th & 16th June	9 (14th June)
L16	31/05/2022	21/06/2022	21	17	5	7	31st May and 1st, 11th, 12th, 13th, 15th & 19th June	6 (12th June)
Met Mast (East)	31/05/2022	21/06/2022	21	0	0	0	n/a	n/a
Met Mast (West)	31/05/2022	21/06/2022	21	0	0	0	n/a	n/a

Table 11 Registrations of bats at each deployment location in Summer 2022. Note there was no activity recorded at the met masts.

Species	L1	L2	L3	L5	L6	L7	L8	L9	L10	L12	L13	L14	L16
Myotis sp.					4	6	23	4	3	2	0	2	3
Common Pipistrelle	38	8	10	24	407	26	14	37	9	18	0	9	6
Leisler's Bat	1	11		223	6	12	113	1	1	4	0	1	3
Soprano Pipistrelle	1	1	5	6	16	12		6	5	14	0	19	3
Brown Long-eared Bat	2			1	4	1	4	1	2		0		
Daubenton's Bat		4		3		4	72		3	2	0	3	
Natterer's Bat						1	8		2		0	1	2
40/50kHz Pipistrelle	3				1					2	0		
Lesser Horseshoe Bat						1					0		

Table 12 Autumn 2022 passive detector deployment details.

Deployment loc	Recorded until	Collection Date	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
T1	04/10/2022	26/10/2022	22	16	6	7	7th, 9th, 12th, 14th, 17th, 21st & 23rd October	4 (7th October)
T2	04/10/2022	26/10/2022	22	7	4	5	7th, 10th, 11th, 12th & 17th October	2 (7th & 12th October)
T3	04/10/2022	26/10/2022	22	92	6	8	7th, 12th, 13th, 14th, 15th, 17th, 23rd & 24th October	24 (12th October)
T4	04/10/2022	26/10/2022	22	45	7	6	7th, 10th, 12th, 15th, 17th & 23rd October	15 (12th October)
T5	04/10/2022	26/10/2022	22	9	3	7	7th, 8th, 10th, 12th, 14th, 17th & 23rd October	2 (12th & 17th October)
T6	04/10/2022	26/10/2022	22	1	1	1	7th October	1 (7th October)
T7	04/10/2022	26/10/2022	22	15	6	7	7th, 8th, 10th, 12th, 14th, 16th & 17th October	5 (12th October)
T8	04/10/2022	26/10/2022	22	12	4	6	7th, 10th, 12th, 14th, 17th & 23rd October	4 (10th October)

Deployment loc	Recorded until	Collection Date	Total	No. of Registrations	No. of Taxa	No. of nights with bat registrations	Dates	Peak Night of Registrations
T9	04/10/2022	26/10/2022	22	25	7	7	10th, 12th, 14th, 16th, 17th, 23rd & 25th October	7 (12th October)
T10	04/10/2022	26/10/2022	22	9	2	3	12th, 16th & 18th October	4 (16th October)
T11	04/10/2022	26/10/2022	22	16	5	6	7th, 8th, 10th, 16th, 17th & 23rd October	4 (16th & 23rd October)

Table 13 Registrations of bats at each deployment location in Autumn 2022. Note there was no activity recorded at the met masts.

Species	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
Myotis sp.		1	21	9	4	1	4		2		1
Common Pipistrelle	1	3	2	1			4	4			3
Leisler's Bat	2	2	2	1	4		3	4	8	3	7
Soprano Pipistrelle	1	1					2		4		
Brown Long-eared Bat	1		1	4					1		1
Daubenton's Bat	8		11	15				2	2		
Natterer's Bat	3		55	14	1			2	1		
40/50kHz Pipistrelle							1				
Lesser Horseshoe Bat				1			1		7	6	4

APPENDIX D:

Construction and Environmental Management Plan

Planning and Environmental Consultants

Construction and Environmental Management Plan

Proposed Repowering of the Existing Kilgarvan Wind Farm, Co. Kerry

Table of Contents

TABLE OF TABLES

TABLE OF PLATES

TABLE OF FIGURES

1. INTRODUCTION

This Construction and Environmental Management Plan (CEMP) has been developed by MKO on behalf of Orsted Onshore Ireland Midco Ltd. (Orsted), who intend to apply to An Bord Pleanála, for planning permission to decommission the existing 28 no. turbines onsite, and to construct 11 no turbines and all associated infrastructure in the townlands of Inchincoosh, Lettercannon, Inchee, Coomacullen in Co. Kerry. Refer to Chapter 4 of the EIAR for a detailed description of the Proposed Development.

The CEMP has been prepared in conjunction with the Environmental Impact Assessment Report (EIAR) and by the Natura Impact Statement (NIS) which will accompany the planning application for the Proposed Development to be submitted to the competent authority. Should the Proposed Development secure planning permission, the CEMP will be updated, in line with all conditions and obligations which apply to any grant of permission. The CEMP should be read in conjunction with the EIAR and the planning drawings. The CEMP will also require updating by the selected contractor in order to identify, assess and satisfy the contract performance criteria as set out by the various stakeholders. The CEMP, due to its structure and nature, will also require constant updating and revision throughout the construction period as set out below. Therefore, this is a working document and will be developed prior to and during the construction phase of the Proposed Development.

Triggers for amendments to the CEMP will include:

- When there is a perceived need to improve performance in an area of environmental impact;
- As a result of changes in environmental legislation applicable and relevant to the Proposed Development;
- Where the outcomes from auditing establish a need for change;
- Where Work Method Statements identify changes to a construction methodology to address high environmental risk; and
- As a result of an incident or complaint occurring that necessitates an amendment.

This CEMP identifies the key planning and environmental considerations that must be adhered to and delivered during site construction and operation. The Contractor, as appointed by the Project Developer, will be required to implement all of the requirements set out in this CEMP. The CEMP may be updated and revised throughout the construction phase of the Proposed Development, but all future iterations must meet or exceed the standards and requirements set out in this document and the Project Developer must be satisfied that all requirements set out in this document can and will be implemented in full by the appointed contractor.

The CEMP to be prepared by the appointed contractor will be a single, amalgamated document that can be used during the construction phase of the Proposed Development, as a single consolidated point of reference relating to all construction, environmental and drainage requirements for the Planning Authority, developer and contractors alike. The CEMP may evolve over further iterations as the construction works progress, but at all times must meet or exceed the standards and requirements set out in this document. It will be the contractor's current version of the CEMP, which at any point in time, will guide the construction activities on site and the implementation of which will be audited by an Environmental Clerk of Works (ECoW).

1.1 Scope of the Construction and Environmental Management Plan

This report is presented as a guidance document for the decommissioning of the existing 28 no. turbines and the construction of 11 no. turbines, and associated infrastructure in the townlands of Inchincoosh, Lettercannon, Inchee, Coomacullen and Cloonkeen, in Co. Kerry,

For the purposes of the CEMP:

- Where the 'Proposed Development' is referred to, this relates to all the project components described in detail in Chapter 4 of the EIAR.
- Where the 'site' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR site Boundary in green as shown on Figure 2-1. In the CEMP, it also refers to all works associated with the Proposed Development enabling works.

The CEMP outlines clearly the mitigation measures and monitoring proposals that are required to be adhered to in order to complete the works in an appropriate manner.

The report is divided into nine sections, as outlined below:

Section 1 provides a brief introduction as to the scope of the report

Section 2 outlines the site and Proposed Development details, detailing the targets and objectives of this plan along with providing an overview of construction methodologies that will be adopted throughout the Proposed Development.

Section 3 sets out details of the environmental controls to be implemented onsite. site drainage principles, traffic management, dust control, invasive species management and a waste management plan are also included in this section.

Section 4 sets out a fully detailed implementation plan for the environmental management of the Proposed Development outlining the roles and responsibilities of the project team.

Section 5 outlines the Emergency Response Procedure to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

Section 6 consists of a summary table of all mitigation proposals to be adhered to during the Proposed Development, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.

Section 7 consists of a summary table of all monitoring requirements and proposals to be adhered to during the Proposed Development, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.

Section 8 sets out a programme for the timing of the works.

Section 9 outlines the proposals for reviewing compliance with the provisions of this report.

1.2 Targets and Objectives

The following key targets and objectives will inform the final detailed design should the Proposed Development secure planning permission and proceed to the construction phase. This includes consideration of the buildability of the designs that emerge:

- Adopt a sustainable approach to construction and, ensure sustainable sources for materials supply where possible;
- Keeping all watercourses free from obstruction and debris;
- Avoidance of any pollution incident or near miss as a result of working around or close to existing watercourses and having emergency measures in place;
- Correct fuel storage and refuelling procedures to be followed;
- Air and noise pollution prevention to be implemented;
- Construction Methods and designs will be altered where it is found there is an adverse effect on the environment;
- Good waste management and house-keeping to be implemented;
- Using recycled materials if possible, e.g. excavated stone, soil and subsoil material;
- Avoidance of vandalism;
- Monitoring of the works and any adverse effects that it may have on the environment and,
- Provide adequate environmental training and awareness for all project personnel.

The key site objectives are as follows;

- Keep impact of construction to a minimum on the local environment, watercourses and wildlife;
- Comply with all relevant water quality legislation;
- Ensure construction works and activities are completed in accordance with mitigation and best practice approach presented in the Environmental Impact Assessment Report (EIAR) and associated planning documentation;
- Ensure construction works and activities are completed in accordance with any planning conditions for the development;
- Ensure construction works and activities have minimal impact/disturbance to local landowners and the local community;
- Ensure construction works and activities have minimal impact on the Natural Environment;

2. SITE AND PROPOSED DEVELOPMENT DETAILS

2.1 Site Location and Description

The Proposed Development is located approximately 5.5km northeast of the village of Kilgarvan Co. Kerry, and approximately 6km west of Coolea, Co Cork. It is proposed to access the site via the existing access off the N22 at Clonkeen. The site is served by a number of existing roads associated with the existing wind farm development, agriculture, and forestry practices.

Current land use on the subject site comprises wind energy, small areas of coniferous forestry and low-intensity agriculture. Land use in the wider landscape comprises a mix of wind energy, low intensity agriculture, one-off rural housing and commercial forestry.

The townlands in which the Proposed Development is located are listed in Table 2-1.

Table 2-1 - Townlands within which the Proposed Development is located

Development Works	Townland
Wind Turbines and associated Foundations and Hardstanding Areas, Permanent Meteorological Mast, Road Widening Works, Road Upgrade Works, Turbine Decommissioning, New Access Road, 2 no. Temporary Construction Compounds, Spoil Management, Borrow Pit, site Drainage, Tree Felling, Operational Stage site Signage and all ancillary works and apparatus.	Inchincoosh, Lettercannon, Inchee, Coomacullen and Cloonkeen.

2.2 Description of the Development

The Proposed Development will comprise the removal of 28 no. turbines and the construction of 11 no turbines with a maximum blade tip of 200m, and all associated works. The full description of the Proposed Development is detailed in Chapter 4 of the EIAR. The current planning application for the Proposed Development is being made to An Bord Pleanála under Section 37E of the Planning and Development Act, 2000, as amended. Further detail in relation to the dual consenting process is provided in Chapter 1 of the EIAR.

The development description for the current planning application as appears in the public notices is as follows:

The Proposed Development comprises:

i. *Removal of 28 no. existing turbines and relevant ancillary infrastructure permitted under Kerry County Council and An Bord Pleanála Planning References; 02/124, 03/2176, 03/2306, 07/1605, 07/4364, Pl. 08.209629, 07/4515, 07/4701, Pl. 08.232259 and 05/1351;*
ii. *Erection of 11 no. wind turbines with a blade tip height range from 199.5m to 200m, a hub height range from 118m to 125m and a rotor diameter range from 149m to 163m, along with associated foundations and hard standing areas;*
iii. *A thirty-five year operational life from the date of full commissioning of the wind farm;*

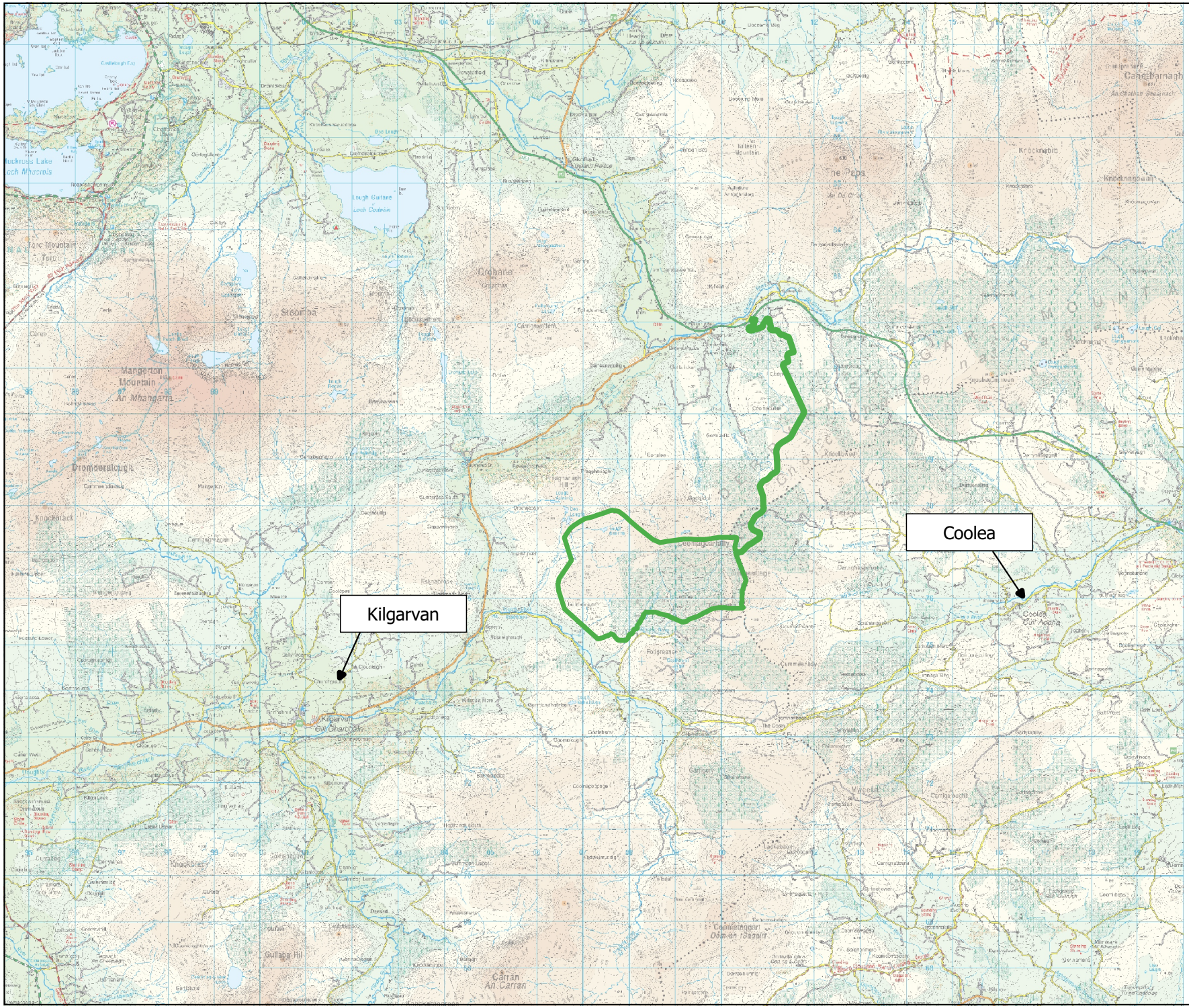
iv. *Underground electrical 33kV and communication cabling connecting the proposed turbines and meteorological mast to the existing 110kV Coomagearlahy substation in the townland of Inchee;*
v. *Upgrade of and the continued use of the existing onsite Coomagearlahy 110kV substation in the townland of Inchee, permitted under Kerry County Council References 07/3648, 04/1648, 06/1143, 06/2660;*
vi. *Upgrade of existing tracks, hardstand areas and provision of new site access roads and junctions;*
vii. *The extension and reuse of the 1 no. existing borrow pit;*
viii. *2 no. temporary construction compounds;*
ix. *Meteorological mast, with a height of 100m and upgrade of existing associated foundation and hard standing area;*
x. *Forestry felling;*
xi. *Site drainage;*
xii. *Biodiversity Enhancement measures;*
xiii. *Operational stage site signage; and,*
xiv. *All ancillary works and apparatus.*

The application is seeking a ten-year planning permission and a 35 year operational life from the date of commissioning of the renewable energy development.

The grid connection from the Proposed Development to the national grid will be via the existing onsite Coomagearlahy 110kV substation. There will be minor upgrade works to the existing onsite substation, however no upgrades will be needed for the 110kV infrastructure.

The layout of the Proposed Development has been led by consideration of constraints and facilitators, thereby avoiding the environmentally sensitive parts of the site. The design was also developed in such a way as to make use of as much of the existing infrastructure (i.e. road network, areas of hardstanding, grid connection infrastructure) as possible. The roads layout for the Proposed Development utilises existing onsite access roads where possible, with approximately 17.9 kilometres of existing roadway requiring upgrade, and approximately 1.5 kilometres of new access road to be constructed.

As part of the Proposed Development, tree felling will be required within and around the development footprint to allow for the construction of the turbines bases, widening to existing access roads, and other ancillary infrastructure. A small section of the Proposed Development site is located on commercial forestry, namely turbine no. 11 and its associated infrastructure. A total of 8.9ha of commercial forestry will be permanently felled within and around Turbine No. 11 and its associated infrastructure, along with existing treeline boundaries along the main access road into the site. The overall layout of the Proposed Development is shown on Figure 4-1 in Chapter 4 of this EIAR. The proposed site layout showing individual elements associated with the Proposed Development along with the EIAR site Boundary are shown in Figure 2-2 and Figure 2-3 respectively. Planning application drawings are provided in Appendix 4-1 of the EIAR.



Map Legend

EIAR Site Boundary

Drawing Title

Site Location

Project Title	
Proposed Repowering of the Existing Kilgarvan Wind Farm	
Drawn By: EL	Checked By: NMcH
Project No.: 211107	Drawing No.: Figure 2-1
Scale: 1:110,000	Date: 2024-04-23

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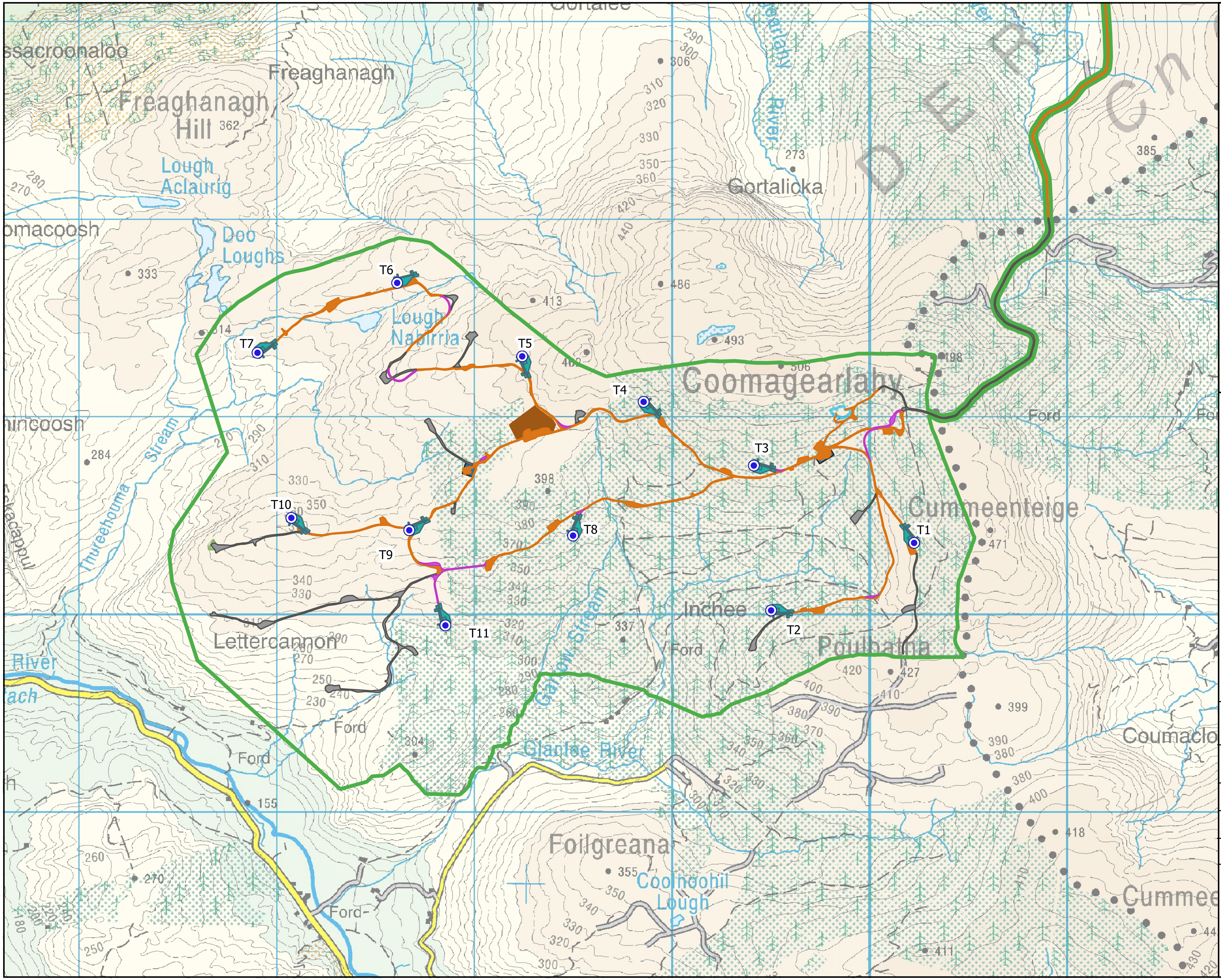

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Proposed Hardstands
- As Built Substation
- Proposed Met Mast Location
- Proposed Borrow Pit Location
- Proposed Construction Compounds
- Proposed New Roads
- Proposed Road Upgrades
- Existing Site Roads

N

Drawing Title	Proposed Development Layout Wind Farm
Project Title	Proposed Repowering of the Existing Kilgarvan Wind Farm
Drawn By: EL	Checked By: NMcH
Project No.: 211107	Drawing No.: Figure 2-2
Scale: 1:25,000	Date: 2024-04-12

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2.3 Targets and Objectives

In so far as the designs that have been completed to date, or are to be further completed in future, the construction phase works are designed to approved standards, which include specified materials, standards, specifications and codes of practice. The design of the project has considered environmental issues and this is enhanced by the works proposals.

The key site targets are as follows:

- Ensure construction works and activities are completed in accordance with mitigation and best practice approach presented in the EIAR, NIS and associated planning documentation;
- Ensure construction works and activities are completed in accordance with all planning documents for the development;
- Ensure construction works and activities have minimal impact/disturbance to local landowners and the local community;
- Ensure construction works and activities have minimal effect on the natural environment;
- Adopt a sustainable approach to construction; and,
- Provide adequate environmental training and awareness for all project personnel

The key site objectives are as follows:

- Using recycled materials if possible, e.g. excavated stone, overburden and peat material;
- Ensue sustainable sources for material supply where possible'
- Avoidance of any pollution incident or near miss as a result of working around or close to existing watercourses and having emergency measures in place;
- Avoidance of vandalism;
- Keeping all watercourses free from obstruction and debris;
- Correct implementation of the sustainable drainage system (SuDS) drainage design principles;
- Keep impact of construction to a minimum on the local environment, watercourses, and wildlife;
- Correct fuel storage and refuelling procedures to be followed;
- Good waste management and house-keeping to be implemented;
- Air and noise pollution prevention to be implemented;
- Monitoring of the works and any adverse effects that it may have on the environment. Construction Methods and designs will be altered where it is found there is an adverse effect on the environment;
- Comply with all relevant water quality legislation listed throughout this document; and,
- Ensure a properly designed, constructed and maintained drainage system appropriate to the requirements of the site is kept in place at all times

2.4 Construction Methodology Overview

2.4.1 Introduction

An experienced main contractor will be appointed to carry the civil works for the construction phase of the Proposed Development. The main contractors will comply with this CEMP and any revisions made to this document throughout the construction phase. An overview of the anticipated Construction Methodologies are provided below.

2.4.2 Overview of Proposed Construction Methodology

The EIAR includes construction methodologies for various elements of work to be undertaken as part of the Proposed Development. These construction methodologies are reproduced in the following sub-sections but will be superseded by an appointed contractor's construction method statements, which will form part of the CEMP. The contractor's construction method statements will be prepared to take account of the detailed engineering, geotechnical and detailed drainage design which will be prepared prior to commencement of construction and all requirements of this CEMP.

The EIAR provided construction methodologies for the following Proposed Development elements:

- Removal of the existing turbines;
- Temporary Construction Compounds;
- Tree Felling;
- Borrow Pit;
- Site Drainage System;
- Peat and Spoil Management Areas;
- New site Access Roads;
- Upgrade of Existing site Access Roads
- Turbine Foundations;
- Hardstanding Areas;
- Site Underground Cabling
- Electricity Substation Upgrade;
- Watercourse Crossings
- Transport Route Accommodation Works
- Decommissioning

2.4.2.1 Removal of Existing Turbines and Associated Infrastructure

The existing 28 no. turbines onsite will be removed from the site in advance of the proposed turbines being transported to site. The methodology by which these turbines will be removed is as follows:

- Cranes will be used to remove the blades from the turbine nacelle;
- Blades will then be segmented onsite and transported to an appropriately licenced facility to be used as a component in concrete;
- The nacelle will be removed from the top of the tower;
- The tower will be disassembled and broken down into individual tower sections;
- The metal nacelle and tower sections will be removed off site and transported to an appropriately licenced facility for recycling;
- site cables will be treated in one of two ways:
    - In the case where cables are direct buried in peat, the ends will be snipped and the cable will be left in place;
    - In the case where the cables have been ducted, the cable will be pulled out from the ducting and the ends will be sealed.
- Where roads and hardstanding areas are not being reused by local landowners or the Proposed Development, they will be left to naturally revegetate and regenerate.

2.4.2.2 Temporary Construction Compounds

There are two temporary construction compounds proposed as part of the Proposed Development. The locations of the compounds are shown in Figure 2-2.

The construction compound will consist of a bunded refuelling and containment area for the storage of lubricants, oils and site generators etc, and full retention oil interceptor, waste storage area, temporary site offices, staff facilities and car-parking areas for staff and visitors. Temporary port-a-loo toilets and

toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. There will also be a water supply on site for hygiene purposes, by way of a temporary storage tank.

Both of the temporary construction compounds will be constructed on areas of existing hardstanding. In both cases, the areas of hardstanding will be extended in order to facilitate the construction of the temporary construction compounds. The compound will typically be constructed as follows:

- The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs, and associated settlement ponds will be installed around the perimeter (refer to Section 3.2.2 below & EIAR Section 4.6);
- The compound will be extended using a similar technique as the construction of the excavated site tracks as discussed below;
- Where required, a layer of geogrid will be installed, and compacted layers of well graded granular material will be spread and lightly compacted to provide a hard area for site offices and storage containers;
- Areas within the compound will be constructed as site roads and used as vehicle hard standings during deliveries and for parking;
- A bunded containment area will be provided within the compound for the storage of lubricants, oils and site generators etc.;
- A waste storage area will be provided within the compound;
- If necessary, the compound will be fenced and secured with locked gates, although fencing would only be utilised where significant risk of danger to third parties or vandalism is envisaged;
- Upon completion of the construction phase of Proposed Development, the compound will be decommissioned and allowed to re-vegetate naturally, landscaping with topsoil as required;
- During the construction phase, a temporary toilet block unit will be located within the temporary construction compound for use during the construction phase. Elsewhere on site, self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants, and;
- The water supply to the site will be from a temporary water storage tank which will be filled using a mobile water tank which will source water locally as required

2.4.2.3 Tree Felling

As part of the Proposed Development, tree felling will be required within and around the development footprint to allow for the construction of the turbine bases, access roads, underground cabling, and the other ancillary infrastructure.

Further details on tree felling required within and around the development footprint on the Proposed Development is detailed in Chapter 6 of the EIAR.

A small section of the Wind Farm site is located on commercial forestry, namely Turbine no. 11 and its associated infrastructure. A total of 8.9 hectares of commercial forestry will be permanently felled within and around Turbine No. 11 and its associated infrastructure, along with existing treeline boundaries as detailed in Chapter 6 of the EIAR. Figure 4-12 in Chapter 4 of the EIAR shows the extent of the commercial forestry to be permanently felled as part of the Proposed Development

The commercial forestry felling activities required as part of the Proposed Development will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments. The policy requires that a copy of the planning

permission for the Proposed Development be submitted with the felling licence application; therefore the felling licence cannot be applied for until such time as planning permission is obtained for the Proposed Development.

Details of the appropriate mitigation and drainage measures are included in Section 3.5 below.

2.4.2.4 Borrow Pit

It is proposed to extend an existing borrow pit onsite for use in the construction of the Proposed Development. The location of the borrow pit is shown in Figure 2-1. The borrow pit will be excavated and backfilled, as outlined in Appendix 4-2 Peat and Spoil Management Plan.

A limited amount of peat excavation will be required as part of the extension of the borrow pit location as the areas surrounding the current existing peat have localised pockets of peat, varying in depth up to 3m. Excavation of this peat will either entirely remove the peat areas or excavate at suitable slopes as designed by the detail stage designers.

The existing borrow pit is excavated in a large area of bedrock outcrop. The bedrock is composed of the Gun Point Formation characterised by green-grey to purple, medium to fine-grained sandstones (locally pebbly), interbedded with green and red to purple siltstones and fine sandstones. The excavated rock from the borrow pit will be used in the construction of the infrastructure elements (turbine bases, roads, etc.) at the Proposed Development. An example excavation profile showing the profile through the propose borrow pit is shown in Appendix C. Where necessary, the project design engineer will determine the appropriate depth of excavation.

The existing borrow pit was used in the construction of the Existing Kilgarvan Wind Farm, for the construction of access roads and hardstands. A preliminary assessment of the proposed borrow pit rock material by face geological mapping suggests that it is suitable for producing engineered fill and could be excavated by breaking or blasting and processed to the detailed design engineered fill requirements. The suitability and processing of the bedrock material will be subject to further GI and laboratory testing assessment at the detailed design stage to confirm the suitability and acceptability of the fill material for certain applications (e.g. Class 1C, 6N2 , UGM-A, etc).

Slopes within the excavated rock formed around the perimeter of the pit borrow pit will be formed at stable inclinations to suit local in-situ rock conditions. An interceptor drain will also be installed upslope of the borrow pit, where necessary. This drain will divert any surface water away from the borrow pit and, hence, prevent water from ponding and lodging on the re-instated borrow pit area.

Upon removal of the overburden and rock from the proposed borrow pit, it is proposed to reinstate the borrow pit using surplus excavated peat and spoil generated onsite during the construction of the Proposed Development. The contractor excavating the rock will be required to develop the borrow pit to allow the excavated peat and spoil to be placed safely. The final profile of the peat and spoil will vary across the base of the borrow pit. The volumes assessment carried out at the borrow pit suggests that the available stone fill capacity is in excess of the stone requirements at the site, allowing for contingency should any design changes be required following detail design. Only the stone volumes required for the Proposed Development will be extracted from the proposed borrow pit. The contractor will develop the borrow pit to ensure that peat placement capacity is maintained.

It may be necessary to construct cells/rock buttresses or leave upstands of intact bedrock within the proposed borrow pit to contain the reinstated peat and overburden. This will allow for the safe placement and grading of the materials using dumper trucks and excavators.

A geogrid or geotextile material may be used to aid in the strengthening of the upper surface of the deposited material within the proposed borrow pit and to aid in the promotion of growth and rehabilitation of the borrow pit area.

An indicative layout of the proposed borrow pit is presented in Appendix C of Appendix 4-2.

Post-construction, the borrow pit areas will be permanently secured and a stock-proof fence will be erected around the borrow pit areas to prevent access to these areas. Appropriate health and safety signage will also be erected on this fencing and at locations around the fenced area

2.4.2.5 Site Drainage System

As detailed in Chapter 9 of the EIAR, there are a number of existing natural drainage systems present on the Proposed Development site. Some of these features are naturally occurring, such as streams, and other features include manmade forestry breaks and drainage channels, mostly concentrated in the areas of commercial forestry and along the existing road network of the existing wind farm.

The early establishment of additional drainage measures for the Proposed Development will manage the risk of impacts on watercourses on and adjacent to the site during construction. In addition, construction operations will adopt best working practices and the development of the site will be phased accordingly.

The EIAR (and appended drawings) includes a drainage design required for the purposes of assessing the potential effects of the Proposed Development. The drainage design will be developed further with a level of construction detail necessary to implement the measures onsite. The detailed (construction phase) drainage design will form part of the updated Main Contractor's CEMP and the effective implementation of the detailed drainage design will be audited by the ECOW.

Surface water management and drainage design principles are outlines in Section 3.2 below and Section 4.6 of the EIAR.

2.4.2.6 Peat and Spoil Management Areas

It is proposed that any excess peat and spoil generated through construction activities, not used to reinstate the borrow pit will be used for landscaping, or be placed around selected turbines bases and hardstands. The areas around 11 no. turbine bases and hardstands have been assessed as suitable locations for peat and spoil placement due to suitable ground conditions including peat depths and slope angles.

Placement or any reinstatement of excavated peat material will be carried out in a fashion which ties in with the existing natural topography and facilitates the reduction of the visual impact on the structures of the Proposed Development. This will be done by landscaping the placed peat with shallow slopes, promoting natural vegetation growth, and allowing for controlled drainage from all structures.

All reinstatement works will be carried out with consideration to potential peat instability, having completed a diligent design and giving consideration to the findings of the associated Peat Stability Risk Assessment Report (Appendix 8-1). Works will be carried out under the supervision of an appropriately experienced geotechnical engineer and Ecological Clerk of Works (ECoW).

2.4.2.7 New Site Access Roads

There are a few short stretches of new access roads needed in order to facilitate the Proposed Development, as can be seen on Figure 4-1.

Due to the ground conditions, new access tracks proposed on the Proposed Development site are proposed to be a solely founded roads.

The general methodology to construct new founded roads (i.e. See Detail A of the road construction detail drawings presented in Appendix B) is presented below.

1. *Excavation of the new access road to competent strata (see Appendix 4-2 for guidance on the correct handling and placement of the different peat layers).*
    a. *Drainage will be installed to divert surface and groundwater from the construction areas.*
2. *Placement of granular fill in layers following the designer's specification.*
3. *Access roads are to be finished with a granular running surface across the full width of the road.*
    a. *A layer of geogrid/geotextile may be required at the interface between the new access road and the competent strata following the designer's specification. A geogrid/ geotextile separator layer will improve the bearing capacity of the underlying material and prevent punching through of the overlying granular fill material*

The general methodology to construct new floating roads (i.e. See Detail B of the road construction detail drawings presented in Appendix B) is presented below.

No excavations (e.g. drainage, peat cuttings) will be carried out within 5m distance of a completed floated access road edge, or at a distance determined following a site inspection.

The presence of excavations can destabilise the road. Temporary excavations, where required, should be excavated in short lengths and backfilled as soon as practicable.

Spoil materials will be side cast along the access road section to aid with the restoration of the peatland areas and embed the access roads into the surrounding environment where slope and ground conditions allow, limiting their ecological and environmental impact. Consideration needs to be given to the side cast of materials in areas of potential instability or additional mitigation requirements, as highlighted in the PSRA (Appendix 8-1). Where permissible, side cast materials will be placed to a maximum height of 1m and placement widths of a minimum of 2 to 3m unless site-specific detail designs allow larger volumes to be placed. Large stockpiles of materials will not be placed on or adjacent to floated access roads. This is to avoid bearing failure of the underlying peat.

Peat material side casting will not be carried out on areas of planar bedrock outcrop slab as this will create a slip surface and potential washout risk. Peat placement or side casting will be carried out only in areas where it is topographically contained and does not create a propagated landslide risk, as is laid out in the PSRA (Appendix 8-1).

Particular buffer areas, including construction buffers and peat stockpile restriction areas, have been highlighted in the PSRA (Appendix 8-1) for the Proposed Development and are presented in Appendix A.

2.4.2.8 Upgrading of Existing Site Access Roads

The extensive existing road network was constructed as part of the Existing Kilgarvan Wind Farm. There will be 17.9km of the existing road network upgraded as part of the Proposed Development in order to facilitate site access, turbine delivery, construction and maintenance The upgrades required to the existing site roads will be relatively minor in nature, and will constitute resurfacing in places, with other stretches of road not requiring any upgrades. The stretches of road that require upgrade in order to facilitate the Proposed Development will be outlined fully at detailed design stage.

1. *Excavation on one or both sides of the existing access road to competent strata.*

2. *Benching of existing road and placement of granular fill in layers, following the designer's specification.*
3. *Overlay of the existing access road with selected granular fill following the designer's specification.*
    a. *Where coarse granular fill has been used in the existing floated access road make-up, a layer of geogrid should be placed on top of the existing floated access road.*
4. *Access roads will be finished with a granular running surface across the full width of the road.*
    a. *A layer of geogrid/geotextile may be required at the surface of the existing access road following the designer's specification.*

The general methodology to upgrade existing floating roads (i.e. See Detail D of the road construction detail drawings presented in Appendix B) is presented below.

1. *Placement of tree brash and/or a geotextile onto on one or both sides of the existing access road directly onto the peat surface, following the designer's specification.*
2. *Benching of existing road and placement of granular fill and reinforcing geogrids in layers following the designer's specification, with due regard to any settlement of peat anticipated for the widened area.*
    a. *It may be necessary to stage the widening to maintain peat stability – i.e. to reduce the rate of placement of fill to allow the peat layers to consolidate and increase in strength.*
    b. *It may be necessary to anchor the geogrids into the existing roads, which would require significant benching of existing roads. Placement of a geogrid anchor between the new and existing road will help to bind/ interlock the two granular fill bodies together and limit any differential displacement/ settlement which may occur due to loading/ trafficking.*
3. *Overlay of the existing access road with selected granular fill following the designer's specification.*
    a. *Where coarse granular fill has been used in the existing floated access road make-up, a layer of geogrid will be placed on top of the existing floated access road.*
    b. *The surface of the existing access road will be graded/levelled before the placement of any geogrid/geotextile, where necessary in order to prevent damaging the geogrid/geotextile.*
4. *Access roads will be finished with a layer of capping across the full width of the road.*
    a. *A layer of geogrid/geotextile may be required at the surface of the existing access road following the designer's specification. An intermediate geogrid/ geotextile layer will improve the bearing capacity of the granular fill material, and aid to bind or interlock the new granular fill material with the existing access road.*

Where there are cross slopes, any road widening works required will be carried out on the upslope side of the existing access road, where possible. Particular design details will be required at detailed design at the transitions between floating and founded roads to reduce differential settlements between the two construction types

2.4.2.9 Turbine Foundations

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use different shaped turbines foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. The turbine foundation transmits any load on the wind

turbine into the ground. The proposed horizontal and vertical extent of the turbine foundation will be 25m and 4m respectively, which has been assessed in the EIAR.

After the foundation level of each turbine has been formed using piling methods or on competent strata (i.e bedrock or subsoil of sufficient load bearing capacity), the "Anchor Cage" is levelled and reinforcing steel is then built up around and through the anchor cage. The outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete and is backfilled accordingly with appropriate granular fill to finished surface level following completion of the foundation.

It is anticipated that the formation level of the turbine foundations will be on the lower mineral subsoil or bedrock. They will be formed at a suitable level directed by the Geotechnical Engineer/Designer. The foundations will be constructed as follows:

- The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter;
- Where practical, the soil will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished turbine;
- No material will be removed from site with excavated spoil being transported and stored in the identified spoil management areas within the Wind Farm site.
- All groundwater and surface water arising from turbine base excavation will be pumped to the dirty water system prior to discharge from the works area;
- Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light;
- The foundations excavation will be raised to formation level by compacted layers of well graded granular material will be spread and compacted to provide a hard area for the turbine foundation;

Standard excavated reinforced concrete bases will be completed as follows:

- A layer of lean-mix blinding will be laid approximately 75mm thick directly on top of the newly exposed formation, tamped and finished with a screed board to leave a flat level surface. The concrete should be protected from rainfall during curing and all surface water runoff from the curing concrete should be prevented from entering surface water drainage directly;
- High tensile steel reinforcement will be fixed in accordance with the designer's drawings & schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools;
- Ductwork will be installed as required, and formwork erected around the steel cage and propped from the backside as required;
- The foundation anchorage system will be checked both for level and line prior to the concrete being installed in the base. These checks will be passed to turbine manufacturer for their approval;
- Concrete will be placed using a concrete pump and compacted when in the forms using vibrating pokers to the levels and profile indicated on the drawings. Upon completion of the concreting works the foundation base will be covered and allowed to cure;
- Steel shutters will be used to pour the circular chimney section;
- Earth wires will be placed around the base;
- The foundation will be backfilled with a cohesive material, where possible using the material arising during the excavation or imported material and landscaped using the soil set aside during the excavation; and.
- Any excess overburden excavated during construction shall be managed in line with the recommendations/ best practice guidelines outlined in Section 4.3.3 of the EIAR.

2.4.2.10 Hard Standing Areas

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. All crane hardstand areas will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure. The crane hardstands will be constructed in a similar manner to the excavated site roads and will measure approximately 41m x 110m. The sizes, arrangement and positioning of hard standing areas are dictated by turbine suppliers. The proposed hard standing areas are illustrated in the detailed drawings included in Appendix 4-1 of the EIAR. The extent of the required areas at each turbine location may be optimised on-site depending on topography, position of the wind farm site access road, the proposed turbine position and the turbine supplier's exact requirements.

2.4.2.11 Site Underground Cabling

Each turbine will be connected to the on-site electricity substation via underground 33 kV (kilovolt) electricity cabling. Fibre-optic cables will also connect each wind turbine and the met mast to the onsite substation. The electricity and fibre-optic cabling connecting to the onsite substation compound will be run in cable ducts approximately 1.2 metres beneath ground level, along the sides of roadways or under the roadways. The route of the cable ducts will follow the access track to each turbine location and are illustrated on the site layout drawings included as Appendix 4-1 of this EIAR, the exact number and configuration of cable ducting may vary within the cabling trench. Figure 4-9 in Chapter 4 shows two variations of a typical cable trench, one for off-road trenches and one for on-road trenches. The cabling may be placed on either side of the roads, on both sides of the road or within the road. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.

Clay plugs (water flow barrier) will be installed at regular intervals of not greater than 50 metres along the length of the trenches where required to prevent the trenches becoming conduits for runoff water. Backfill material will be compacted in layers with approved engineer's specified material, which may be imported onto the Wind Farm site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure.

2.4.2.12 Electricity Substation Upgrade

The Proposed Development will be utilising the existing onsite Coomagearlahy 110kV substation and overhead line to Clonkeen 110kV Substation. There are no works proposed to alter or upgrade the overhead line to Clonkeen 110kV Substation, or the substation itself. There will be minor upgrades needed to the existing onsite Coomagearlahy 110kV substation in order to ensure that it is up to date with current EirGrid specifications. The construction methodology for these proposed upgrades are as follows:

- Replacement of existing M switchgear, control and protection equipment in the Coomagearlahy 3 control building to accommodate the change in the number of turbines and the reconfigured export capacity of the repowered site;
- Replacement of the existing MV/110kV 50MVA grid transformer in Coomagearlahy 3 HV compound with an MV/110kV 80MVA grid transformer to accommodate the reconfigured export capacity of the repowered site;
- Installation of a 110kV line/earth disconnector in Coomagearlahy 3 HV compound to EirGrid specification, and
- Installation of a capacitor bank and harmonic filter in Coomagearlahy 3 HV compound to achieve compliance with the EirGrid Grid Code.

2.4.2.13 Watercourse Crossings

Within the Proposed Development site, road upgrades are proposed over a total of 10 no. existing watercourse crossings.

- 5 no. crossings are located on tributaries of the Roughty River within the wind farm site:
  - An unnamed stream ~500m northeast of T3;
  - An unnamed stream ~250m southwest of T4;
  - An unnamed stream ~150m southeast of T6;
  - An unnamed stream ~280m northeast of T7; and,
  - An unnamed stream ~220m east of T8.
- An additional 4 no. crossings are located on the main access road from the N22 and cross tributaries of the Flesk River:
  - 1 unnamed stream in the townland of Coomacullen;
  - Coomacullen stream;
  - Cloonkeen stream; and,
  - An unnamed stream in the vicinity of Clonkeen substation.
- 1 no. existing crossing to be upgraded is located is located on the Inchamore stream within the Sullane River catchment.

All of the above existing watercourse crossings are culverted, and no instream works are required.

In addition, there is 1 no. new proposed watercourse crossing located ~190m north of T11 over an unnamed tributary of the Roughty River.

2.4.2.14 Transport Route Accommodation Works

A route assessment was undertaken covering the proposed turbine delivery route, with the route assessment locations shown in Figure 15-2a of Chapter 15.

- Location 1: N28 Pfizer roundabout, Ringaskiddy
- Location 2 – N28/R611 roundabout
- Location 3 – N22 Macroom Bypass/R584 roundabout
- Location 4 – N22/Kilgarvan Wind Farm Access Junction

Following assessment of the above locations, it was found that no accommodation works would be needed in order to facilitate the turbine delivery vehicles. Further detail of this assessment can be found in Section 15.1.8.

This option includes placement of turbine blades on a blade adaptor vehicle as they are being transported from Ringaskiddy Port to the Proposed Development site. This strategy would not require any facilitation or upgrade works along the turbine delivery route. Another option which is being considered is to utilise a section of the old N22 approximately 4km from the existing entrance to the Proposed Development, to switch the blade over from the blade trailer to a blade adapter in order to transport the blade from the site entrance to their intended set-down area within the site. While there are no enabling works being applied for as part of this strategy, any potential impacts associated with this strategy will be assessed within this EIAR. In order to utilise this method, existing soil berms, fences, gates and some vegetation will need to be removed. It may also be the case that the turbine transport vehicles may reverse back into this section of the old N22 from the Killarney side. In this case, it will also be necessary to remove some soil berms and place some hardcore surfacing on the verge of the new road section. The removal of these elements is assessed within Chapters 5-15 of this EIAR as appropriate.

If the strategy of swapping the blade in the set down area off the N22 is to be utilised, it will be subject to a separate future planning application.

The autotrack assessment of the turbine delivery route was undertaken by Alan Lipscombe Traffic and Transport. and the drawings, referred to below, are included as Chapter 15 of this EIAR

2.4.3 Decommissioning

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Development may be decommissioned fully.

Upon decommissioning of the Wind Farm site, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine will likely be removed from site using the same transport methodology adopted for delivery to site initially. The turbine materials will be transferred to a suitable recycling or recovery facility.

The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.

All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be 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 unnecessary environment emissions such as noise, dust and/or vibration.

site roadways could be in use for purposes other than the operation of the Proposed Development by the time the decommissioning of the Proposed Development is to be considered, and therefore it may be more appropriate to leave the site roads in situ for future use. It is envisaged that the roads will provide a useful means of extracting the commercial forestry crop which exists on the site, and as agricultural roads.

A Decommissioning Plan has been prepared (Appendix 4-5) the detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the Proposed Development has been fully assessed in the EIAR.

3. ENVIRONMENTAL MANAGEMENT

3.1 Introduction

This CEMP includes all best practice measures required to construct the Proposed Development. The drainage proposals will be developed further prior to the commencement of construction however, any such improvements will be in line with the principles set out here and will also be in full compliance with the planning consent and mitigation measures as presented in the EIAR, NIS and all other relevant planning documents. The following sections give an overview of the drainage design principles, dust and noise control measures and a waste management plan for the site.

3.2 Protecting Water Quality

3.2.1 Environmental Management in the Construction Phase

Timing of works can strongly influence the potential for damaging the freshwater environment. Operations during wetter periods of the year pose a significantly greater risk of causing erosion and siltation, which can be particularly severe following major rainfall or snowmelt events. Traditionally, wind farm construction undertaken during the drier summer months would result in significantly less erosion and siltation. Construction activities in the hydrological buffer zones shall be avoided during or after prolonged rainfall or an intense rainfall event and work will cease entirely near watercourses when it is evident that water quality is being impacted. Given that this site has an established drainage network and existing watercourse crossing points, there will be minimal impacts on watercourses.

3.2.2 Site Drainage Principles

The site drainage features have been outlined in Section 4.6 of the EIAR for the Proposed Development. The protection of the watercourses within and surrounding the site, and downstream catchments that they feed is of utmost importance in considering the most appropriate drainage proposals for the site of the Proposed Development. No routes of any natural drainage features will be altered as part of the Proposed Development. Turbine locations and associated new roadways were originally selected to avoid natural watercourses, and existing roads are to be used wherever possible. The Proposed Development has where possible, been kept a minimum of 50 metres from natural watercourses. There will be no direct discharges to natural watercourses. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from natural watercourse and lakes. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Development and are indicated on the drainage design drawings.

A detailed drainage design for the Proposed Development will be prepared prior to the commencement of construction by the Project Hydrologist to incorporate these site drainage principles and carry forward into the construction phase of the Proposed Development.

Existing artificial drains in the vicinity of existing site roads will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage water from works areas, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.

3.2.3 Legislation and Best Practice Guidance

The drainage design presented in the EIAR and Planning Application documents has been prepared based on experience of the project team of other renewable energy sites in similar environments, and the number of best practice guidance documents.

There is no one guidance document that deals with drainage management and water quality controls for wind farm and other renewable energy developments. However, a selection of good practice approaches have been adopted in preparation of this CEMP, and these are taken from the various best practice guidance documents listed below. These relate to infrastructure and operational works on sites, road design, water quality controls for linear projects, road drainage and management of geotechnical risks. To achieve best practice in terms of water protection through construction management, the detailed drainage design and all drainage management proposals shall be prepared in accordance with guidance contained in the following:

- Institute of Geologists Ireland (2013): *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;*
- National Roads Authority (2008): *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;*
- Department of Environment, Heritage and Local Government (2006): *Wind Energy Development Guidelines for Planning Authorities;*
- Forestry Commission (2004): *Forests and Water Guidelines*, Fourth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): *Forest Operations & Water Protection Guidelines;*
- Forest Services (Draft) *Forestry and Freshwater Pearl Mussel Requirements – site Assessment and Mitigation Measures;*
- Forest Service (2000): *Forestry and Water Quality Guidelines.* Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- COFORD (2004): *Forest Road Manual – Guidelines for the Design, Construction and Management of Forest Roads;*
- Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*;
- Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters;*
- Scottish Natural Heritage (2010): *Good Practice During Wind Farm Construction;*
- CIRIA (Construction Industry Research and Information Association) (2006): *Guidance on 'Control of Water Pollution from Linear Construction Projects'* (CIRIA Report No. C648, 2006);
- CIRIA 2006: *Control of Water Pollution from Construction sites - Guidance for Consultants and Contractors (*CIRIA C532, 2006).
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (DoHPLG, 2018); and,
- *Guidance on the preparation of the EIA Report* (Directive 2011/92/EU as amended by 2014/52/EU), (European Union, 2017).

3.2.4 Site Drainage Design and Management

The proposed site drainage features for this site are outlined in Chapter 4, Section 4.6 of the EIAR. As this CEMP is a working document and is presented as an Appendix to the EIAR, the drainage measures are not included in this document. When the final CEMP report is prepared, and presented as a standalone document, all drainage measures will be included in that document. These drainage proposals will be developed further prior to the commencement of construction as part of the detailed drainage design. The following sections give an outline of drainage management arrangements in terms of pre-construction, construction, operational and decommissioning phases of the Proposed Development.

3.2.4.1 Pre-Construction Drainage

As outlined in Chapter 9 of this EIAR, there is an existing drainage network on the Proposed Development site, consisting of both natural and manmade drainage features. There are several 1st and 2nd order streams within the Proposed Development site. These natural watercourses originate within the EIAR Site Boundary and flow downslope before discharging into the Roughty River. In places, the natural drainage is further facilitated by a network of manmade drains. These manmade drains are concentrated within areas of coniferous forestry and along sections of the existing site roads. These existing drainage channels will continue to function as they are during the pre-construction phase of the Proposed Development.

However, prior to commencement of works in sub-catchments across the site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. It is proposed to complete these inspections on a catchment by catchment basis prior to the commencement of construction works across the site, as works in all areas will not commence simultaneously.

Drainage associated with pollution control measures will be implemented onsite before the main construction works commence. Where possible, drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off.

3.2.4.2 Construction Phase Drainage

The Project Hydrologist will attend the site to set out and assist with the implementation of the proposed drainage controls as shown in the drainage design drawings included with this planning application. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. Drains will be excavated and stilling ponds constructed to eliminate any suspended solids within the surface water running off the site.

The implementation of a Scheduling of Works Operating Record (SOWOR) will continue through the construction phase of the project. The SOWOR provides a number of abandonment triggers which will ensure that site management are well informed as to the level of incident that will require the abandonment of works. The various triggers both pre-commencement and abandonment ensure best practice in terms of water quality management is maintained prior to commencement and during the various felling and construction phases.

Best practice and practical experience on other similar projects suggest that in addition to the drainage plans that are included in and as part of this application, there are additional site based decisions that can only be made in the field through interaction between the site Construction Manager, the Project Hydrologist and the Project Geotechnical Engineers. The mechanisms for interaction between these are outlined within Section 4 below.

In relation to decisions that are made on site it is important to stress that these will be implemented in line with the associated drainage controls and mitigation measures, outlined in Sections 2.5 and 3.3 of the SWMP, and to ensure protection of all watercourses.

3.2.4.2.1 *Preparative site Drainage Management*

All materials and equipment necessary to implement the drainage measures outlined above will be brought on-site in advance of any works commencing. An adequate quantity of straw bales, clean stone, terram, stakes, etc. will be kept on site at all times to implement the drainage design measures as necessary. The drainage measures outlined in the above will be installed prior to, or at the same time as the works they are intended to drain.

3.2.4.2.2 Pre-emptive site Drainage Management

The works programme for the initial construction stage of the development will also take account of weather forecasts and predicted rainfall in particular. Large excavations and movements of peat/subsoil or vegetation stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

The following forecasting systems are available and will be used on a daily basis at the site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

Using the threshold rainfall values, listed below, will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event.

Works will be suspended if forecasting suggests either of the following is likely to occur:

- >10 mm/hr (i.e. high intensity local rainfall events);
- >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
- >half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures shall be completed:

- Secure all open excavations;
- Provide temporary or emergency drainage to prevent back-up of surface runoff; and,
- Avoid working during heavy rainfall (listed above) and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.

3.2.4.2.3 Reactive Site Drainage Management

The detailed drainage plan prepared for the site has provided for reactive management of drainage measures. The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat potentially silt-laden water from the works areas, will be monitored continuously by the Environmental Clerk of Works (ECoW) on-site. The ECoW or project hydrologist will respond to changing weather, ground or drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained. This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, following a confirmatory inspection by the project hydrologist, in whatever combinations are deemed to be most appropriate to the situation on the ground at a particular time.

In the unlikely event that works are giving rise to siltation of watercourses, the ECoW or project hydrologist will stop all works in the immediate area around where the siltation is evident. The source of the siltation will be identified and additional drainage measures, as outlined in Section 2.5 above, will be installed in advance of works recommencing.

3.2.4.3 Operational Phase Drainage Management

The Project Hydrologist will inspect and review the drainage system after construction has been completed to provide guidance on the requirements of an operational phase drainage system. This operational phase drainage system will have been installed during the construction phase in conjunction with the road and hardstanding construction work as described below:

- Some interceptor drains will be left in place, upgradient of the proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader.
- Swales/road side drains will remain in place to intercept and collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to stilling ponds for sediment settling;
- Check dams will be put in place at regular intervals along interceptor drains and swales/roadside drains in order to reduce flow velocities and therefore minimise erosion within the system during storm rainfall events; and,
- Stilling ponds/settlement ponds, emplaced downstream of swales and roadside drains, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses. The stilling ponds will be sized according to the size of the area they will be receiving water from, but will be sufficiently large to accommodate peak flows storm events. Inspection and maintenance of all settlement ponds, along with the entire drainage network, will be ongoing through the construction period.

In the operational phase of the wind farm, the reliance on the drainage system summarised above will become reduced as areas naturally revegetate. Once areas revegetate, this will result in a resumption of the natural drainage management that will have existed prior to any construction.

3.2.5 Forestry Felling

Tree felling to facilitate the Proposed Development will commence before the initial construction groundworks on a phased basis across the site.

Water protection measures will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses. These measures are derived from best practice guidance documents as outlined in Section 3.2.3 above. The water protection measures to be adopted during felling operations are set out as follows:

- The extent of all necessary forestry felling areas will be identified and demarcated with markings on the ground in advance of any felling commencing.
- All roads and culverts will be inspected by the ECoW and contractor prior to any machinery being brought on site to commence the felling operation.
- Existing drains that drain an area to be felled towards surface watercourses will be blocked, and temporary silt/sediment traps (i.e. check dam / silt fence) will be constructed to ensure collection of all silt within felling areas. These temporary silt traps will be cleaned out and backfilled once felling works are complete. This ensures

there is no residual collected silt remaining in blocked drains after felling works are completed.

- New collector drains and sediment traps will be installed during ground preparation to intercept water upgradient of felling areas and divert it away. Collector drains will be excavated at an acute angle to the contour (0.3%-3% gradient), to minimise flow velocities.
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated.
- Sediment removed from traps will be carefully disposed of in the peat repository areas.
- Machine combinations (i.e. hand-held or mechanical) will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance;
- Trees will be cut manually inside the 50m buffer and using machinery to extract whole trees only;
- Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicles through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works;
- Ditches which drain from the proposed area to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and shall avoid being placed at right angles to the contour;
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the peat disposal areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground;
- In areas particularly sensitive to erosion or where felling inside the 50 metre buffer is required, it will be necessary to install double or triple sediment traps.
- Double silt fencing will also be put down slope of felling areas which are located inside the 50 metre buffer zone;
- All drainage channels will taper out before entering the aquatic buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels, to the outside of the buffer zone;
- Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled;
- Brash mats will be used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal shall take place when they become heavily used and worn. Provision shall be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction shall be suspended during periods of high rainfall (refer to Section 3.2.4.2.2 above) ;
- Timber will be stacked in dry areas, and outside a local 50 metre watercourse buffer. Straw bales and check dams to be emplaced on the down gradient side of timber storage/processing sites;
- Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off;

- Checking and maintenance of roads and culverts will be on-going through the felling operation;
- No crossing of streams by machinery will be permitted and only travel perpendicular to and away from streams will be allowed;
- Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits, trained personnel will be used where refuelling is required;
- A permit to refuel system will be adopted at the site; and,
- Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors.

Table 3-1 Minimum Buffer Zone Widths (Forest Service, 2000)

Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils
Moderate	(0 – 15%)	10 m	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

3.2.5.1 Forestry Felling Drainage Management

Before the commencement of any felling works, an Environmental Clerk of Works (ECoW) shall be appointed to oversee the keyhole and extraction works. The ECoW shall be experienced and competent, and shall have the following functions and operate their record using a Schedule of Works Operation Record (SOWOR), as proposed in the planning application:

- Attend the site for the setup period when drainage protection works are being installed, and be present on site during the remainder of the forestry keyhole felling works.
- Prior to the commencement of works, review and agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see below), water crossings and onsite storage facilities for fuel, oil and chemicals (see further below).
- Be responsible for preparing and delivering the Environmental Tool Box Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works.
- Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness in accordance with Section 3.4 (Monitoring and Recording) and Appendix C (site Monitoring Form (Visual Inspections)) of the *Forestry & Freshwater Pearl Mussel Requirements.*
- Take representative photographs showing the progress of operation onsite, and the integrity and effectiveness of the water protection measures.
- Collect water samples for analysis by a 3rd party accredited laboratory, adhering to the following requirements:
    - Surface water samples shall be collected upstream and downstream of the keyhole felling site at suitable sampling locations.
    - Sampling shall be taken from the stream / river bank, with no in-stream access permitted.
    - The following minimum analytical suite shall be used:
        - pH,
        - Electrical Conductivity,
        - Temperature

- Total Suspended Solids, Biochemical Oxygen Demand, Total Phosphorus, Ortho-Phosphate, Total Nitrogen, and Ammonia.

- Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions.
- Prepare and maintain a contingency plan.
- Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed.
- Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the ECoW.

3.2.6 Borrow Pit Drainage

While surface water will be contained in the proposed borrow pit area, the design proposal is to control the level of water by creating a single point outlet from the basin-like area that will ensure the water does not overtop the pit area. Run-off from the proposed borrow pit area will be controlled via a single outlet that will be installed at the edge of the borrow pit. The single outfall point will be constructed to manage runoff from the borrow pit and its immediate surrounds. Interceptor drains will already have been installed upgradient of the borrow pit area before any extraction begins.

During the construction phase of the project, it will be necessary to keep the borrow pit area free of standing water while rock is still being extracted. This will be achieved by using a mobile pump, which will pump water into the same series of drains, settlement ponds and level spreader, which will receive the water from the single outlet.

3.2.7 Cable Trench Drainage

Cable trenches will be developed in short sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences.

To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the upgradient side of the trench. Should any rainfall cause runoff from the excavated material, the material is contained in the downgradient cable trench. Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Development, will be transported to one of the peat repository areas, the on-site borrow pit or used for landscaping and reinstatements of other areas elsewhere on site.

On steeper slopes, silt fences, as detailed in Chapter 9 will be installed temporarily downgradient of the cable trench works area, or on the downhill slope below where excavated material is being temporarily stored to control run-off.

3.3 Refuelling, Fuel and Hazardous Materials

The following mitigation measures are proposed to avoid release of hydrocarbons at the site:

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Off-site refuelling shall occur at a controlled fuelling station;
- On-site refuelling will take place using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site or at the primary construction compound, via a fuel tanker, and will be towed around the site by a 4x4 jeep to where machinery is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the wind farm. The 4x4 jeep (and all

other plant and vehicles on site) will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use. Only designated trained and competent operatives, with a permit to refuel, will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.

- Fuels volumes stored on site shall be minimised. The fuel storage areas, within the temporary construction compounds, will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;
- The electrical substation compound will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- Herbicides, for use in the removal of any invasive species identified onsite, will be stored in appropriately bunded containers at the temporary construction compounds. Further measures are outlined in Section 3.8.1 below.
- The plant used will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be developed (refer to Section 5 of the CEMP). Spill kits will be available to deal with any accidental spillage in and outside the refuelling area.
- Hazardous wastes that may occur on site during the construction phase of the development may include oil, diesel fuel, chemicals, paints, preservatives etc.
- All hazardous wastes will be stored in bunded containers/areas before being collected by an authorised waste contractor and brought to an EPA licensed waste facility.
- Hazardous wastes will be kept separate from non-hazardous wastes so that contamination does not occur.

3.4 Cement Based Products Control Measures

The following mitigation measures will be implemented to avoid release of cement leachate from the site:

- No batching of wet-cement products will occur on site;
- The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout of trucks and discussing emergency procedures.
- Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place. Where possible pre-cast elements for culverts and concrete works will be used;
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where concrete is delivered on site, only chute cleaning will be permitted, using the smallest volume of water possible to dedicated impermeable concrete washout area which requires monitoring and maintenance. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete (see Section 3.2.4.2.2);
- The pour site will be free of standing water and plastic covers will be ready in case of sudden rainfall event;
- The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a concrete washout area, built using straw bales and lined with an impermeable membrane. below. The areas are generally covered when not in use to prevent rainwater collecting. In periods of dry weather, the areas can be uncovered to allow much of the water to be lost to evaporation. At the end of the

concrete pours, any of the remaining liquid contents is tankered off-site. Any solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste (refer to Section 3.9 below).

The 50 m wide river buffer zone will be in place for the duration of the construction phase. No construction activity will occur within the buffer zone with the exception of bridge and culvert construction. The buffer zone will:

- Prevent any cement-based products accidentally entrained in the construction phase drainage system entering directly into watercourses, achieved in part by ending drain discharge outside the 50 m buffer zone wherever possible and allowing percolation across the vegetation of the buffer zone;
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the 50m watercourse buffer;
- Provide a buffer against accidental direct pollution of surface waters by any pollutants, or by pollutants entrained in surface water run-off.

Plate 3-1 Typical concrete chute wash out areas

3.5 Peat Stability Management

Peat instability or failure refers to a significant mass movement of a body of peat that would have an adverse impact on wind farm development and the surrounding environment. Peat failure excludes localised movement of peat that could occur below an access road, creep movement or erosion type events. In the absence of appropriate mitigation, the consequence of peat failure at the study area may result in:

- Death or injury to site personnel;
- Damage to machinery;
- Damage or loss of access tracks;
- Drainage disrupted;
- site works damaged or unstable;
- Contamination of watercourses, water supplies by sediment particulates; and,
- Degradation of the environment.

3.5.1 General recommendations for Good Construction

Based on the recommendations and control measures given in the GDG Peat Stability Assessment (Appendix 8-1 of the EIAR) report being strictly adhered to during construction and the detailed stability assessment carried out for the peat slopes which showed that the site has an acceptable margin of safety.

The risk assessment at each turbine location identified a number of control measures to further reduce the potential risk of peat failure. Access roads to turbines will be subject to the same relevant control measures that apply to the nearest turbine as detailed in the GDG Peat Stability Risk Assessment Report.

The following measures which will be implemented during the construction phase of the project will assist in the management of the risks for this site.

- Appointment of experienced and competent contractors;
- The site will be supervised by experienced and qualified personnel;
- Sufficient time will be allocated for the project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement);
- Undercutting of slopes and unsupported excavations will be prevented.
- A managed robust drainage system will be maintained.
- Placement of loads/overburden on marginal ground will be prevented
- Set up, maintain and report findings from monitoring systems (as outlined in the Geotechnical and Peat Stability Assessment);
- Construction method statements will be developed and agreed before commencement of construction and are followed by the contractor; and,
- The Construction Risk Register will be revised and amended as construction progresses to ensure that risks are managed and controlled for the duration of construction.
- The hydrology of area will be maintained as far as possible by maintaining existing drains to water pressures in the peat to avoid peat becoming “buoyant”
- The use of experienced geotechnical staff for site investigations
- The use of experienced contractors and trained operators will carry out the work.
- Detailed ground investigation will determine peat, mineral soil and bedrock condition and properties.
- Potential requirement for small buttress on upslope side of access road to retain peat will be used should any instability be noted.

3.5.2 Peat and Spoil Usage in Restoration of the Borrow Pits

The general construction methodology for the construction of the borrow pits is outlined in Section 2.4.4 above. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

3.5.3 Peat Placement Areas

The placement of peat and spoil, excavated during the construction phase of the Proposed Development, as presented in Gavin and Doherty Geosolutions’ Peat & Spoil Management Plan in Appendix 4-2 of the EIAR, is outlined in Section 2.4.5 above. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

3.6 Dust Control

Construction dust can be generated from many on-site activities such as excavation and backfilling. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. soil, sand, peat, etc. and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

Proposed measures to control dust include:

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions. Silty or oily water will not be used for dust suppression.
- Construction traffic will be restricted to defined routes and a speed limit implemented.
- The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by the ECoW for cleanliness, and cleaned as necessary;
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind;
- Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods;
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions;
- The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary;
- All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph;
- Daily inspection of construction sites to examine dust measures and their effectiveness.
- When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper; and,
- All vehicles leaving the construction areas of the site will pass through a wheel washing area prior to entering the local road network.

3.7 Noise Control

The operation of plant and machinery, including construction vehicles, is a source of potential impact that will require mitigation at all locations within the site. The following proposed measures to control noise will be implemented in full include:

- Local residents will be kept informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern;
- Any extraordinary site work occurring outside of the core working hours (for example, crane operations lifting components onto the tower) will be programmed, when appropriate, so that haulage vehicles would not arrive at or leave the site between 19:00 and 07:00, with the exception of abnormal loads that would be scheduled to avoid anticipated periods of high traffic flows;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and be subject to programmed maintenance;
- Inherently quiet plant will be selected where appropriate and available - all major compressors would be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which would be kept closed whenever the machines are in use;
- All ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;
- Machines will be shut down between work periods (or when not in use) or throttled down to a minimum;
- All equipment used on site will be regularly maintained, including maintenance related to noise emissions;
- Vehicles will be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation; and
- All ancillary plant such as generators and pumps will be positioned so as to cause minimum noise disturbance and if necessary, temporary acoustic screens or enclosures will be provided.

3.8 Invasive Species Management

A baseline invasive species survey was carried out at the site to identify the presence and location of any invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) by a suitably qualified ecologist. As outlined in Chapter 6 of the EIAR, no invasive species (as listed under the Third Schedule) were identified within the EIAR Site Boundary. Thus, no invasive species management plan was developed for this project.

3.8.1 Other Invasive Species

As noted above, no species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded during the survey. No aquatic invasive species were recorded and no works on or in watercourses are proposed as part of the Proposed Development.

In the event that the presence of other such species is found at or adjacent to the development footprint during pre-commencement surveys, particularly in areas where its excavation may be required, an invasive species management plan will be prepared for the site to prevent the introduction or spread of any invasive species within the footprint of the works. An invasive species management plan, if required, will set out best practice control methods as summarised in the following sections.

3.8.2 Site Management

Careful preparation of the site and planning of the works is crucial to successful treatment of invasive species. The following list of guidelines, which is not exhaustive, shall be followed by all on-site personnel. Only those who have been inducted into biosecurity measures on-site may enter the contaminated zones within the works areas. Should any risk of contaminated material escaping be observed by the Site Supervisor, the management plan for the site must be amended by an appropriately qualified person to mitigate against the risk.

3.8.3 Establish Good Site Hygiene

The following measures are proposed to establish good site hygiene to ensure the control of any potential spread of invasive species during construction works:

- A risk assessment and method statement will be provided by the Contractor prior to commencing works.
- Fences will be erected around areas of infestation, as confirmed by test pits, and warning signs shall be erected.
- A designated wash-down area will be created, where power-washed material from machinery can be contained, collected and disposed of with other contaminated material. This area will contain a washable membrane or hard surface.
- Stockpile areas will be chosen to minimise movement of contaminated soil.
- Stockpiles will be marked and isolated.
- Contaminated areas which will not be excavated will be protected by a root barrier membrane if they are likely to be disturbed by machinery. Root barrier membranes will be protected by a layer of sand above and below and topped with a layer of hardcore.
- The use of vehicles with caterpillar tracks within contaminated areas will be avoided to minimise the risk of spreading contaminated material.
- An ECoW/suitably qualified ecologist will be on site to monitor and oversee the implementation of invasive species management plans.

Plant and equipment which is operated within an area for the management of materials in contaminated areas will be decontaminated prior to relocating to a different works area. The decontamination procedures will take account of the following:

- Personnel may only clean down if they are familiar with the plant and rhizome material and can readily identify it.
- Decontamination will only occur within designated wash-down areas.
- Vehicles will be cleaned using stiff-haired brush and pressure washers, paying special attention to any areas that might retain rhizomes e.g. wheel treads and arches.
- All run-off will be isolated and treated as contaminated material. This will be disposed of in already contaminated areas.

3.9 Waste Management

This section of the CEMP provides a waste management plan (WMP) which outlines the best practice procedures during the excavation and construction phases of the project. The WMP will outline the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Development. Disposal of waste will be seen as a last resort.

3.9.1 Legislation

The Waste Management Act 1996 and its subsequent amendments provide for measures to improve performance in relation to waste management, recycling and recovery. The Act also provides a regulatory framework for meeting higher environmental standards set out by other national and EU legislation.

The Act requires that any waste related activity has to have all necessary licenses and authorisations. It will be the duty of the Waste Manager on the site of the development to ensure that all contractors hired to remove waste from the site have valid Waste Collection Permits. It will then be necessary to ensure that the waste is delivered to a licensed or permitted waste facility. The hired waste contractors and subsequent receiving facilities must adhere to the conditions set out in their respective permits and authorisations.

The Department of the Environment provides a document entitled, 'Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects' (2006). It is important to emphasise that no demolition will take place at this site, however, this document was referred to throughout the process of completing this WMP.

3.9.2 Waste Management Hierarchy

The waste management hierarchy sets out the most efficient way of managing in the following order:

Prevention and Minimisation:

The primary aim of the WMP will be to prevent and thereby reduce the amount of waste generated at each stage of the project.

Reuse of Waste:

Reusing as much of the waste generated on site as possible will reduce the quantities of waste that will have to be transported off site to recovery facilities or landfill.

Recycling of Waste:

There are a number of established markets available for the beneficial use of Construction and Demolition waste such as using waste concrete as fill for new roads.

At all times during the implementation of the WMP, disposal of waste to landfill will be considered only as a last resort.

3.9.3 Construction Phase Waste Management

3.9.3.1 Description of the Works

The construction of the Proposed Development will involve the removal of 28 no. turbines, construction of 11 no. turbines, upgrade of existing site access roads, construction of new roads, internal cabling, upgrades to the existing onsite Coomagearlahy 110kV substation and all associated infrastructure.

The existing 28 no. turbines will be dismantled and removed in reverse order to the manner in which they were assembled. The methodology for disassembling the turbines is outlined in Section 2.2.3 above. The hardstands and foundations which are not being re-used to facilitate the Proposed Development will be left to regenerate and revegetate naturally.

The turbines will be manufactured off site and delivered to site where on site erection will occur after the existing turbines have been removed from the site.

The turbine foundations will consist of stone from the onsite borrow pit and a concrete base which will contain reinforcing steel. These concrete foundations will be shuttered with steel formwork specifically designed for the works and re-usable off site on similar projects.

There are updates proposed to the existing onsite 110kV Coomagearlahy substation in order to facilitate the Proposed Development. The works are detailed fully in EIAR Chapter 4, Section 4.3.6. There will be no alterations or extension to the existing footprint of the existing substation, all proposed upgrades will be located internal to the existing substation compound.

The existing site roads will be upgraded using rock won from the onsite borrow pit. Similarly, the construction of new roads will be carried out using rock won from the onsite borrow pit.

The waste types arising from the construction phase of the development are outlined in Table 3-2 below.

Table 3-2 Expected waste types arising during the Construction Phase

Material Type	Example	EWC Code
Cables	Electrical wiring	17 04 11
Cardboard	Boxes, cartons	15 01 01
Composite packaging	Containers	15 01 05
Fibreglass	Turbine blade component	10.11.03
Hydrocarbons	Oils and lubricants drained from the turbines	13.01.01, 13.02.04
Metals	Copper, aluminium, lead, iron and steel	17 04 07

Material Type	Example	EWC Code
Inert materials	Sand, stones, plaster, rock, blocks	17 01 07
Mixed municipal waste	Daily canteen waste from construction workers, miscellaneous	20 03 01
Plastic	PVC frames, electrical fittings	17 02 03
Plastic packaging	Packaging with new materials	15 01 02
Tiles and ceramics	Slates and tiles	17 01 03
Wooden packaging	Boxes, pallets	15 01 03

Hazardous wastes that may occur on site during the construction phase of the development may include oil, diesel fuel, chemicals, paints, preservatives etc. All hazardous wastes will be stored in bunded containers/areas before being collected by an authorised waste contractor and brought to an EPA licensed waste facility. As mentioned above, hazardous wastes will be kept separate from non-hazardous wastes so that contamination does not occur.

3.9.3.2 Waste Arising and Proposals for Minimisation, Refuse and Recycling of Construction Waste

Construction waste will arise on the project mainly from excavation and unavoidable construction waste including material surpluses and damaged materials and packaging waste.

Appropriate measures will be taken to ensure excess waste is not generated during construction, including;

- Ordering of materials will be on an 'as needed' basis to prevent over supply to site. Co-ordination is required with suppliers enabling them to take/buy back surplus stock.
- Purchase of materials pre-cut to length to avoid excess scrap waste generated on site.
- Request that suppliers use least amount of packaging possible on materials delivered to the site.
- Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal
- Ensuring correct sequencing of operations.
- Use reclaimed materials in the construction works.

Hazardous waste will be kept separate from all other construction waste to prevent contamination and removed appropriately.

3.9.3.3 Waste Arising from Construction Activities

All waste generated on site will be contained in waste skips at a waste storage area on site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein.

The removal of the existing 28 no. turbines onsite will give rise to a relatively large volume of waste. It is proposed to segment the blades onsite into 9 no. sections and remove them from site, as outlined in Chapter 4 of this EIAR. The tower sections will also be removed from site in segments, with all

materials being recycled or reused, with no waste materials being sent to landfill. Proposal for the removal of turbine components is outlined above in Section 2.4.2.1 and in Chapter 4 of this EIAR.

The expected remaining waste volumes generated on site are unlikely to be large enough to warrant source segregation at the wind farm site. Therefore, all wastes streams generated on site will be deposited into a single waste skip. This waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.

The waste generated from the turbine erection will be limited to the associated protective covers which are generally reusable. Considering the specialist nature of this packaging material the majority will be taken back by suppliers for their own reuse. Any other packaging waste generated from the turbine supply will be deposited into the on-site skips and subsequently transferred to the MRF.

It is not envisaged that there will be any waste material arising from the materials used to construct the site roads as only the quantity of stone necessary will be sourced from local quarries and brought on site on an 'as needed' basis.

site personnel will be instructed at induction that under no circumstances can waste be brought to site for disposal in the on-site waste skip. It will also be made clear that the burning of waste material on site is forbidden.

3.9.4 Waste Arising from Decommissioning

The design life of the proposed renewable energy development is 35 years after which time a decision will be made to determine whether or not the turbines will be replaced by new turbines or if decommissioning will occur. The lengthy time frame between the completion of the construction phase and decommissioning will result in the only materials remaining on site at that time will be infrastructural material such as the turbine foundations, turbines and the granular material used to construct roads. When the site is decommissioned, cranes will disassemble each turbine tower and all equipment. The associated components will be removed from site for re-use, recycling or waste disposal. Any structural elements that are not suitable for recycling will be disposed of in an appropriate manner. All lubrication fluids will be drained down and put aside for appropriate collection, storage, transport and disposal. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor.

The waste types arising from the decommissioning of the development are outlined in Table 3-3 below.

Table 3-3 Expected waste types arising during the Decommissioning Phase

Material Type	Example	EWC Code
Cables	Electrical wiring	17 04 11
Metals	Copper, aluminium, lead, iron and rebar	17 04 07
Inert materials	Crushed stone, concrete	17 01 07

3.9.4.1 Reuse

Many construction materials will be reused a number of times before they have to be disposed of:

- Concrete will be reused as aggregate for roads cable trench backfilling material.
- Plastic packaging etc. will be used to cover materials on site or reused for the delivery of other materials.

- Excavated material will be reused for reinstatement of the areas around turbine foundations and adjacent to site roads.

3.9.4.2 Recycling

If a certain type of construction material cannot be reused onsite, then recycling is the most suitable option. The opportunity for recycling on site will be restricted to the associated packaging from the wind turbines.

All waste that is produced during the construction phase including dry recyclables will be deposited in the on-site skip initially and sent for subsequent segregation at a remote facility. The components of the 28 no. turbines to be removed from site will be recycled as per the methodology outlined in Section 2.4.2.1. The anticipated volume of all waste material to be generated at the development is low which provides the justification for adopting this method of waste management.

3.9.5 Implementation

3.9.5.1 Roles and Responsibilities

Prior to the commencement of the development a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan.

3.9.5.2 Training

It is important for the Construction Waste Manager to communicate effectively with colleagues in relation to the aims and objectives of the waste management plan. All employees working on site during the construction phase of the project will be trained in materials management and thereby, should be able to:

- Distinguish reusable materials from those suitable for recycling;
- Ensure maximum segregation at source;
- Co-operate with site manager on the best locations for stockpiling reusable materials;
- Separate materials for recovery; and
- Identify and liaise with waste contractors and waste facility operators.

3.9.5.2.1 *Record Keeping*

The WMP will provide systems that will enable all arisings, movements and treatments of construction waste to be recorded. This system will enable the contractor to measure and record the quantity of waste being generated. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The WMP can then be adapted with changes that are seen through record keeping.

The fully licensed waste contractor employed to remove waste from the site will be required to provide documented records for all waste dispatches leaving the site. Each record will contain the following:

- Consignment Reference Number
- Material Type(s) and EWC Code(s)
- Company Name and Address of site of Origin
- Trade Name and Collection Permit Ref. of Waste Carrier

- Trade Name and Licence Ref. of Destination Facility
- Date and Time of Waste Dispatch
- Registration no. of Waste Carrier vehicle
- Weight of Material
- Signature of Confirmation of Dispatch detail
- Date and Time of Waste Arrival at Destination
- site Address of Destination Facility

3.9.5.3 Waste Management Plan Conclusion

The WMP will be properly adhered to by all staff involved in the project which will be outlined within the induction process for all site personnel. The waste hierarchy will always be employed when designing the plan to ensure that the least possible amount of waste is produced during the construction phase. Reuse of certain types of construction wastes will cut down on the cost and requirement of raw materials therefore further minimising waste levels.

4. ENVIRONMENTAL MANAGEMENT IMPLIMENTATION

4.1 Roles and Responsibilities

The site Supervisor/Construction Manager and/or Environmental Clerk of Works (ECoW) are the project focal point relating to construction-related environmental issues.

In general, the ECoW will maintain responsibility for monitoring the works and Contractors/Sub-contractors from an environmental perspective. The ECoW will act as the regulatory interface on environmental matters by reporting to and liaising with Kerry County Council and other statutory bodies as required.

The ECoW will report directly to the site Supervisor/Construction Manager. An ECoW, Project Ecologist, Project Hydrologist, Project Geotechnical engineer will visit the site regularly and report to the site Environmental Office. This structure provides a "triple lock" review/interaction by external specialists. An organogram structure for the construction stage is as follows:

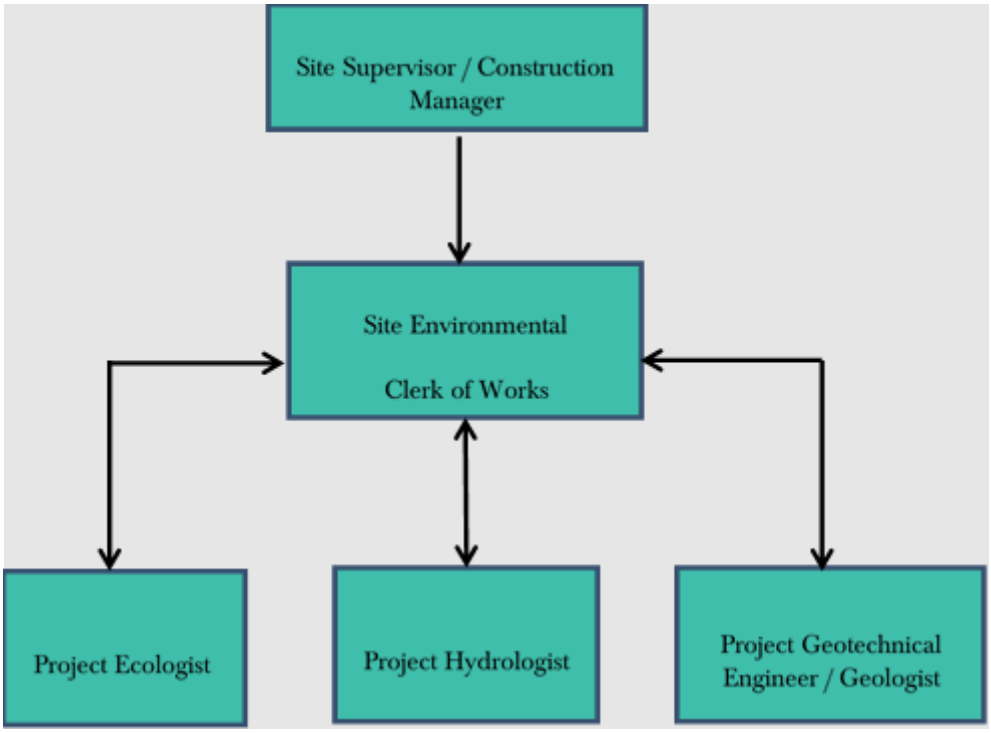

Figure 4-1 site Management Chain of Command

Any requirement of the granted permission, for the works to be supervised by an engineer with professional indemnity insurance, who upon completion of the works, including site stability, shall certify the said works, will be adhered to. Such an engineer will be appointed to oversee and supervise the construction phase of the project.

4.1.1 Construction Manager /Site Supervisor

The Construction Manager / site Supervisor will have overall responsibility for the organisation and execution of all related environmental activities as appropriate, in accordance with regulatory and project environmental requirements. The duties and responsibilities of the site Supervisor/Construction Manager will include:

- Ensure that all works are completed safely and with minimal environmental risk;
- Approve and implement the Project CEMP and supporting environmental documentation, and ensure that all environmental standards are achieved during the construction phase of the project;
- Take advice from the Environmental Clerk of Works on legislation, codes of practice, guidance notes and good environmental working practice relevant to their work;
- Ensure compliance through audits and management site visits;
- Ensure timely notification of environmental incidents; and,
- Ensure that all construction activities are planned and performed such that minimal risk to the environment is introduced.

Ensure that all construction activities are planned and performed such that minimal risk to the environment is introduced.

4.1.2 Environmental Clerk of Works

The main contractor will be required to engage a qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works, and to monitor all site works and to ensure that methodologies and mitigation are followed throughout construction to avoid negatively impacting on the receiving environment.

The ECoW will report to the site Supervisor/Construction Manager. The responsibilities and duties of the ECoW will include the following:

- Preparation and update of the CEMP as required, and supporting environmental documentation and review/approval of contractor method statements;
- Undertake inspections and reviews to ensure the works are carried out in compliance with the CEMP;
- Monitor the implementation of the CEMP, particularly all proposed/required Environmental Monitoring;
- Generate environmental reports as required to show environmental data trends and incidents and ensure environmental records are maintained throughout the construction period;
- Advise site management/contractor/sub-contractors on:
    - Prevention of environmental pollution and improvement to existing working methods;
    - Changes in legislation and legal requirements affecting the environment;
    - Suitability and use of plant, equipment and materials to prevent pollution;
    - Environmentally sound methods of working and systems to identify environmental hazards;
- Ensure the specified mitigation measures are initiated and adhered to during the construction phase;
- Liaise with Project Ecologist, Project Hydrologist, Project Geotechnical Engineer and any other members of the project team to ensure regular site visits and audits/inspections are completed;
- Ensure adequate arrangements are in place for site personnel to identify potential environmental incidents;
- Ensure that details of environmental incidents are communicated in a timely manner to the relevant regulatory authorities, initially by phone and followed up as soon as is practicable by e-mail;

- Support the investigation of incidents of significant, potential or actual environmental damage, and ensure corrective actions are carried out, recommend means to prevent recurrence and communicate incident findings to relevant parties; and,
- Identify environmental training requirements and arrange relevant training for all levels of site-based staff/workers.

The level, detail and frequency of reporting expected from the ECoW for the Construction Manager, developer's project manager, and any Authorities or other Agencies, will be agreed by all parties prior to commencement of construction, and may be further adjusted as required during the course of the project.

4.1.3 Project Ecologist

The Project Ecologist will report to the ECoW and is responsible for the protection of sensitive habitats and species encountered during the construction phase of the proposed renewable energy development. The Project Ecologist will not be full time on site but will visit the site at least once a month during construction.

The responsibilities and duties of the Project Ecologist will include the following:

- Review and input to the final construction phase CEMP in respect of ecological matters;
- In liaison with Environmental Clerk of Works, oversee and provide advice on all relevant ecology mitigation measures set out in the EIAR and planning permission conditions;
- Regular inspection and monitoring of the development, through all phases of construction/operation and provide ecological advice as required;
- Carry out ecological monitoring and survey work as may be required by the planning authority.

Carry out ecological monitoring and survey work as may be required by the planning authority.

4.1.4 Project Hydrologist

The Project Hydrologist will report to the ECoW and is responsible for inspection and review of drainage and water quality aspects associated with construction of the proposed renewable energy development. The Project Hydrologist will not be full time on site but will visit the site at least once a month during construction and on a weekly basis during site preparation/groundworks.

The responsibilities and duties of the Project Hydrologist will include the following:

- Assist in compiling a detailed drainage design before construction commences and attend the site to set out and assist with micro siting of drainage controls. This will be completed over several site visits at the start of the construction phase;
- Review and input to the final construction phase CEMP in respect of drainage and water quality management;
- Following the initial stage of drainage construction regular site visits will be required, at least once a month, to complete hydrological and water quality audits and reviews and report any issues noted to the Site Supervisor/Construction Manager; and,
- Complete ongoing inspection and monitoring of the development, particularly in areas of drainage control, through all phases of construction (including pre, during and post construction) and ensure construction is carried out as specified in the EIAR, and in relevant planning conditions.

4.1.5 Project Geotechnical Engineer/Geologist

The Geotechnical Engineer or Project Geologist will report to the ECoW and is responsible for inspection and review of geotechnical aspects associated with construction of the proposed renewable energy development. The Geotechnical Engineer will not be full time on site but will visit site at least once a month during the construction phase and on a weekly basis during site preparation/groundworks.

The responsibilities and duties of the Geotechnical Engineer or Geologist will include the following:

- Visit site regularly, or at least once a month during the construction phase, to complete geotechnical audits and reviews and report any issues to the site Supervisor/Construction Manager;
- Ensuring that identified hazards are listed in the Construction Risk Register and that these are subject to ongoing monitoring; and,
- Ongoing inspection and monitoring of the development, particularly in areas of peatland and the temporary stockpile areas, through all phases of construction (including pre, during and post construction) and ensure construction is carried out as specified in the EIAR, NIS and in relevant planning conditions.

4.2 Water Quality and Monitoring

4.2.1 Pre-Construction Baseline Monitoring

Baseline water quality field testing and laboratory analysis will be undertaken where required prior to commencement of felling and construction at the site.

Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards (EQSs) and sampling will be undertaken at designated locations as outlined in Figure 9-9 in Chapter 9 of the EIAR.

Baseline sampling will be completed on at least two occasions, and these should ideally coincide with low flow and high flow stream conditions. The high flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell.

4.2.2 Construction Phase Monitoring

4.2.2.1 Daily Visual Inspections

An inspection and maintenance plan for the on-site drainage system and natural watercourses will be prepared in advance of commencement of any works. Inspections will also be undertaken after tree felling. Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs should be undertaken for each primary watercourse and specifically following heavy rainfall events (i.e. weekly, monthly and event based).

Inspection sheets and photographic records will be kept on site. Inspection points will include the in-situ field monitoring point locations and the laboratory analysis sampling points. Inspection points will depend on works being completed within the catchment upstream of the identified monitoring locations. Visual inspections will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period and data including photographs will be collected by visual inspections and independently assessed by the Project Hydrologist who will monitor and advise on the records being received.

The following periodic inspection regime will be implemented:

- Daily general visual inspections of site operations and inspections of all watercourses drainage infrastructure within the site and in the surrounding area by the ECoW or a suitably qualified and competent person as delegated by the ECoW;
- Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter will be noted and corrective action will be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement;
- Event based inspections by the ECoW as follows:
- >10 mm/hr (i.e. high intensity localised rainfall event);
- >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
- Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week).
- Monthly site inspections by the Project Hydrologist/ ECoW during construction phase;
- Quarterly site inspections by the Project Hydrologist/ ECoW after construction for a period of one year following the construction phase; and,
- A written record will be maintained or available on-site within this Construction Environmental Management Plan (CEMP) which will be maintained on-site during the construction phase.

4.2.2.2 Continuous Turbidity Monitoring

Turbidity monitors or sondes can be installed where required at locations surrounding the site. The sondes will provide continuous readings for turbidity levels in the watercourse. This equipment will be supplemented by daily visual monitoring at their locations as outlined in the sections below.

4.2.2.3 Laboratory Analysis

Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken as per water monitoring programme for the Proposed Development. This will not be restricted to just these locations around the proposed renewable energy development site with further sampling points added as deemed necessary by the ECoW in consultation with the Project Hydrologist and site Manager.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs should be undertaken for each primary watercourse, and specifically following heavy rainfall events (i.e. weekly, monthly and event based).

4.2.2.4 Field Monitoring

Field chemistry measurements of unstable parameters, (pH, conductivity, temperature) will be taken at the surface water monitoring locations, as per water monitoring programme for the Proposed Development and each primary watercourse along the route. These analyses will be carried out by

either the ECoW or the Project Hydrologist. In-situ field monitoring will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring.

4.2.2.5 Monitoring Parameters

The analytical determinants of the monitoring programme (including limits of detection and frequency of analysis) will be as per S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations and European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The likely suite of determinants will include:

- pH (field measured)
- Electrical Conductivity (field measured)
- Temperature (field measured)
- Dissolved Oxygen (field measured)
- Total Phosphorus
- Chloride
- Nitrate
- Nitrite
- Total Nitrogen
- Ortho-Phosphate
- Ammonia N
- Biochemical Oxygen Demand
- Total Suspended Solids

4.2.3 Construction Phase Drainage Inspections & Maintenance

Drainage performance will form part of the civil works contract requirements. During the construction phase, the Project Contractor will be responsible for the effectiveness of drainage measures. This responsibility extends to drainage maintenance, to ensure that the installed drainage measures continue to perform as intended by the detailed drainage design. Silt fences, check dams, level spreaders and other drainage measures likely to form part of the detailed drainage design, require regular maintenance to ensure they continue to function effectively, and the Project Contractor is entirely responsible for this maintenance.

Regular inspections of all existing and installed drainage measures should be undertaken by the Project Contractor, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water within the system. The contractor will devise a system of recording the findings of these inspections. Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. For this reason, the drainage measures installed on-site should be inspected at least weekly by the contractor and maintained as required during the construction phase of the Proposed Development to ensure good performance.

The ECoW will monitor the effectiveness of the on-site drainage during changing weather, ground or drainage conditions encountered on site, through their regular visual inspections of on-site watercourses and water monitoring programme. Where it appears that additional drainage measures will be required to ensure the drainage system remains effective, the ECoW will notify the contractor, the developer and project design team including the Project Hydrologist. The ECoW's role in this regard does not replace the need for the weekly (at least) inspections of the drainage system's measures by the Project Contractor.

4.2.4 Surface Water Monitoring Reporting

Visual inspection and laboratory analysis results of water quality monitoring shall assist in determining requirements for any necessary improvements in drainage controls and pollution prevention measures implemented on site.

It will be the responsibility of the ECoW to present the ongoing results of water quality and weather monitoring at or in advance of regular site meetings.

Reports on water quality will consider all field monitoring and visual inspections, and results of laboratory analysis completed for that period. Reports will describe how the results compare with baseline data as well as previous reports on water quality. The reports will also describe whether any deterioration or improvement in water quality has been observed, whether any effects are attributable to construction activities and what remedial measures, or corrective actions have been implemented. Any proposed alteration to sampling frequency will be agreed with the Planning Authority in advance.

4.3 Environmental Awareness and Training

4.3.1 Environmental Induction

The Environmental Induction will be integrated into the general site induction on a case-by-case basis for each member of staff employed on-site depending on their assigned roles and responsibilities on site.

Where necessary, the Environmental Induction will as a minimum include:

- A copy of the Environmental Management site Plans and discussion of the key environmental risks and constraints;
- An outline of the CEMP structure;
- A discussion of the applicable Works Method Statement;
- The roles and responsibilities of staff, including contractors, in relation to environmental management; and,

An outline of the environmental Incident Management Procedure.

4.3.2 Toolbox Talks

Toolbox talks would be held by the ECoW or Construction Manager at the commencement of each day, or at the commencement of new activities. The aims of the toolbox talks are to identify the specific work activities that are scheduled for that day or phase of work. In addition, the necessary work method statements and sub plans would be identified and discussed prior to the commencement of the day's activities. The toolbox talks will include training and awareness on topics including:

- On-site Ecological Sensitivities;
- Buffers to be upheld – watercourses, archaeology, ecology;
- Sediment and Erosion Control;
- Good site practice;
- On-site Traffic Routes and Rules;
- Keeping to tracks – vehicle rules;
- Strictly adhering to the development footprint;
- Fuel Storage;
- Materials and waste procedures;

site meetings would be held on a regular basis involving all site personnel. The objectives of site meetings are to discuss the coming weeks activities and identify the relevant work method statements and sub plans that will be relevant to that week's activities. Additionally, any non-compliance identified during the previous week would also be discussed with the aim to reduce the potential of the same non-compliance reoccurring.

During construction of the Proposed Development, all staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan

5. EMERGENCY RESPONSE PLAN

An Emergency Response Plan (ERP) is presented in this section of the CEMP. It provides details of procedures to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

5.1 Overview

The Emergency Response Plan (ERP) is presented in this section of the CEMP. It provides details of procedures to be adopted in the event of an emergency. The site ERP includes details on the response required and the responsibilities of all personnel in the event of an emergency. The ERP will require updating and submissions from the contractor/PSCS and suppliers as the project progresses. Where sub-contractors that are contracted on site are governed by their own emergency response procedure a bridging arrangement will be adopted to allow for inclusion of the sub-contractor's ERP within this within this document.

This is a working document that requires updating throughout the various stages of the project.

5.1.1 Roles and Responsibilities

The chain of command during an emergency response sets out who is responsible for coordinating the response. The Site Supervisor/Construction Manager will lead the emergency response which makes him responsible for activating and coordinating the emergency response procedure. The other site personnel who can be identified at this time who will be delegated responsibilities during the emergency response are presented in Figure 5-1. In a situation where the site Supervisor/ Construction Manager is unavailable or incapable of coordinating the emergency response, the responsibility will be transferred to the next person in the chain of command outlined in Figure 5-1. This will be updated throughout the various stages of the project.

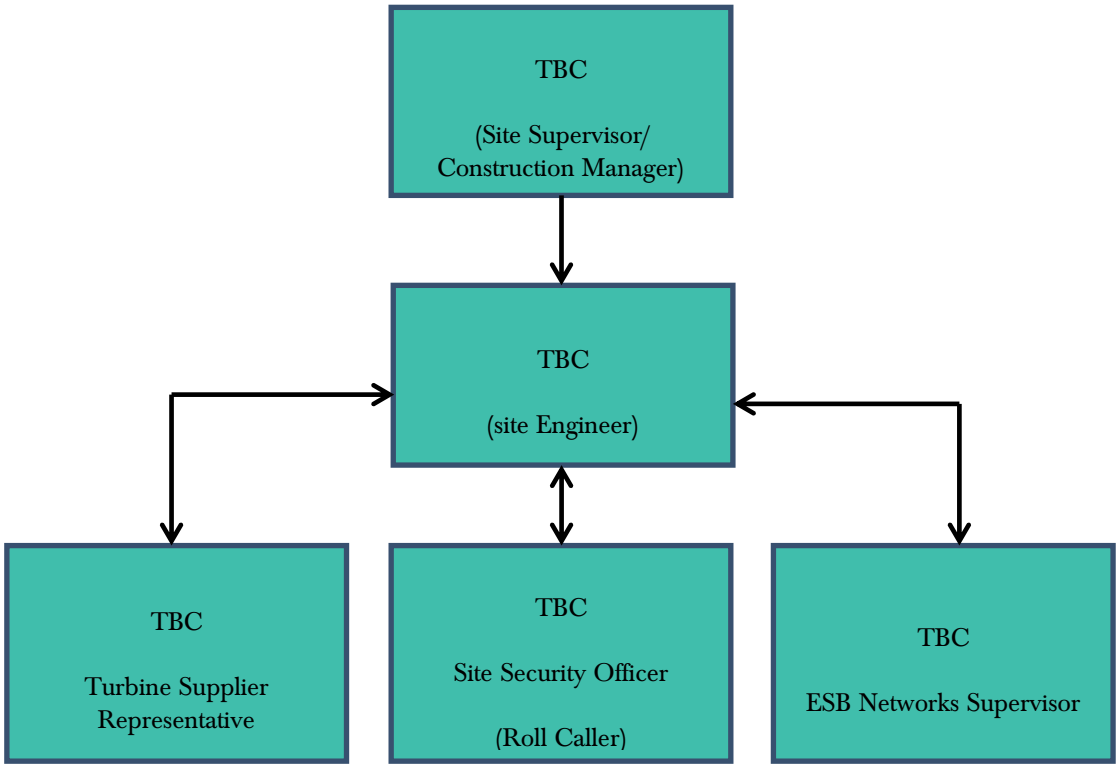

Figure 5-1 Emergency Response Procedure Chain of Command

5.1.2 Hazard Identification

In order to establish the type and scale of potential emergencies that may occur, the following hazards have been identified as being potential situations that may require an emergency response in the event of an occurrence.

Table 5-1 Hazards associated with potential emergency situations

Hazard	Emergency Situation
Construction Vehicles: Dump trucks, tractors, excavators, cranes etc.	Collision or overturn which has resulted in operator or third-party injury.
Abrasive wheels/Portable Tools	Entanglement, amputation or electrical shock associated with portable tools
Contact with services	Electrical shock or gas leak associated with an accidental breach of underground services
Fire	Injury to operative through exposure to fire
Falls from heights including falls from scaffold towers, scissor lifts, ladders, roofs and turbines	Injury to operative after a fall from a height
Sickness	Illness unrelated to site activities of an operative e.g. heart attack, loss of consciousness, seizure
Turbine Specific Incident	This will be included when the upon agreement and section of the final turbine type

In the event of an emergency situation associated with, but not restricted to, the hazards outlined in Table 5-1 the site Supervisor/Construction Manager will carry out the following:

- Establish the scale of the emergency situation and identify the number of personnel, if any, have been injured or are at risk of injury.
- Where necessary, sound the emergency siren/fog-horn that activates an emergency evacuation on the site. The site Supervisor/Construction Manager must proceed to the assembly point if the emergency poses any significant threat to their welfare **and if there are no injured personnel at the scene that require assistance**. The site Supervisor/Construction Manager will be required to use their own discretion at that point. In the case of fire, the emergency evacuation of the site should proceed, without exception. The site evacuation procedure is outlined in Section 5.1.3.
- Make safe the area if possible and ensure that there is no identifiable risk exists with regard to dealing with the situation e.g. if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured.
- Contact the required emergency services or delegate the task to someone. If delegating the task, ensure that the procedures for contacting the emergency services as set out in Section 5.3 is followed.
- Take any further steps that are deemed necessary to make safe or contain the emergency incident e.g. cordon off an area where an incident associated with electrical issues has occurred.
- Contact any regulatory body or service provider as required e.g. ESB Networks the numbers for which as provided in Section 5.4.
- Contact the next of kin of any injured personnel where appropriate.

5.1.3 Site Evacuation/Fire Drill

A site evacuation/fire drill procedure will provide basis for carrying out the immediate evacuation of all site personnel in the event of an emergency. The following steps will be taken:

- Notification of the emergency situation. Provision of a siren or fog-horn to notify all personnel of an emergency situation.
- An assembly point will be designated in the construction compound area and will be marked with a sign. All site personnel will assemble at this point.
- A roll call will be carried out by the site Security Officer to account for all personnel on site.
- The Site Security Officer will inform the site Supervisor/Construction Manager when all personnel have been accounted for. The Site Supervisor/Construction Manager will decide the next course of action, which be determined by the situation that exists at that time and will advise all personnel accordingly.

All personnel will be made aware of the evacuation procedure during site induction. The Fire Services Acts of 1981 and 2003 require the holding of fire safety evacuation drills at specified intervals and the keeping of records of such drills

5.2 Environmental Emergency Response Procedure

5.2.1 Excessive Peat Movement

Where there is excessive peat movement or continuing peat movement recorded at a monitoring location, or identified at any location within the site, but no apparent signs of distress to the peat (e.g. cracking, surface rippling) then the following shall be carried out.

- All construction activities shall cease within the affected area.
- Increased monitoring at the location shall be carried out. The area will be monitored, as appropriate, until such time as movements have ceased.
- Re-commencement of limited construction activity shall only start following a cessation of movement and the completion of a geotechnical risk assessment by a geotechnical engineer.

5.2.2 Onset of Peat Slide

Where there is the onset or actual detachment of peat (e.g. cracking, surface rippling) then the following shall be carried out.

- On alert of a peat slide incident, all construction activities will cease and all available resources will be diverted to assist in the required mitigation procedures.
- Where considered possible action will be taken to prevent a peat slide reaching any watercourse. This will take the form of the construction of check barrages on land. Due to the terrain, the possible short run-out length to watercourses, speed of movement and the inability to predict locations it may not be possible to implement any on-land prevention measures, in this case a watercourse check barrage will be implemented.
- For localised peat slides that do not represent a risk to a watercourse and have essentially come to rest the area will be stabilised initially by rock infill, if required. The failed area and surrounding area will then be assessed by the engineering staff

and stabilisation procedures implemented. The area will be monitored, as appropriate, until such time as movements have ceased.

5.2.3 Spill Control Measures

Every effort will be made to prevent an environmental incident during the construction and operational phase of the project. Oil/fuel spillages are one of the main environmental risks that will exist on the site which will require an emergency response procedure. The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. The following steps will be implemented in the event of such an incident:

- The source of the spill will be stopped, and the alarm will be raised to alert people working in the vicinity of any potential dangers.
- If applicable, any sources of ignition will be eliminated in the immediate vicinity of the incident.
- The spill will be contained using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- If possible, any vulnerable areas will be covered or bunded off where appropriate such as drains, watercourses or sensitive habitats.
- If possible, clean up as much as possible using the spill control materials.
- Any used spill control material will be contained and disposed of appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- The ECoW will be notified immediately giving information on the location, type, and extent of the spill so that they can take appropriate action.
- The ECoW will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The ECoW will notify the appropriate regulatory body such as Mayo County Council, and the Environmental Protection Agency (EPA), if deemed necessary.

The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident will be investigated in accordance with the following steps.

- The ECoW must be immediately notified.
- If necessary, the ECoW will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident.
- The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions and remedial measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident.
- If the incident has impacted on an ecologically sensitive receptor, such as a sensitive habitat, protected species or designated conservation site (pSPA or cSAC), the ECoW will liaise with the Project Ecologist.
- If the incident has impacted on a sensitive receptor such as an archaeological feature the ECoW will liaise with the Project Archaeologist.
- A record of all environmental incidents will be kept on file by the ECoW and the Main Contractor. These records will be made available to the relevant authorities such as Kerry County Council, EPA if required.

The ECoW will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the Main Contractor as appropriate.

5.3 Contact the Emergency Services

In the event of requiring the assistance of the emergency services the following steps will be taken:

Stay calm. It is important to take a deep breath and not get excited. Any situation that requires 999/112 is, by definition, an emergency. The dispatcher or call-taker knows that and will try to move things along quickly, but under control.

Know the location of the emergency and the number you are calling from. This may be asked and answered a couple of times but do not get frustrated. Even though many emergency call centres have enhanced capabilities meaning they are able to see your location on the computer screen they are still required to confirm the information. If for some reason you are disconnected, at least emergency crews will know where to go and how to call you back.

Wait for the call-taker to ask questions, then answer clearly and calmly. If you are in danger of assault, the dispatcher or call-taker will still need you to answer quietly, mostly "yes" and "no" questions.

If you reach a recording, listen to what it says. If the recording says your call cannot be completed, hang up and try again. If the recording says all call takers are busy, WAIT. When the next call-taker or dispatcher is available to take the call, it will transfer you.

Let the call-taker guide the conversation. He or she is typing the information into a computer and may seem to be taking forever. There is a good chance, however, that emergency services are already being sent while you are still on the line.

Follow all directions. In some cases, the call-taker will give you directions. Listen carefully, follow each step exactly, and ask for clarification if you do not understand.

Keep your eyes open. You may be asked to describe victims, suspects, vehicles, or other parts of the scene.

Do not hang up the call until directed to do so by the call taker.

Due to the remoteness of the site it may be necessary to liaise with the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.

5.4 Contact Details

A list of emergency contacts is presented in Table 5-2. A copy of these contacts will be included in the site Safety Manual and in the site offices and the various site welfare facilities.

Table 5-2 Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Doctor – Ballyvourney Medical Centre	+353 26 45687
Hospital – Bantry General Hospital	(027) 50133
ESB Emergency Services	1850 372 999

Contact	Telephone no.
Gas Networks Ireland Emergency	1850 20 50 50
Gardaí – Ballyvourney Garda Station.	(026) 45002
Health and Safety Co-ordinator - Health & Safety Services	TBC
Health and Safety Authority	1890 289 389
Inland Fisheries Ireland (IFI)	1890 347 424
Project Supervisor Construction Stage (PSCS): TBC	TBC
Project Supervisor Design Stage (PSDS): TBC	TBC
Orsted Project Delivery Manager	TBC
Natural Power – Operational Wind Farm Controller	1800 200 817
Orsted Regional O&M Supervisor	TBC

5.4.1 Procedure for Personal Tracking

All operatives on site without any exception will have to undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.

In the event of a site operative becoming in an emergency situation where serious injury has occurred and hospitalisation has taken place, it will be the responsibility of the Site Manager or next in command if unavailable to contact the next of kin to inform them of the situation that exists.

5.5 Induction Checklist

Table 5-3 provides a list of items highlighted in this ERP which must be included or obtained during the mandatory site induction of all personnel that will work on the site. This will be updated throughout the various stages of the project.

Table 5-3 Emergency Response Plan Items Applicable to the site Induction Process

ERP Items to be included in site Induction	Status
All personnel will be made aware of the evacuation procedure during site induction	
Due to the remoteness of the site it may be necessary to liaise with and assist the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.	

ERP Items to be included in site Induction	Status
All operatives on site without any exception will have undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.	

6. MITIGATION MEASURES

All mitigation measures relating to the pre-commencement, construction and operational phases of the Proposed Development were set out in the various sections of the Environmental Impact Assessment Report (EIAR), NIS prepared as part of the planning permission application to An Bord Pleanála.

This section of the CEMP groups together all of the mitigation measures presented in the above documents. The Mitigation Measures are presented in the following pages.

By presenting the mitigation proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the future phases of the project. The tabular format in which the below information is presented, can be further expanded upon during the course of future project phases to provide a reporting template for site compliance audits.

Table 6-1 Site Preparation and Mitigation Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
EIAR Chapter 4 – Description of the Proposed Project					
Pre-Construction Phase					
MM1	Environmental Management	EIAR Chapter 4	All proposed activities on the site of the Proposed Development will be provided for in an environmental management plan. A Construction and Environmental Management Plan (CEMP) has been prepared for the Proposed Development and is included in Appendix 4-3 of this EIAR. The CEMP sets out the key environmental considerations to be managed by the contractor during construction of the Proposed Development. The CEMP includes details of drainage, spoil management and waste management, and outlines clearly the mitigation measures and monitoring proposals that are required to be adhered to in order to comply with the environmental commitments outlined in the EIAR. In the event planning permission is granted for all elements of the Proposed Development, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the Planning Authority for approval.		
MM2	Environmental Management	CEMP Section 4	○ The main contractor will be required to engage a qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works (ECoW) to oversee the construction works and audit the implementation of the CEMP. The ECoW will report to the Project Developer and Project Contractor but will liaise closely with the Construction Manager in relation to the Project Contractor's day-to-day implementation of the CEMP onsite. ○ The Environmental Clerk of Works (ECoW) will be nominated by the project developer to oversee the Project Contractor's effective implementation of the Proposed		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Projects environmental requirements and obligations, as captured in the CEMP and provide on-site advice on the mitigation measures necessary as necessary to ensure the project proceeds as intended. ○ The level, detail and frequency of reporting expected from the ECoW for the Construction Manager, Developer's Project Manager, and any Authorities or other Agencies, will be agreed by all parties prior to commencement of construction, and may be further adjusted as required during the course of the Proposed Development.		
MM3	Surface Water Quality	CEMP Section 4	○ Visual inspection and laboratory analysis results of water quality monitoring shall assist in determining requirements for any necessary improvements in drainage controls and pollution prevention measures implemented on site. ○ Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards (EQSs) and sampling will be undertaken at designated locations as outlined in Figure 9-9 of the EIAR. ○ Baseline sampling will be completed on at least two occasions, and these should ideally coincide with low flow and high flow stream conditions. The high flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell.		
MM4	Concrete Deliveries	EIAR Chapter 4 CEMP Section 3	○ The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout of trucks and discussing emergency procedures.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place. Where possible pre-cast elements for culverts and concrete works will be used;		
MM5	Site Drainage Plan	EIAR Chapter 4, 9 CEMP Section 3	The key principles of drainage design that will be implemented and adhered to as part of the Proposed Development are as follows: ○ Keep 'clean water clean' by intercepting it where possible, upgradient of works areas and minimise works in or around artificial drainage features and divert it around the excavation areas, reinstatement areas, construction areas and temporary storage areas. Another method for drainage control involves collecting any drainage waters from works areas within the site that might carry silt or sediment, and nutrients, to route them towards new proposed silt traps and settlement ponds prior to controlled difuse release into the drainage network. ○ No alteration of natural watercourses or to existing drainage channels on site ○ Maintain the existing hydrology of the Site. ○ Blocking of existing manmade drainage as appropriate. ○ Where possible, drainage controls will be installed during seasonally dry ground conditions. ○ Daily inspection and recording of surface water management system by on-site Environmental Clerk of Works and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the Site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Use of siltbuster or equivalent system if required. ○ However, prior to commencement of works in sub-catchments across the site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. It is proposed to complete these inspections on a catchment-by-catchment basis prior to the commencement of construction works across the site, as works in all areas will not commence simultaneously.		
MM6	Waste Management	EIAR Chapter 4 CEMP Section 3	○ Prior to the commencement of the development a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the Waste Management Plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to.		
MM7	Preparative Site Drainage Management	EIAR Chapter 4 CEMP Section 4	○ Interceptor drains will be installed in advance of any main construction works commencing. The material excavated to make the drain will be completed on the downslope edge of the drain to form a diversion dike. However, prior to commencement of works in sub-catchments across the site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. It is proposed to complete these inspections on a catchment-by-catchment basis prior to the commencement of construction works across the site, as works in all areas will not commence simultaneously. ○ Drainage associated with pollution control measures will be implemented onsite before the main construction works commence. Where possible, drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			impact on surface waters by suspended sediment released during construction and entrained in surface run-off. ○ No routes of any natural drainage features will be altered as part of the Proposed Development and turbine locations and associated new roadways were originally selected to avoid natural watercourses, and existing roads are to be used wherever possible. ○ Buffer zones of 50m around rivers and streams, respectively, have been used to inform the layout of the Proposed Development. ○ Double silt fences will be used in areas where a 50m setback from existing watercourses cannot be achieved		
MM8	Earthworks	CEMP Section 3	○ Drainage associated with pollution control measures will be implemented onsite before the main construction works commence. Where possible, drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off.		
MM9	Traffic Management	EIAR Chapter 4, 15	In the event planning permission is granted for the Proposed Development, the final Traffic Management Plan will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned. The plan will include: ○ A delivery schedule. ○ Details of works or any other minor alteration identified. ○ A dry run of the route using vehicles with similar dimensions.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM10	Spoil Management	EIAR Chapter 4 CEMP Section 3	○ The proposed placement of peat and spoil and excavation method, as per the Peat & Spoil Management Plan in Appendix 4-2 of the EIAR, includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.		
Construction Phase					
MM11	Refuelling	EIAR Chapter 4, 8, 9 CEMP Section 3	○ Wherever possible, vehicles will be refuelled off-site. However, for construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site. ○ The construction compounds will consist of a bunded refuelling and containment area for the storage of lubricants, oils and site generators, etc, and full retention oil interceptor, waste organic storage area, welfare facilities including temporary site offices, staff facilities and car parking areas for staff and visitors. ○ On-site refuelling of machinery will be carried out at dedicated refuelling locations using a mobile double skinned fuel bowser. The fuel bowser, a double-axle custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. ○ The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use. ○ Only designated trained and competent operatives will be authorised to refuel plant on site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Mobile measures such as drip trays, spill kits and fuel absorbent mats will be used during all refuelling operations.		
MM12	Concrete Deliveries and Management	EIAR Chapter 4 CEMP Section 3	○ Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in concrete delivery trucks. The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. ○ When concrete is delivered to site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the site. ○ Concrete trucks will be washed out fully at the batching plant, where facilities are already in place. ○ The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent. ○ The residual liquids and solids can be disposed of off-site at an appropriate waste facility. ○ Where temporary lined impermeable containment areas are used, such containment areas are typically built using straw bales and lined with an impermeable membrane. ○ Concrete trucks will not be washed out on the site but will be directed back to their batching plant for washout. ○ Site roads will be constructed to a high standard to allow transport of the turbine components around the site, and hence, concrete delivery trucks will be able to access all areas where the concrete will be needed. No concrete will be transported around the site in open trailers or dumpers so as to avoid spillage while in transport. All		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			concrete used in the construction of turbine bases will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete locally to the location where it is needed. ○ The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, confirming routes, prohibiting on-site washout and discussing emergency procedures. ○ Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted on the site. ○ Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast. ○ Restricting concrete pumps and machine buckets from slewing over watercourses while placing concrete. ○ Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets. ○ Ensuring that covers are available for freshly placed concrete to avoid the surface washing away in heavy rain. ○ Disposing of any potential, small surplus of concrete after completion of a pour in suitable locations away from any watercourse or sensitive habitats.		
MM13	Road Cleanliness	EIAR Chapter 4	○ A wheelwash facility will be provided for the site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 3	○ The site roads will be well finished with compacted hardcore, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt. ○ A road sweeper will be available if any section of the public roads requires cleaning due to construction traffic associated with the Proposed Development.		
MM14	Watercourse Buffers & Water discharge	EIAR Chapter 4, 9 CEMP Section 3	○ Two distinct methods will be employed to manage drainage water within the Proposed Development site. The first method involves 'keeping clean water clean' by avoiding disturbance to existing drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations, reinstatement areas, construction areas and temporary storage areas. The second method involves collecting any drainage waters from works areas within the site that might carry silt or sediment, and nutrients, to route them towards new proposed silt traps and settlement ponds (or stilling ponds) prior to controlled diffuse release into the existing drainage network. This allows for attenuation and settlement prior to s diffuse release.		
MM15	Wastewater Management	EIAR Chapter 4 CEMP Section 2	The construction compounds will consist of a bunded refuelling and containment area for the storage of lubricants, oils and site generators, etc, and full retention oil interceptor, waste organic storage area, welfare facilities including temporary site offices, staff facilities and car parking areas for staff and visitors. Temporary port-a-loo toilets and toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered offsite by a permitted waste collector to wastewater treatment plant. There will also be a water supply onsite for hygiene purposes, by way of a temporary storage tank.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM16	Drainage Measure Management	EIAR Chapter 4 CEMP Section 3	○ Vegetation filters will carry outflow from the level spreaders as overland sheet flow, removing any suspended solids and discharging to the groundwater system by diffuse infiltration. ○ Drains will be excavated, and stilling ponds constructed to eliminate any suspended solids within surface water running off the site. ○ Regular inspections of all existing and installed drainage measures should be undertaken by the Project Contractor, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water within the system. ○ The contractor will devise a system of recording the findings of these inspections. ○ Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. ○ For this reason, the drainage measures installed on-site should be inspected at least weekly by the contractor and maintained as required during the construction phase of the Proposed Project to ensure good performance. ○ The ECoW will monitor the effectiveness of the on-site drainage during changing weather, ground or drainage conditions encountered on site, through their regular visual inspections of on-site watercourses and water monitoring programme. Where it appears that additional drainage measures will be required to ensure the drainage system remains effective, the ECoW will notify the contractor, the developer and project design team including the Project Hydrologist.		
MM17	Interceptor Drains	EIAR Chapter 4	○ The interceptor drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. This will		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 4	minimise the volume of potentially silty runoff to be managed within the construction area. ○ Interceptor drains will be predominantly installed horizontally across slopes to run in parallel with the natural contour line of the slope. Intercepted water will travel along the interceptor drains, pass through piped drains, and onto areas downgradient of works areas where the drain will terminate at a level spreader. Across the entire length of the interceptor drains, the design elevation of the water surface along the route of the drains will not be lower than the design elevation of the water surface in the outlet at the level spreader.		
MM18	Collector/swales Drains	EIAR Chapter 4 CEMP Section 4	○ New collector drains and sediment traps will be installed during ground preparation to intercept water upgradient of felling areas and divert it away. Collector drains will be excavated at an acute angle to the contour (0.3%-3% gradient), to minimise flow velocities. ○ Drainage swales will remain in place to collect runoff from roads and hardstanding areas of the Proposed Development during the operational phase. ○ Drainage swales will be installed downgradient of any works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and picked up silt and sediment. Swales will intercept the potentially silt-laden water from the excavations and construction areas of the site and prevent it reaching natural watercourses. ○ Drainage swales will be installed in advance of any main construction works commencing. The material excavated to make the swale will be compacted on the downslope edge of the drain to form a diversion dike.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM19	Check Dams	EIAR Chapter 4 CEMP Section 4	○ Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. ○ Regular maintenance of dams, to ensure they continue to function effectively, and the Project Contractor is entirely responsible for this maintenance. ○ Existing artificial drains in the vicinity of existing site roads will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage water from works areas, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains.		
MM20	Level Spreader	EIAR Chapter 4	○ A level spreader will be constructed at the end of each interceptor drain to convert concentrated flows in the drain, into diffuse sheet flow on areas of vegetated ground. The levels spreaders will be located downgradient of any proposed works areas in locations where they will not contribute further to water ingress to construction areas of the Proposed Development site. ○ The water carried in interceptor drains will not have come in contact with works areas, and therefore should be free of silt and sediment. The level spreaders will distribute clean drainage water onto vegetated areas where the water will not be reconcentrated into a flow channel immediately below the point of discharge. The discharge point will be on level or only very gently sloping ground rather than on a steep slope so as to prevent erosion. ○ The slope in the channel leading into the spreader will be less than or equal to 1%. The slope downgradient of the spreader onto which the water will dissipate will have a grade of less than 6%. The availability of slopes with a grade of 6% or less will determine the locations of level spreaders. If a slope grade of less than 6% is not available in the immediate area downgradient of a works area at the end of a diversion		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			drain, a piped slope drain (see Section 4.6.5.5 below) will be used to transfer the water to a suitable location. ○ The spreader lip over which the water will spill will be made of a concrete kerb, wooden board, pipe, or other similar piece of material that can create a level edge similar in effect to a weir. The spreader will be level across the top and bottom to prevent channelised flow leaving the spreader or ponding occurring behind the spreader. The top of the spreader lip will be 150mm above the ground behind it. The length of the spreader will be a minimum of four metres and a maximum length of 25 metres, with the actual length of each spreader to be determined by the size of the contributing catchment, slope and ground conditions. ○ Clean four-inch stone can be placed on the outside of the spreader lip and pressed into the ground mechanically to further dissipate the flow leaving the level spreader over a larger area		
MM21	Culverts	EIAR Chapter 4 CEMP Section 4	○ All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse. ○ All roads and culverts will be inspected by the ECoW and contractor prior to any machinery being brought on site to commence the felling operation. ○ Checking and maintenance of roads and culverts will be on-going through any felling operation. ○ Some culverts may be installed to manage drainage waters from works areas of the Proposed Development, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. ○ In all cases, culverts will be oversized to allow mammals to pass through the culvert.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem.		
MM22	Piped Slope Drains	EIAR Chapter 4	○ Piped slope drains will be used to convey surface runoff from diversion drains safely down slopes to flat areas without causing erosion. Once the runoff reaches the flat areas it will be reconverted to diffuse sheet flow. Level spreaders will only be established on slopes of less than 6% in grade. Piped slope drains will be used to transfer water away from areas where slopes are too steep to use level spreaders ○ The piped slope drains will be semi-rigid corrugated pipes with a stabilised entrance and a rock apron at the outlet to trap sediment and dissipate the energy of the water. The base of drains leading into the top of the piped slope drain will be compacted and concavely formed to channel the water into the corrugated pipe. The entrance at the top of the pipe will be stabilised with sandbags if necessary. The pipe will be anchored in place by staking at approximately 3-4 metre intervals or by weighing down with compacted soil. The bottom of the pipe will be placed on a slope with a grade of less than 1% for a length of 1.5 metres, before outflowing onto a rock apron. ○ The rock apron at the outlet will consist of 6-inch stone to a depth equal to the diameter of the pipe, a length six times the diameter of the pipe. The width of the rock apron will be three times the diameter of the pipe where the pipe opens onto the apron and will fan out to six times the diameter of the pipe over its length ○ Piped slope drains will only remain in place for the duration of the construction phase of the Proposed Development. On completion of the works, the pipes and rock aprons will be removed, and all channels backfilled with the material that was originally excavated from them.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Piped slope drains will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and blockages. Stake anchors or fill over the pipe will be checked for settlement, cracking and stability. Any seepage holes where pipe emerges from drain at the top of the pipe will be repaired promptly		
MM23	Vegetation Filters	EIAR Chapter 4	○ Vegetation filters are the existing vegetated areas of land that will be used to accept surface water runoff from upgradient areas. The selection of suitable areas to use as vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions. ○ Vegetation filters will carry outflow from the level spreaders as overland sheet flow, removing any suspended solids and discharging to the groundwater system by diffuse infiltration. ○ Vegetation filters will not be used in isolation for waters that are likely to have higher silt loadings. In such cases, silt-bearing water will already have passed through stilling ponds prior to diffuse discharge to the vegetation filters via a level spreader		
MM24	Stilling Ponds	EIAR Chapter 4	○ Stilling or settlement ponds will be used to attenuate runoff from works areas of the site of the Proposed Development during the construction phase and will remain in place to handle runoff from roads and hardstanding areas of the Proposed Development during the operational phase. The purpose of the stilling ponds is to intercept runoff potentially laden with sediment and to reduce the amount of sediment leaving the disturbed area by reducing runoff velocity. Reducing runoff velocity will allow larger particles to settle out in the stilling ponds, before the run-off water is redistributed as diffuse sheet flow in filter strips downgradient of any works areas ○ Stilling ponds will be excavated/constructed to the appropriate size at each required location as shown on the drainage design drawings included in Appendix 4-4 of this document. The points at which water enters and exits the stilling ponds will be		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			stabilised with rock aprons, which will trap sediment, dissipate the energy of the water flowing through the stilling pond system, and prevent erosion. The stilling ponds will reduce the velocity of flows in order to allow settlement of silt to occur. Water will flow out of the stilling pond through a stone dam, partially wrapped in geo-textile membrane, which will control flow velocities and trap any sediment that has not settled out ○ Water will flow by gravity through the stilling pond system. The stilling ponds have been sized according to the size of the area they will be receiving water from and are large enough to accommodate a 10-year return rainfall event. The settlement ponds are designed for 11hr and 24hr retention times used to settle out medium silt (0.006mm) and fine silt (0.004mm) respectively (EPA, 2006)[1]. The stilling ponds will be dimensioned so that the length to width ratio will be greater than 2:1, where the length is the distance between the inlet and the outlet. Where ground conditions allow, stilling ponds will be constructed in a wedge shape, with the inlet located at the narrow end of the wedge. Each stilling pond will be a minimum of 1-1.5 metres in depth. Deeper ponds will be used to minimise the excavation area needed for the required volume ○ The embankment that forms the sloped sides of the stilling ponds will be stabilised with vegetated turves, which will have been removed during the excavation of the stilling ponds area ○ Stilling ponds will be located towards the end of swales, close to where the water will be reconverted to diffuse sheet flow. Upon exiting the stilling pond system, water will be immediately reconverted to diffuse flow via a fan-shaped rock apron if there is		

[1] Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006)

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			adequate space and ground conditions allow. Otherwise, a swale will be used to carry water exiting the stilling pond system to a level spreader to reconvert the flow to diffuse sheet flow. ○ A water level indicator such as a staff gauge will be installed in each stilling pond with marks to identify when sediment is at 10% of the stilling pond capacity. Sediment will be cleaned out of the still pond when it exceeds 10% of pond capacity. Stilling ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and anything else that might interfere with flows		
MM25	Silt Bags	EIAR Chapter 4 CEMP Section 3	○ The silt bag will allow the water to flow through the geotextile fabric and will trap any of the finer silt and sediment remaining in the water after it has gone through the previous drainage measures. ○ The dewatering silt bag that will be used will be approximately 3 metres in width by 4.5 metres in length and will be capable of trapping approximately four tonnes of silt.		
MM26	Siltbuster	EIAR Chapter 4	○ The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type concrete wash unit. ○ The residual liquids and solids can be disposed of off-site at an appropriate waste facility.		
MM27	Silt Fences	EIAR Chapter 4 CEMP Section 4	○ Silt fences will be installed as an additional water protection measure around existing watercourses in certain locations, particularly where works are proposed within the 50-metre buffer zone of a natural watercourse, which is inevitable where existing roads in proximity to watercourses are to be upgraded as part of the Proposed Development. Silt fences will be installed as single, double or a series of triple silt fences, depending on the space available and the anticipated sediment loading. The silt fence designs		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			follow the technical guidance document 'Control of Water Pollution from Linear Construction Projects' published by CIRIA (Ciria, No. C648, 1996). Up to three silt fences may be deployed in series. ○ On steeper slopes, silt fences, will be installed temporarily downgradient of the cable trench works area, or on the downhill slope below where excavated material is being temporarily stored to control run-off. ○ Silt fences will require regular maintenance to ensure they continue to function effectively, and the Project Contractor is entirely responsible for this maintenance.		
MM28	Hydrocarbon Interceptor	CEMP Section 3 EIAR Chapter 4	○ A hydrocarbon interceptor is a trap used to filter out hydrocarbons from surface water runoff. A suitably sized hydrocarbon interceptor will be installed wherever it is intended to store hydrocarbons and oils (i.e. construction compounds and substation compound) or where it is proposed to park vehicles during the construction and operational phases of the Proposed Development (i.e. construction compounds, substation compound and visitor car park.		
MM29	Water Discharges	EIAR Chapter 4 CEMP Section 3	○ There will be no direct discharges to natural watercourses. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from natural watercourse and lakes. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Development and are indicated on the drainage design drawings.		
MM30	Excavations	EIAR Chapter 4 CEMP	○ No excavations (e.g. drainage, peat cuttings) will be carried out within 5m distance of a completed floated access road edge, or at a distance determined following a site inspection. The presence of excavations can destabilise the road. Temporary excavations, where required, should be excavated in short lengths and backfilled as soon as practicable.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Large excavations and movements of peat/subsoil or vegetation stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast. ○ Undercutting of slopes and unsupported excavations will be prevented. ○ All necessary health and safety signage will be erected to warn of deep excavations etc. Access to and from excavated bases will be formed by excavating a pedestrian walkway to 1:12 grade. ○ Tracked excavators will carry out excavation for roads with appropriate equipment attached. The excavations shall follow a logical route working away from the borrow pit location. Excavated material will be transported back to the borrow pit in haul trucks. A two to three-metre-wide working area will be required around each hardstanding area, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur. ○ Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light;		
MM31	Spoil Management	EIAR Chapter 4 Appendix 4-2 CEMP	○ No excavated material will be removed from site with excavated spoil being transported and stored in the identified spoil management areas within the Wind Farm Site. ○ It is proposed that any excess peat and spoil generated through construction activities, not used to reinstate the borrow pit will be used for landscaping, or be placed around selected turbines bases and hardstands. The areas around 11 no. turbine bases and hardstands have been assessed as suitable locations for peat and spoil placement due to suitable ground conditions including peat depths and slope angles.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ The rock buttresses will be constructed in stages to allow infilling of peat and spoil within cells. The buttress will be constructed of selected rock fill and placed and compacted in suitable layers to form a buttress of sufficient stability to retain the placed peat and spoil. ○ The rock buttresses will be wide enough (up to 4m) to allow construction traffic access for tipping and grading during the placement of the excavated peat and spoil. The permanent side slopes of the rock buttress will be constructed at 40 to 60 degrees. ○ Infilling of the peat and spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress, allowing the borrow pit to be developed and infilled in cells. The contractor excavating the rock will be required to develop the borrow pits in a way which will allow the excavated peat and spoil to be reinstated safely. ○ A layer of geotextile will be placed on the inside face of the perimeter berm to act as a separator layer between the berm and the placed peat/spoil, to prevent the placed peat/spoil infilling any voids on the inside face of the berm, maintaining the permeability of the berm. ○ The use of temporary access ramps and long reach excavators during the placement of the excavated peat and spoil will be required. ○ The surface of the placed peat and spoil will be shaped following backfill using excavators to allow efficient run-off of surface water from the placed arisings towards the perimeter of the borrow pit. ○ A layer of geogrid to strengthen the surface of the placed peat and spoil within the borrow pits will be required.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ The acrotelm will be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the peat and spoil within the borrow pits. ○ Spoil materials will be side-cast along the access road section to embed the access roads into the surrounding environment where slope and ground conditions allow, limiting their ecological and environmental impact.		
Operational Phase					
MM32	Drainage Maintenance	EIAR Chapter 4 CEMP Section 3	○ Some interceptor drains will be left in place, upgradient of the proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader. ○ Swales/road side drains will remain in place to intercept and collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to stilling ponds for sediment settling; ○ Check dams will be put in place at regular intervals along interceptor drains and swales/roadside drains in order to reduce flow velocities and therefore minimise erosion within the system during storm rainfall events; and, ○ Stilling ponds/settlement ponds, emplaced downstream of swales and roadside drains, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses. The stilling ponds will be sized according to the size of the area they will be receiving water from, but will be sufficiently large to accommodate peak flows storm events. Inspection and maintenance of all settlement		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			ponds, along with the entire drainage network, will be ongoing through the construction period.		
MM33	Collector/Swale Drains	EIAR Chapter 4 CEMP Section 3	○ Drainage swales (or collector drains) are shallow drains that will be used to intercept and collect run-off from construction areas of the site during the construction phase. Drainage swales will remain in place to collect runoff from roads and hardstanding areas of the Proposed Development during the operational phase.		
Decommissioning Phase					
MM34	Decommissioning	EIAR Chapter 4	○ Prior to the end of the operational period the Decommissioning Plan (Appendix 4-5 of the EIAR) will be updated in line with decommissioning methodologies that may exist at the time and will agree with the competent authority at that time.		
MM35	Decommissioning	EIAR Chapter 4	○ Upon decommissioning of the Proposed Development, the wind turbines would be disassembled in reverse order to how they were erected. ○ 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 environment nuisances such as noise, dust and/or vibration. ○ Site roadways will be left in situ, for future forestry operations and for local landowners to access their lands. Underground cables will be removed and the ducting left in place.		
MM36	Decommissioning	EIAR Chapter 4 CEMP	○ The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential effects.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
Chapter 5: Population and Human Health					
MM37	Human Health	EIAR Chapter 5	Prior to the commencement of any works, the occupants of dwellings in the vicinity of the proposed works area will be contacted and the scheduling of the works will be made known. Local access to properties will also be maintained throughout any construction works.		
Construction Phase					
MM38	Land Use Patterns	EIAR Chapter 5	The existing land-use of wind energy, small-scale agriculture and farming practices will continue on the site in conjunction with the Proposed Development. The Proposed Development will have no effect on existing land-uses as it has been operating as a wind energy development since 2007 and has been co-existing with the other land uses. The section of the old N22 that is being assessed as part of the turbine delivery route will not change its land use, as it was previously in use as a National Primary Route, with minimal works being needed (temporary berm, fence and gate removal) needed to restore it to an area fit to accommodate the transfer of the turbine components from the SuperWing Carrier to the blade adapter trailer.		
MM39	Residential Amenity	EIAR Chapter 5, 10, 12, 15	○ All mitigation as outlined and in the corresponding chapters: Chapter 10 Air Quality, Chapter 12 Noise and Vibration, and Chapter 15 Material Assets will be implemented in order to reduce insofar as possible, impacts on residential amenity at properties located in the vicinity of Proposed Developments construction works.		
MM40	Human Health	EIAR Chapter 5	The Proposed Development will be constructed, operated and decommissioned in accordance with all relevant Health and Safety Legislation, including: ○ Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005); ○ Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and ○ Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006). ○ During construction of the Proposed Development, all staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'. This will encompass the use of all necessary Personal Protective Equipment, Risk Assessment and Method Statements and adherence to the site Health and Safety Plan. ○ Fencing will be erected in areas of the site where uncontrolled access is not permitted. Appropriate health and safety signage will also be erected on this fencing and at locations around the site. ○ The existing on site Coomagearlahy 110kV substation is currently a live node on the national electricity grid, and is connected to Clonkeen 110kV substation, approximately 6.07km to the north via an overhead electrical cable. It is intended that this cable will remain in place and no alterations will be made to it. Health and safety guidelines for working within and around electrical substations and underground cables will be adhered to on site.		
MM41	Human Health	EIAR Chapter 5, 10	○ Proposed Development construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ All plant and materials vehicles shall be stored in dedicated areas (on-site). Machinery will be switched off when not in use. ○ Turbines and construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. Please see Chapter 15 Material Assets for details. ○ All plant and materials vehicles shall be stored in dedicated areas (on-site). ○ Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. ○ The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF will be local to the site to reduce the emissions associated with vehicle movements. There are several licenced waste treatment facilities located outside of Killarney and Kenmare, approximately 14.2km northwest and 16km southwest respectively of the site. ○ Aggregate materials for the construction of the Proposed Development infrastructure will be predominantly sourced onsite. ○ Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ All plant and materials vehicles shall be stored in dedicated areas within the site. ○ Turbines and construction vehicles will be transported to the site on specified haul routes only. ○ The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary. ○ The roads adjacent to the site entrances will be checked weekly or damage/potholes and repaired as necessary. ○ The transport of construction materials around the site from the nearby quarry facilities will be covered by tarpaulin where necessary. ○ Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the site to reduce the volume of emissions associated with vehicle movements. ○ A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3). The Proposed Development will be constructed in accordance with all relevant Health and Safety Legislation, including: ○ Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005); ○ Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and ○ Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).		
MM42	Human Health	Chapter 4, 5, 9	○ A bespoke drainage design which includes but is not limited to interceptor drains, check dams, swales and ponds will be implemented on the Site. ○ Chapter 9 of the EIAR details all best practice and mitigation measures to minimise the potential for entrainment of suspended sediment or potential hydrocarbon leak		
MM43	Human Health	Chapter 5, 12	Good site practices will be implemented to minimise the likely effects. Section 8 of BS5228-1:2009+A1:2014 recommends a number of simple control measures as summarised below that will be employed onsite: ○ No plant used on site will be permitted to cause an on-going public nuisance due to noise. ○ The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. ○ All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract. ○ Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers. ○ Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Any plant, such as generators or pumps, which is required to operate outside of general construction hours will be surrounded by an acoustic enclosure or portable screen. ○ During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Chapter 11 using methods outlined in British Standard BS 5228-1:2014+A1:2019 Code of practice for noise and vibration control on construction and open sites – Noise. ○ The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours, large turbine component delivery, rotor/blade lifting) it could occasionally be necessary to work out of these hours. Rock Breaking Noise Emission Measures: ○ Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency. ○ Ensure all leaks in air lines are sealed. ○ Use a dampened bit to eliminate ringing. ○ Erect acoustic screen between compressor or generator and noise sensitive area. When possible, line of sight between top of machine and reception point needs to be obscured. ○ Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM44	Human Health	EIAR Chapter 5, 15	○ A complete Traffic and Transport Assessment (TTA) of the Proposed Project has been carried out by Alan Lipscombe Traffic and Transport Consultants. The full results of the TTA are presented in Section 15.1 of Chapter 15: Material Assets. ○ Traffic management measures have been presented in this chapter which, if implemented, will minimise any potential effect on the local population during the construction phase of the Proposed Project due to traffic. ○ Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made known. Local access to properties will also be maintained throughout any construction works.		
Operational Phase					
MM45	Human Health	EIAR Chapter 5	○ There are no turbines proposed in excess of 800m (4 x tip height) of any sensitive receptors. ○ All mitigation as outlined under noise and vibration, dust, traffic, visual amenity and shadow flicker in this EIAR will be implemented in order to reduce insofar as possible effects on residential amenity at properties located in the vicinity of the Proposed Development.		
MM46	Human Health	EIAR Chapter 5	The Proposed Development will operate in accordance with all relevant Health and Safety Legislation, including: ○ Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005); ○ Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and ○ Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).		
MM47	Human Health	EIAR Chapter 5	○ It is Ørsted company policy that any person entering or leaving the site must first ring the NaturalPower phoneline to log their presence on the site. All persons who intend to enter the site must also carry out a site induction and be the holder of a valid SafePass card. ○ Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits. ○ Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have been defaced, removed or are becoming hidden by vegetation or foliage, with prompt action taken as necessary. ○ Signs will also be erected at suitable locations across the site as required for the ease and safety of operation of the Proposed Development. These signs include: ○ Buried cable route markers at 50m (maximum) intervals and change of cable route direction; ○ Directions to relevant turbines at junctions; ○ "No access to Unauthorised Personnel" at appropriate locations; ○ Speed limits signs at site entrance and junctions; ○ "Warning these Premises are alarmed" at appropriate locations;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ "Danger HV" at appropriate locations; ○ "Warning – Keep clear of structures during electrical storms, high winds or ice conditions" at site entrance; ○ "No unauthorised vehicles beyond this point" at specific site entrances; and ○ Other operational signage required as per site-specific hazards. ○ During the operation of the Proposed Development regular maintenance of the turbines will be carried out by the turbine manufacturer or appointed service company.		
MM48	Human Health	EIAR Chapter 5	○ An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the site, providing access for emergency services at all times. ○ The components of a wind turbine are designed to last up to 35 years and are equipped with a number of safety devices to ensure safe operation during their lifetime. During the operation of the Proposed Development regular maintenance of the turbines will be carried out by the turbine manufacturer or appointed service company. A project or task specific Health and Safety Plan will be developed for these works in accordance with the site's health and safety requirements.		
MM49	Human Health	EIAR Chapter 5, 9	○ The mitigation measures detailed in Chapter 9 Hydrology and Hydrogeology for felling, sediment control, hydrocarbons and control of cement-based products will ensure all surface water runoff and contaminated groundwater will be captured and treated prior to discharge/release. Please see Chapter 9 for details.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM50	Shadow Flicker	EIAR Chapter 5	○ Assuming worst-case conditions, a total of 2 no properties may experience daily and/or annual shadow flicker occurrences and would therefore require mitigation to reduce this to less than 30 minutes per day, or less than 30 hours per year, as per the 2006 Wind Energy Guidelines (DoEHLG). However, both of these properties are participating landowners and therefore no mitigation is proposed.		
Decommissioning Phase					
MM51	Human Health	EIAR Chapter 5	○ Any effect and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent, and the mitigation measures outlined above will be implemented during the decommissioning phase also. A Decommissioning Plan will be agreed with the local authorities three months prior to decommissioning the Proposed Development. The principles that will inform the final decommissioning plan are contained in the Construction and Environmental Management Plan (CEMP) in Appendix 4-9.		
EIAR Chapter 6 Biodiversity					
Pre-construction					
MM52	Invasive Species Management	EIAR Chapter 6 CEMP Section 3	○ High impact invasive plant species Japanese Knotweed and Rhododendron have been recorded off-site in the wider local area. Both species represent a risk that machinery associated with tree felling and construction could act as a vector for introducing or dispersing non-native invasive species within the Proposed Development working areas (including intersecting watercourses) and to adjacent lands/ watercourses. ○ Therefore, a baseline invasive species survey will be carried out at the site to identify the presence and location of any invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) by a suitably qualified ecologist. If the presence of such species is found		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			at or adjacent to the site, particularly in areas where its excavation may be required, an invasive species management plan will be prepared for the site to prevent the introduction or spread of any invasive species within the footprint of the works.		
MM53	Fauna	EIAR Chapter 6	○ A pre-construction mammal survey (including checks for non-volant mammals and passive/active bat surveys) will be carried out immediately before the commencement of vegetation clearance to ensure that there is no evidence of resting/breeding sites of protected mammal species in or directly adjacent to the works footprint. There are no known mammal resting/roosting or breeding sites which will be directly impacted by the Proposed Development. In the event that resting places of any protected mammal species are present the ECoW (or nominated specialist) will advise on the appropriate course of action. The ecologist will have 'Stop Work' authority and works will only proceed in the vicinity of the identified constraint in accordance with the advice of the ecologist and the relevant environmental legislation.		
MM54	Bats	EIAR Chapter 6	○ A core search radius of c. 50m radius from the turbine was decided upon following a review of the literature in chapter 6 for bat fatality monitoring. ○ Felling is also carried out to reduce the likelihood of occurrence of bats in the immediate proximity of operational turbines.		
MM55	Habitats	EIAR Chapter 6	○ From the outset an iterative process of constraints led design was employed for the Proposed Development whereby independent ecological expertise was utilised at an early design stage in identifying the constraints and designing the site layout to take account of these constraints. The siting of the turbines and associated infrastructure was informed by the environmental constraints. ○ Bird Vantage Point surveys will be commenced ahead of the construction phase and continue throughout the construction phase.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Mammals associated with aquatic habitats (e.g. Otter) in the wider area could potentially be subject to indirect negative impact through activities associated with the project, such as siltation, run-off and fuel spills. The design of the project (e.g. setback buffers from watercourses) has through iterative design minimised the risks of significant downstream effects on the local environment. Environmental controls and measures which minimise the occurrence of such impacts downstream of the site are outlined in Chapter 7, Aquatic Ecology.		
MM56	Aquatic Ecology	EIAR Chapter 6, 7	○ Mammals associated with aquatic habitats (e.g. Otter) in the wider area could potentially be subject to indirect negative impact through activities associated with the project, such as siltation, run-off and fuel spills. The design of the project (e.g. setback buffers from watercourses) has through iterative design minimised the risks of significant downstream effects on the local environment. Environmental controls and measures which minimise the occurrence of such impacts downstream of the site are outlined in Chapter 7, Aquatic Ecology.		
Construction Phase					
MM57	Designated Sites	EIAR Chapter 6	○ A suitably qualified ECoW will be appointed and will ensure the implementation and delivery of the mitigation strategy. ○ A pre-construction survey will be carried out to confirm the presence/absence of Third Schedule Invasive plant species in or directly adjacent to the works footprint. In the event that any Third Schedule Invasive species are recorded in this area an Invasive Species Management Plan will be prepared by a suitably qualified ecologist. A suitably qualified specialist will be appointed if necessary to deliver any recommended control or eradication plans. The plan, if required, will be integrated into the contractor's CEMP.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Due to the unavoidable disturbance to Kerry Slug habitat, a derogation license will be sought from the NPWS prior to the commencement of construction. Works will be carried out in compliance with any conditions set by such the license. To minimise effects on Kerry Slug areas of suitable habitat that occur outside of the footprint of the Proposed Development shall be avoided during the course of construction thereby minimising the loss and disturbance of Kerry Slug habitat. Immediately prior to undertaking works in areas of suitable habitat, the ECoW, or nominated specialist, will check for the presence of Kerry Slug. The preferred method shall be hand-searching. Should slugs be discovered then they will be transferred to suitable habitat identified outside of the works footprint. Throughout construction, monitoring of suitable habitat within works areas will continue using a combination of metric traps and regular hand-searching. Hand-searching will be undertaken during periods of wet weather when slugs are most active and feeding on the surface and therefore at greater risk of impacts e.g. from site traffic. ○ Bird Vantage Point surveys will be commenced ahead of the construction phase and continue throughout the construction phase. No clearance of vegetation will be carried out in the bird breeding season (March to August inclusive). In the unlikely event that any nesting/roosting Hen Harrier are recorded within, or in the immediate vicinity of the works footprint works will only proceed in this area on the advice of the ECoW and in consultation with NPWS. ○ A passive bat monitoring programme will be carried out at the site throughout the construction phase. Artificial lighting will be minimised throughout in order to minimise disruption of foraging and commuting routes for bats.		
MM58	Habitats and Botanical Species	EIAR Chapter 6	○ No removal/clearance of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the works area/footprint will be clearly marked for associated site staff.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ The construction of the Proposed Development will be implemented in accordance with the CEMP for the Proposed Development to ensure environmental protection of the site in accordance with best practice controls (e.g. CIRIA 2015; see Appendix 4.3). This will be effective in addressing potential indirect impacts on habitats and species such as those associated with dust emissions. All of the mitigation to protect water quality as outlined in Chapter 7, 9 and in the CEMP (Appendix 4.3) will be fully implemented. ○ Prior to the development works, a survey by an appropriately experienced ecologist will be carried out to confirm the presence/absence and extent of Third Schedule Invasive plant species within or directly adjacent to the proposed works footprint. In the event that any Third Schedule Invasive species are recorded in this area an Invasive Management Plan will be prepared by a suitably qualified ecologist. A suitably qualified specialist will be appointed if necessary to deliver any recommended control or eradication plans. The plan, if required, will be integrated into the contractor's CEMP. ○ The contractor will refer to and implement the following, which provides detailed recommendations for the control of invasive species and noxious weeds: Chapter 7 and Appendix 3 of the TII Publication The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2008). ○ Maintaining site hygiene at all times in an area where invasive non-native species are present is essential to prevent further spread. The following site hygiene measures will be implemented onsite during the construction and/or for maintenance works during the operational stage where applicable:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• Fence off the infested areas prior to and during construction works where possible in order to avoid spreading seeds or plant fragments around or off the construction site. • Clearly identify and mark out infested areas. Erect signs to inform Contractors of the risk. • Avoid if possible using machinery with tracks in infested areas. • Clearly identify and mark out areas where contaminated soil is to be stockpiled on site and cannot be within 75m of any watercourse or within a flood zone. • If soil/stone is imported to the site for landscaping, infilling or embankments, the contractor will gain documentation from suppliers stating that it is free from invasive species. • Ensure all site users are aware of measures to be taken and alert them to the presence of the Invasive Species Management Plan. • Erection of adequate site hygiene signage in relation to the management of non-native invasive material as appropriate. ○ A peatland restoration plan has been developed and will be applied at a suitable location identified by Dr. John Conaghan, the botanical specialist (Appendix 6-5). The restoration area comprises a mix of open blanket bog areas with forest drains and small areas dominated by low-yielding/stunted conifers. The present ecological value of the plot is relatively low at present due to drainage, however there is good potential		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			to increase the cover of bog vegetation, and especially *Sphagnum* mosses, by blocking the drains and felling conifers. These works will be carried out in parallel with the construction phase and under the supervision of ECoW (or nominated specialist). The blanket bog rehabilitation plan for the Proposed Development will restore an area of former lowland blanket bog that has been damaged by drainage and afforestation. This will provide mitigation for the loss of blanket bog and heath habitat as a result of wind farm construction. The methodology described in the plan is based on similar bog projects which have been carried out successfully at various Coillte owned properties in Ireland (Coillte 2008, Mackin *et al.* 2017). The restoration area will be monitored for the lifetime of the wind project in accordance with the plan.		
MM59	Mammals	EIAR Chapter 6	○ Construction operations will largely take place during the hours of daylight to minimise disturbances to nocturnal mammal species. Night-time lighting will be kept to a minimum. ○ All lighting systems will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness. ○ All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled according to the CEMP (Appendix 4.3) ○ Any sightings of mammals on-site will be logged on the wildlife register. This includes any fatalities recorded during construction phase. ○ Bat activity will be monitored at the site in the year(s) of construction with two active detector night-time surveys between May and October. Passive bat detectors will be deployed at several locations close to the construction footprint for the duration of the		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			construction period to monitor the pattern of bat activity in the area throughout the tree felling and construction period. The locations chosen for the deployment of the passive detector(s) will include a number of locations at or adjacent to turbine locations and a number of other locations remote from turbines. These locations will be used for pre-, during- and post-construction bat activity monitoring. ○ A fatality monitoring programme for birds and bats (using dog-based searches) will be implemented during the construction phase when the old turbines are being decommissioned and the new turbines and associated infrastructure installed. Monthly searches of turbine bases (where a turbine is present) and around met masts will be carried out throughout the construction phase with associated searcher efficiency and scavenger removal trials will also be included in the programme. A report will be prepared at the end of the construction phase and circulated for the information of the Planning Authority, Kerry County Council and NPWS.		
MM60	Avifauna	EIAR Chapter 6	During the construction phase there will be vegetation clearance and disturbance associated with movement of plant, materials and personnel. The mitigation as described below and in the accompanying CEMP (Appendix 4.3) will be implemented in full. ○ An appropriately qualified and experienced Ecological/Environmental Clerk of Works (ECoW) will be appointed to monitor the day-to-day construction activity and implementation of the environmental and ecological mitigation measures. ○ A Toolbox Talk will be prepared and incorporated as part of the construction phase site induction. A wildlife register will be maintained by the environmental site staff during the construction phase. Site staff will be encouraged to report any bird sightings of note made during the construction phase and this information will be logged by the environmental site staff. The site manager will		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			continue to maintain a wildlife register throughout the operational phase. ○ Construction operations will largely take place during the hours of daylight to minimise disturbances to roosting birds or any active crepuscular/nocturnal bird species. ○ All lighting systems will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness. ○ All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at prescribed locations and all waste materials will be disposed of to licensed facilities. ○ Tree-felling and removal of mature vegetation will be undertaken outside of the bird breeding season (March 1st – August 31st). To avoid impacts on nesting birds and potentially small mammals all undisturbed works areas will be first checked by a suitably qualified ecologist to ensure that no protected species are present. ○ Standard Vantage Point Monitoring in accordance with the Survey Methods for Use in Assessing the Impacts of Onshore Wind farms on Bird Communities (Scottish Natural Heritage. 2018) will be carried out during the construction year by competent experienced ornithologists. The survey shall cover the development footprint and all areas within 500m of the works. ○ During the construction phase and in advance of the operation phase of the new turbines, a detailed White-tailed Eagle mitigation strategy will be implemented in accordance with that agreed with Kerry County Council as part of the Grousemount Planning Application, for the purpose of minimising the risk to White-tailed Eagles.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The requirement to adhere to this strategy to prevent Eagle mortality is also referenced in Chapter 12 of the Kerry County Development Plan 2022 - 2028 (Section 12.5.4.1.4). An outline plan to minimise risk to White-tailed Eagles is presented in Appendix 6-9. A suitably qualified ornithologist will be appointed to develop and oversee the implementation of the plan which will include the following: ○ Meet with the key stakeholders including the White-tailed Eagle Reintroduction group, and NPWS. ○ Implement an annual monitoring and reporting approach in accordance with the agreed programme for Grousemount Wind Farm. ○ Instigate regular checks, to ensure that no carrion is present within the wind farm site that could possibly serve as an attractant for feeding White-tailed Sea Eagles. Because dead sheep are likely to be the main source of carrion, effort will be concentrated during times when such death is most likely, i.e. seasonally and climatically. The final approach will be informed by the experience of the Grousemount strategy. ○ The birds most likely to access the wind farm site are young birds that have dispersed from the release, or nest sites. Funds for 10 GSM/GPS 'satellite' tags, including download costs (assuming each tag will last four years), will be transferred to the Reintroduction Programme prior to commencement of the wind farm's operation in accordance with the agreed approach implemented for Grousemount Wind Farm. Responsibility for the tagging of birds		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			will be handed to the Reintroduction Programme as was the case for Grousemount. ○ A fatality monitoring programme for birds and bats (using dog-based searches) will be implemented during the construction phase when the old turbines are being removed and the new turbines and associated infrastructure installed. Monthly searches of turbine bases (where a turbine is present) and around met masts will be carried out throughout the construction phase with associated searcher efficiency and scavenger removal trials will also be included in the programme. A report will be prepared at the end of the construction phase and circulated for the information of the Planning Authority, Kerry County Council and NPWS.		
MM61	Other Protected Taxa	EIAR Chapter 6, 7, 9	○ Areas where spoil is to be stored temporarily, or permanently, will be checked in advance for the presence of Frogs (and spawn). If protected species are present, the environmental staff will translocate these, if possible (under licence if applicable). The same measure will be applied for any drains or areas of standing water worked on, or forded by construction machinery. These areas will be checked on an ongoing basis by the ECoW and any areas with breeding frogs, spawn or tadpoles will be mapped and if possible fenced off temporarily to allow Frogs to metamorphose. If such areas cannot be avoided by site traffic the environmental staff will translocate the frogs (adults/young) under licence if applicable. ○ An updated survey for adult Marsh Fritillary, *Euphydras aurinia*, will be carried out in the year of construction (May/June) ideally before construction commences. Locations with Devil's Bit Scabious within the site and along the turbine delivery and grid access route will be checked in September/October for the presence of larval webs. Marsh Fritillary butterfly is the only Irish insect listed under Annex II of the EU Habitats Directive. In the event that larval webs are recorded within the proposed works area, mitigation measures will follow best practice guidelines as outlined in the 'Ecological		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes' (NRA, 2008). This could include (for instance) the implementation and monitoring of exclusion areas. ○ If other taxa such as other species of Lepidoptera, Common Lizard etc. are recorded within or adjacent to the works footprint, these sightings will be logged on the wildlife register.		
Operational Phase					
MM62	Designated Sites	EIAR Chapter 6	○ Bat activity will be monitored at the site for the first three years of operation using passive detector deployment at the same locations used to monitor activity in the construction phase. Annual reports on the occurrence and activity of Lesser Horseshoe Bat and other bats species detected will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS. ○ As a precautionary mitigation measure, in addition to the creation of buffers between the proposed turbines and surrounding vegetation reduced rotation speed will be implemented when turbines are idling. Automatic 'feathering' of idling blades will be implemented (through SCADA) to reduce rotation speed of blades to below 2 RPM while idling. Feathering blades has been shown to be effective in reducing fatality rates of bats by up to 50% and does not result in a significant loss of energy output (SNH, 2019). ○ Vantage Point surveys (breeding and winter) will be carried out at the operational site in years 1, 2, 3, 5, 10 and 15 in accordance with guidance (e.g. SNH, 2009). Reports will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS.		
MM63	Habitats and Botanical Species	Chapter 6 Appendix 6-5	○ The peatland restoration plan (Appendix 6-5) will be monitored annually in years 1, 2 and 3 and at five-year intervals thereafter for the lifetime of the wind farm. Status reports will be prepared and any recommendations for additional management presented in these reports will be implemented according to the advice of the habitat specialist. The reports will be provided for the information of the Planning Authority, Kerry County Council and NPWS. ○ The restoration plan will also include monitoring of the restored borrow pit and decommissioned turbine bases, hard stands and access tracks. ○ The presence of any Third Schedule Invasive plant species in the development area will be noted and advice provided on appropriate control/eradication options.		
MM64	Mammals	EIAR Chapter 6	○ Bat activity will be monitored at the site for the first three years of operation using passive detector deployment at the same locations used to monitor activity in the construction phase. Annual reports on the occurrence and activity of Lesser Horseshoe Bat and other bats species detected will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS. ○ As a precautionary mitigation measure, in addition to the creation of buffers between the proposed turbines and surrounding vegetation		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			reduced rotation speed will be implemented when turbines are idling. Automatic 'feathering' of idling blades will be implemented (through SCADA) to reduce rotation speed of blades to below 2 RPM while idling. Feathering blades has been shown to be effective in reducing fatality rates of bats by up to 50% and does not result in a significant loss of energy output (SNH, 2019). ○ The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS. ○ All lighting systems at the site, including at the entrance and around the substation will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness. ○ All edible and putrescible wastes will be stored and disposed of in an appropriate manner. ○ Any sightings of mammals on-site will be logged on the wildlife register – these logs will be maintained by the site manager and available for inspection at the site office/substation. Any records of mammal fatalities within the wind farm site and along the access track from Cloonkeen will be logged and photographed.		
MM65	Avifauna	EIAR Chapter 6	○ Vantage Point surveys (breeding and winter) will be carried out at the operational site in years 1, 2, 3, 5, 10 and 15 in accordance with guidance (e.g. SNH, 2009). Reports		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS. ○ The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS. ○ The White-tailed Eagle mitigation strategy will continue to be implemented as described in Section 6.6.1.4 and Appendix 6-9. A suitably qualified ornithologist will be appointed to oversee the implementation of the plan and prepare annual reports. ○ The 'tags' will provide accurate data on numerous locations per day, providing rapid detection of any regular use of the wind farm site by White-tailed Eagle(s) and enable the Site Manager to focus visual observational efforts (and to investigate any possible cause of regular use e.g. presence of a carcass) before any activity builds to a level where collision risk becomes unacceptable. The Site Manager will be responsible for managing and implementing a potential turbine shut-down system, which will be informed by the following: ○ Any sightings and information from third parties, notably the Reintroduction Programme and information on tagged individuals ○ Based on these information sources, thresholds and a protocol for instigating a shut-down (turbine numbers, locations and stop duration) will be agreed with NPWS and/or the White-tailed Eagle Reintroduction Programme in accordance with the measures agreed		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			at Grousemount Wind Farm prior to the operation of the new turbines. ○ The proposed mitigation strategy measures for White-tailed Eagle will be applied initially for the first five years of operation. A review will be conducted after five years, including consultation with stakeholders, to consider if these, or other additional measures should continue to be applied for the remainder of the lifetime of the wind farm. A review report with recommendations will be prepared by a suitably qualified ornithologist with actionable recommendations fully implemented. ○ The installation of warning lights on turbines can help to increase their visibility, and thereby reduce the risk of bird collision. A number of the turbines will be fitted with aviation warning lights in accordance with the requirements of the Irish Aviation Authority in advance of project construction.		
MM66	Other Protected Taxa	EIAR Chapter 6	○ A Kerry Slug survey will be carried out in the first year of operation including in areas which have been translocated and a report of the survey results will be prepared for the information of the Planning Authority, Kerry County Council and NPWS. ○ Casual sightings of rare or protected invertebrates, amphibians etc. made in the course of operational phase ecological monitoring will be recorded and if appropriate this information will be submitted to the National Biodiversity Data Centre.		
Decommissioning Phase					
MM67	decommissioning	EIAR Chapter 6	The final decommissioning of the Proposed Development will be carried out according to a decommissioning plan (Appendix 4-7).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		Appendix 4-7	○ The potential for impacts during decommissioning are similar in nature, if not in scope, to those assessed for the initial decommissioning and construction phase. All decommissioning works will be governed by the same requirements to control run-off or potential pollution to watercourses as have been implemented during the construction phase. ○ The site compound will need to conform to the construction phase mitigation measures including those related to lighting design and proper treatment of edible and putrescible wastes. All plant removed during decommissioning of the site will be re-used at other wind farm sites whenever possible. All remaining materials which cannot be re-used will be recycled. This is likely to include scrap metal, plastic and other waste materials. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor in the most environmentally appropriate manner available at the time of the decommissioning by an appropriately licenced contractor. ○ Following reinstatement, the site will be monitored to determine the progress of revegetation and if necessary to examine the need for supplementary planting with native species. A full site survey by a habitat specialist will be carried out at the end of Year 1 to assess the progression of the restoration and revegetation of the decommissioned areas and to capture photographic evidence of the site vegetation status, drainage management and general site appearance at the end of Year 1.		
EIAR Chapter 7 Aquatic Ecology					
Pre-Construction Phase					
MM68	Felling		○ A detailed and comprehensive pre-felling pre-commencement confirmatory audit of the minor drainage channels within the proposed felling areas and their proposed access routes will be jointly undertaken by the forestry harvesting Site Manager and		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			the ECoW. This will identify all '2aquatic zones' and 'relevant watercourses' / drains (as specified in the Felling Standards (DAFM (2019)). Areas of very wet ground ("hotspots") will also be earmarked as exclusion zones as these could become damaged by machine tracking and/or become preferential surface run-off conduits following the felling. The audit will establish where silt traps and/or flow control measures will be placed to maximise on-site attenuation of sediment.		
MM69	Water Exclusion Zones	EIAR Chapter 7	○ Before operations commence, a 10 m wide exclusion zone will be identified along the edge of all aquatic zones and hotspots, and this will be marked clearly on a site map. ○ All operators will be made aware of the exclusion zone and its purpose, through the pre-commencement awareness process and throughout operations.		
MM70	Silt & Sediment	EIAR Chapter 7	○ Prior to the commencement of operations, silt traps will be installed within existing forest drains that connect with aquatic zones, either directly or indirect via relevant watercourses.		
MM71	Earthworks-General Sediment Control Measures	EIAR Chapter 7	○ A detailed and comprehensive pre-commencement confirmatory audit of the existing road drainage features will be undertaken by the contractor and ECoW to identify areas where existing and additional run-off control features will be installed and/or improved in compliance with the detailed drainage design accompanying this application. This applies to the Proposed Development site and the site access road. There are numerous unmapped, small forestry and existing roadside drains that will require sediment run-off control features during the construction phase and these will		

[2] ***Aquatic zone:*** *Any natural river, stream or lake (but not an artificial drain) illustrated on an Ordnance Survey 6 inch map.*
Relevant watercourse: *Any other watercourse that has the potential to act as a pathway for the movement of significant amounts of sediment and/or nutrients from the site to an aquatic zone. Relevant watercourses are existing drains and channels that may contain flowing water during and immediately after rainfall*

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			all be subject to run-off control features including cut-off drains, check-dams, silt fencing and settlement pond installation.		
Construction Phase					
MM72	Tree Felling	EIAR Chapter 7 Appendix 4-2	Tree felling will be the subject of a Felling Licence from the Forest Service and will be in accordance with the conditions of such a licence. The following Guidelines & Standards apply and will be complied with during felling operations: ○ Forestry & Water Quality Guidelines (DAFM, 2000a) ○ Forest Harvesting & the Environment Guidelines (DAFM, 2000b) ○ Standards for Felling and Reafforestation (DAFM, 2019) The appointed qualified and experienced ECoW (see Section 4.1.2 of the CEMP, Appendix 4.2) will ensure all felling related water quality protection guidelines and standards are complied with during the pre-commencement and felling operation phases. The ECoW will carry out daily visual checks of all measures employed to avoid or reduce impact of forestry residues, erosion, including inspections of temporary drainage infrastructure (e.g., drain crossings), silt control measures, extraction routes and log storage areas.		
MM73	Water Exclusion Zones	EIAR Chapter 7	○ All operators will be made aware of the exclusion zone and its purpose, through the pre-commencement awareness process and throughout operations. ○ Machine traffic and timber stacking are not permitted within exclusion zones. ○ Trees within the reach of the harvester arm will be felled by harvester and stacked outside the exclusion zone.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Trees outside machine reach will be felled manually by chainsaw operators. Felled trees will be winched out of the exclusion zone where it is appropriate and safe to do so, or removed by extended harvester arm, for subsequent sending and processing outside the exclusion zone. ○ In all cases, trees will be felled away from the water feature. ○ Regarding aquatic zones, watercourse banks must not be disturbed. No branches or debris will be allowed to enter the aquatic zone during operations. Any branches that do fall in will immediately and with care be removed. ○ The accumulation of brash, logs and debris in on-site drains and any aquatic zones will be prevented.		
MM74	Silt & Sediment Control	EIAR Chapter 7	○ Silt traps will be staggered along the length of the drain, and not only at the lower reaches towards its outflow. ○ Silt trap designs will include log sections laid lengthways into the drain and/or the use of staked geotextile barriers. ○ Silt fences will be installed where necessary, to block pathways for silt escapement where overland flow is possible. ○ Once silt traps and silt fences become functional, they will be checked a minimum of twice weekly and maintained / repaired, as necessary, in order to ensure continued effectiveness throughout felling operations. ○ Drainage channels which by-pass the vegetated buffer zone and provide direct connection between the felling area and the stream need to be intermittently blocked with staked plastic sheet pile to minimise the risk of silt and nutrient run-off into the receiving waters.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Extraction and haul routes must be confined to the driest areas of the site and routed in order to minimise the amount of trafficking around the site. Wherever possible, low load bearing harvesters and forwarding machinery will be used. Thick brash mats will be used and maintained and will be removed once felling is complete. At no time will brash be allowed to accumulate in drains, no matter how small. If brash has to be stockpiled it will be in dry areas as far from drainage as possible.		
MM75	Temporary Water Crossings	EIAR Chapter 7	○ Direct crossing over stream beds will not be permitted. ○ Crossing of on-site forest drains / 'relevant watercourses' and aquatic zones will be avoided. ○ The crossing of drains during felling and extraction will be minimised, and machine activity will be restricted to brashed extraction racks and haulage routes. ○ Where a drain crossing is needed, a method will be selected that prevents the breakdown and erosion of drain sides. ○ For larger drain crossings, i.e., those with standing water or obvious water flow, a heavy-duty plastic culvert will be deployed lengthways into the channel and covered with brash material. ○ For smaller drain crossings, i.e., those that have no standing water and are generally dry, log sections will be temporarily laid lengthways into the channel and overlaid with brash. ○ When installing and removing the temporary crossings, it will be ensured that no additional work is carried out within the aquatic zone, and that the upstream		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM76	Earthworks General Sediment Control	EIAR Chapter 7, 9 Appendix 4-2	○ Overarching water quality protection measures and site-specific drainage design will be adhered to, as detailed in Chapter 9: Water, Section 9.5 and amalgamated into the CEMP. ○ Tracking or fording across the exclusion zone or watercourse streambeds is prohibited – the existing crossing points on access tracks will be used. ○ Topsoil stripping in proximity to any watercourses will be undertaken in dry weather conditions and any spoil stockpiles must be located greater than 50m from a watercourse, and/or at least 10m away from a non-flowing drain, surrounded with double lines of geotextile silt fencing to prevent escapement of suspended solids. ○ Prior to the commencement of operations, silt traps and check-dams will be installed within existing swales / drains that connect with watercourses, either directly or indirectly via other drains. ○ Silt traps will be staggered along the length of swales / drains, and not only at the lower reaches towards the outflow to watercourses. ○ Silt fences will be installed where necessary, to intercept pathways for silt runoff where overland flow towards watercourses is possible. ○ Attenuation / settlement ponds will be installed as specified in the site drainage plan on downslopes of new internal access track constructions in areas where it is difficult to control run-off, i.e., where there is steep topography. ○ Once check-dams, attenuation / settlement ponds, silt traps and silt fences are installed and works commence, they will be checked a minimum of twice weekly and maintained as necessary, in order to ensure continued effectiveness throughout earthworks and excavation operations.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Crushed rock for track resurfacing should be locally sourced with low limestone content to limit potential for pH changes linked to sediment washout to watercourses and downstream fisheries habitats. ○ The qualified, experienced Environmental Clerk of Works (ECoW) will be responsible for daily, weekly and monthly checks that ensure all water quality protection measures and guidelines are complied with during the pre-commencement and active earthworks / excavations period of the construction phase. The ECoW will carry out daily visual checks of all measures employed to control, avoid or reduce export of suspended solids and sediment from active earthworks areas.		
MM77	Earthworks- New and Upgraded Roads	EIAR Chapter 7	○ Regarding internal access track upgrades, there will be limited, if any "cleaning" of existing vegetation of any existing drains, swales or ponds, as their vegetated state reduces run-off velocity and prevents scour / erosion, contributing to avoidance and reduction of solids export through scour protection, retention and attenuation function. In place where it's not possible to retain full lengths of existing swale / drain vegetation – then intermittent lengths of existing vegetation will be marked out and retained, supplemented by check dams, until after the bulk of access track upgrade works are complete. Freshly "cleaned" or excavated swales / drains will have intermittent, well-constructed check-dams installed along the length - comprised of gravel mounds and staked geotextile dams. Check-dams will then become permanent features of the swale, helping to manage run-off velocities during the operation phase.		
MM78	Earthworks- Borrow Pit	EIAR Chapter 7	○ The relatively low gradient topography and contained nature of the proposed borrow pit location (set into the hillside) means there is good opportunity to implement silt and sediment controls on hydrological pathways that will avoid and minimise potential for excessive suspended solids loads to reach the Thureehouma stream in the first place. The approach to dirty water management at the borrow pit will be to maintain a "containment area", e.g., through use of silt fencing and/or bunds that prevent run-off		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			along preferential flow paths. A series of gravel and/or staked geotextile check dams will be installed along the main preferential flow path exiting the borrow pit area. Temporary attenuation/settlement ponds will be installed downslope from the borrow pit on surface water run-off flow paths.		
MM79	Earthworks- Cable Trenching	EIAR Chapter 7	○ All trenching works will be undertaken using a cut and fill procedure to ensure that only short sections of the trench (≤50m) are open at any time. The trench construction reaches will be limited to lengths that can be trenched, ducted and back-filled within the same work day. ○ There will be no discharge of silt contaminated pump-out water directly to on-site drains or watercourses. Any silt contaminated water which gathers in an excavated trench will be collected and treated appropriately using Best Practice methods (e.g., silt bags, settlement systems) before being discharged. Treated water will be discharged across vegetated land to drain slowly into any nearby drain or watercourse. ○ Any freshly excavated spoil will be retained in an area over 10m away from any drain or watercourse until such time as the trench is refilled. The spoil heap will be located on either a well vegetated area surrounded by silt fencing or with the use of containment measures (geotextile mat or bag) and covered to reduce potential for sediment wash out. A ready supply of these materials will be onsite to deal with such eventualities. Spoil heaps are unlikely to accumulate because trenches will be immediately back filled following ducting installation. ○ At the watercourse crossings, a method of water management such as dam and pump over will be used to create a short, dry working area for cable-trenching. There is no fisheries significance at these upper headwater locations and hence no requirement for fish removal. Stony stream bed substrates will be removed and stockpiled immediately nearby, and these will be reused for reinstatement of streambed and banks to pre-		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			existing condition once the trench is backfilled. Any additional stony streambed reinstatement material will be of a locally sourced type (e.g., from the borrow pit).		
MM80	Watercourse Crossings Sediment Control	EIAR Chapter 7	○ Overarching water quality protection measures and site-specific drainage design will be adhered to. ○ All general sediment control measures will be adhered to, as well as specific measures set out below. **Measures relating to Culvert Upgrades - Instream Works:** ○ Instream works may only occur during the period July to September (of any year). ○ Culverts will be subject to Section 50 consent (Arterial Drainage Act 10945), being no less than 900mm in diameter, allowing for a minimum 300mm embed below existing bed level and meeting hydraulic design standards, i.e., capable of passing a fluvial flood flow with a 1% annual exceedance probability (AEP) or 1 in 100 year flow without significantly changing the hydraulic characteristics of the watercourse. ○ Culvert upgrades will utilise pre-cast concrete components to eliminate risk of wet cement wash-out. ○ Although there is no fisheries significance in the upper Roughty or Flesk tributaries, IFI must be provided with details of the construction methodology (following planning permission) for the 1no. culvert installation in the Lettercannon headwater and the culvert extension at the Flesk tributary (Site F4). Following agreement of the construction method, IFI must also be notified prior to instream works commencing.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ A method of water management such as dam and pump over will be used to create a dry working area for instream culvert installation or upgrade work. ○ Pumps will remain on-hand to remove ingress water through dams and from groundwater sources. Pump-out water will be extracted from a sunken, gravelled sump area within the 'dry' work area and discharged over 20m away from the stream onto an area of low gradient, rough vegetation surrounded with a double line of silt fencing. ○ There is no fisheries significance at the upper headwater culvert locations in the Roughty or the Flesk sub-catchment and hence no requirement for fish removal. ○ The ECoW must be on hand when each channel is dewatered to ensure that all water management, pump-over, pump-out and sediment containment measures are operating effectively to prevent export of solids (and other pollutants) from the works area. ○ Stony stream bed substrates will be removed locally and stockpiled immediately nearby, and these will be reused for reinstatement of streambed and banks to pre-existing condition once the trench is backfilled. Additional stony streambed reinstatement material will be of a locally sourced type (e.g., from the borrow pit). ○ Stream bed and banks will have rock armour installed to prevent scour upstream and downstream ends of the upgraded culverts. These are steep, step-pool type watercourses and rock armour will be installed as appropriate to restore the pre-existing channel gradient.		
MM81	Concrete	Chapter 7, 9	○ The possibility of spillage can be mitigated largely through avoidance using the best practice in construction management, noting that all major infrastructure, e.g., proposed new foundations/ hardstandings, are located a minimum of 50m from		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			watercourses, hence the overall risk of cement toxicity to downstream salmonids and pearl mussel is very low..		
MM82	Hydrocarbons	Chapter 7,9	○ Loss of hydrocarbons during the construction phase can be avoided and prevented by best practice in terms of site layout including fuel storage and best practice construction management. All of these possibilities can and will be mitigated primarily by avoidance using the best practice in construction site layout and construction management meaning the overall risk is very low.		
Operational Phase					
MM83	Degradation of Water Quality	EIAR Chapter 7,9	○ The site-specific drainage design will be implemented in full. This has been designed to significantly increase the level of on-site attenuation to what currently exists including the use of new silt traps, settlement ponds and vegetated buffer areas prior to discharge to the existing site drainage network. ○ During the operational phase, access tracks will be inspected routinely to ensure no significant rutting or erosion is occurring. Such inspections will be carried out a minimum of twice per annum, timed to allow for any repairs prior to the winter season (e.g., August/September) and again in the spring (e.g., March/April) to repair any winter period damage. ○ Culverts will be inspected on the same schedule as tracks and cleared of any debris that could cause blockage and localised erosion. ○ Any areas of obvious road erosion / rutting that are potential sediment loss sources will be repaired as soon as they are identified using clean, locally sourced hardcore with a low fine content. These can be recorded during routine site visits over the operational phase.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Track-side drains will be allowed to retain re-grown wet grassland / heath vegetation and aquatic macrophytes throughout the operational phase, as these naturally contribute to on-site attenuation by slowing water velocity and trapping/filtering sediment within trackside drainage in advance of entry to watercourses. ○ No refuelling or other hydrocarbon related usage will be undertaken within 50m of any watercourse in relation to maintenance vehicles, plant or machinery.		
Decomissioning Phase					
MM84	Decomissioning Phase	EIAR Chapter 7	○ Mitigation as set out in MM72-MM82, above.		
EIAR Chapter 8 Land, Soils and Geology					
Pre-Construction Phase					
MM85	Peat Stability Assessment	EIAR Chapter 8 Appendix 8-1	○ An iterative design process involving multiple stages of ground investigations, followed by turbine and infrastructure design has been completed to ensure the areas with optimum ground conditions have been selected. Mitigation by Design: ○ Where existing electrical onsite cabling is direct buried within peat, this will be left in-situ, cut, and tied. No excavations will be completed. Where cables have been ducted, the cable will be snipped at both ends and pulled from the ducting. The ducting will remain in situ. Therefore, there will be no disturbance to the peat and subsoils associated with the decommissioning of the existing internal cabling;		
Construction Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM86	Removal of the Existing Kilgarvan Wind Farm on Land Peat/ Subsoils	EIAR Chapter 8	○ The Proposed Development layout has been designed to make use of as much of the existing infrastructure as possible, i.e., hardstands, site access roads, the existing substation and overhead grid connection. The integration of the existing wind farm layout and associated infrastructure into the Proposed Development will minimise the disturbance to the peat and subsoils. ○ The natural revegetation of existing ancillary infrastructure will have a long-term positive effect on the land environment and no specific mitigation measures are required. <u>Mitigation by Design</u>: ○ Where existing electrical onsite cabling is direct buried within peat, this will be left in in-situ, cut, and tied. No excavations will be completed. Where cables have been ducted, the cable will be snipped at both ends and pulled from the ducting. The ducting will remain in situ. Therefore, there will be no disturbance to the peat and subsoils associated with the decommissioning of the existing internal cabling;		
MM87	Effects on Land-Take	EIAR Chapter 8	○ The Proposed Development layout has used the Existing Kilgarvan Wind Farm site layout as much as possible in order to minimise potential effects to land (land-take). This has reduced the area of the site which will be altered from existing forestry and peat bogs to site access roads and/or hardstands. ○ The loss of ~8.9ha of forestry and ~2.8ha of upland bog will not have a significant impact on soils/land at the Proposed Development site. Following the construction phase these areas of the site will be replaced by hardstand areas. This represents a change in landcover of ~2% of the total Proposed Development site (~775ha). Therefore, the effects of peat bog land loss and commercial forestry land loss within the Proposed Development site is negligible.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM88	Peat and Bedrock Excavation	EIAR Chapter 8	Mitigation by Avoidance: The Proposed Development layout has used the Existing Kilgarvan Wind Farm site layout as much as possible in order to minimise the requirement for peat and bedrock excavation. Mitigation by Design: ○ Placement of turbines and associated infrastructure in areas with shallower peat; ○ The peat and subsoil which will be removed during the construction phase will be localised to the wind farm infrastructure turbine location, substation and temporary compounds and access roads; ○ The Proposed Development has been designed to avoid sensitive habitats within the application area; ○ A minimal volume of peat, subsoil and rock will be excavated and removed to allow for infrastructure works to take place in comparison to the total volume of these materials present on the site due to optimisation of the Proposed Development design; ○ In general, excavated peat and spoil will be moved short distances from the point of excavation and will be used for landscaping or stored in the onsite borrow pit; and, ○ Construction of settlement ponds will be volume neutral, and all excess material will be used locally to form pond bunds and surrounding landscaping.		
MM89	Extension, Excavation and Reinstatement of the Borrow Pit	EIAR Chapter 8	The proposed borrow pit location has been chosen to minimise potential effects on the soils and geological environment. The proposed borrow pit constitutes an extension to the existing borrow pit which was used to facilitate the construction of the Proposed Development. The existing borrow pit is located in the Gun Point Formation and is overlain by small volumes of		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			peat, therefore reducing the volumes of peat which will require excavation and storage elsewhere in the Proposed Development Site. The Peat and Spoil Management Plan attached as Appendix 4-2 sets out the guidelines for the construction and reinstatement of the on-site borrow pit. Upon the removal of the required volumes of material (for the construction of the infrastructure elements at the wind farm) from the borrow pit it is proposed to reinstate the pit using excavated peat. The borrow pit is designed and will be constructed in a way which will allow the excavated peat and spoil to be placed safely, with areas within the borrow pit designated for the storage of excavated peat. Other mitigation measures included in the design of the borrow pit are as follows: ○ Excavation works will be undertaken and supervised by an experienced contractor and suitably qualified personnel; ○ Rock will be removed by either breaking or blasting and will be determined by confirmatory ground investigations comprising of rotary core drilling; ○ The borrow pit will be developed with stable ground inclinations; ○ Exposed slopes will be left with irregular faces to promote re-vegetation; ○ The stability of the rock faces will be inspected by the Project Geotechnical Engineer upon excavation to ensure stability; ○ Rock buttresses will be constructed within the borrow pit to help retain placed peat and spoil. The founding stratum for each buttress will be inspected and approved by the Project Geotechnical Engineer; ○ Infilling of peat and spoil should commence at the back of the borrow pit and progress towards the pit entrance.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			No other specific mitigation measures are required as the excavation of bedrock to provide material for the construction phase is seen as an acceptable part of the Proposed Development.		
MM90	Proposed Substation Upgrade & Contamination of Soil by leakages, Spillages, and Alteration of Peat/ Soil Geochemistry	EIAR Chapter 8 Appendix 4-3	○ On-site re-fuelling will be undertaken using a double skinned bowser with spill kits kept on site for accidental leakages or spillages; ○ Only designated trained operatives will be authorised to refuel plant on-site. ○ Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; ○ Fuels stored on-site will be minimised. All storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; ○ Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; ○ The electrical control building (at the existing onsite 110kV Coomagearlahy substation) will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; ○ The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, ○ An emergency response plan for the construction phase to deal with accidental spillages will be contained within the Construction Environmental Management Plan		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM91	Erosion of Exposed Subsoils and Peat During Construction of Infrastructure	EIAR Chapter 8	○ Peat removed from the development locations will be reinstated within the Proposed Development site (~24,330m^3 of peat will be used for landscaping at turbine locations, along site roads and at construction compound locations; ~7,880m^3 of peat will be used in the reinstatement of existing hardstand areas to be decommissioned; and, ~38,880m^3 of peat will be used to reinstate the borrow pit); ○ Where possible, the upper vegetative layer (where still present) will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the stored peat within the peat storage areas; ○ Re-seeding and spreading/planting will also be carried out in these areas; ○ Brash/bog mats will be put in place to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur		
MM92	Erosion of Exposed Soils/Subsoils and Peat During Tree Felling	EIAR Chapter 8	○ Before any works are completed silt fences will be installed to limit the movement of entrained sediment in surface water runoff; ○ The harvester and the forwarder are designed specifically for the forest environment and are low ground pressure machines; ○ All machinery will be operated by suitably qualified personnel; ○ These machines will traverse the site along specified off-road routes (referred to as racks); ○ Brash mats will be placed on the racks to support the vehicles on soft ground, reducing peat and mineral soil disturbance and erosion and avoiding the formation of rutted areas, in which surface water ponding can occur;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ As felling progresses, the harvester will collect brash produced by the felling and place it in front of the machine before it advances forward along the rack; ○ The condition of the racks will be continually monitored and fresh brash will be applied when the brash mat becomes heavily used and worm, ensuring that the mat remains effective throughout the operational phase; and, ○ The location of racks will be chosen to avoid wet and potentially sensitive areas.		
MM93	Peat Instability & Failure	EIAR Chapter 8 Appendix 8-1	○ Appointment of experienced and competent contractors; ○ The site will be supervised by experienced and qualified personnel; ○ Allocate sufficient time for the project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement); ○ Prevent undercutting of slopes and unsupported excavations; ○ Maintain a managed robust drainage system; ○ Prevent placement of loads/overburden on marginal ground; ○ Implementation of safety buffers around the location of the 2012 landslide and an area of quaking bog to the southwest of T6 as outlined in the Geotechnical and Peat Stability Assessment; ○ Adhere to the 5 no. peat storage restriction areas detailed in the Geotechnical and Peat Stability Risk Assessment; ○ Set up, maintain and report findings from monitoring systems as outlined in the Geotechnical and Peat Stability Assessment;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Ensure construction method statements are developed and agreed before commencement of construction and are followed by the contractor; ○ Revise and amend the Construction Risk Register as construction progresses to ensure that risks are managed and controlled for the duration of construction; and, ○ During construction it is recommended to carry out frequent monitoring, especially after heavy rainfall events or prolonged rainfall. Please refer to Appendix 8-1 for details on the safety buffers and stockpile restrictions.		
Operational Phase					
MM94	Soils and Geology	EIAR Chapter 8	Mitigation measures for soils and geology during the operational stage include; ○ Use of aggregate from authorised quarries for use in road and hardstand maintenance. ○ Vehicles used during the operational phase will be refuelled off site before entering the site; ○ No fuels will be stored on-site during the operational phase; and ○ Spill kits will be available in all site vehicles to deal with an accidental spillage and breakdowns; and, ○ An emergency plan for the operational phase to deal with accidental spillages and breakdowns will be contained in the Environmental Management Plan. ○ All transformers and substation areas will be bunded to 110% of the volume of oil used in each transformer/substation;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ An emergency plan for the operational phase to deal with accidental spillages will be contained in the Environmental Management Plan.		
Decommissioning Phase					
MM95	Decomissioning Phase	EIAR Chapter 8 Appendix 4-5	Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant. Some of the effects will be avoided by leaving elements of the Proposed Development in place where appropriate. The existing onsite 110kV Coomagearlahy substation is part of the national grid. The turbine bases will be rehabilitated by covering with local topsoil/peat in order to regenerate vegetation which will reduce runoff and sedimentation effects. Internal roads will remain as amenity pathways. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.		
EIAR Chapter 9 Hydrology and Hydrogeology					
Pre-Construction Phase					
MM96	Pre-emptive Site Drainage Management	EIAR Chapter 9	The works programme for the felling operations will also take account of weather forecasts and predicted rainfall in particular. Operations will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast. The following forecasting systems are available and will be used on a daily/weekly basis, as required, to allow site staff to direct proposed and planned construction activities: ○ General Forecasts: Available on a national, regional and county level from the Met Éireann website (www.met.ie/forecasts). These provide general information on weather		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; ○ MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale; ○ 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events; ○ Rainfall Radar Images: Images covering the entire country are freely available from the Met Éireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and, ○ Consultancy Service: Met Éireann provide a 24-hour telephone consultancy service. The forecaster will provide an interpretation of weather data and give the best available forecast for the area of interest. Using the safe threshold rainfall values will allow planned works to be safely executed (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event. Works will be suspended if forecasting suggests any of the following is likely to occur: ○ >10 mm/hr (i.e. high intensity local rainfall events); ○ >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, ○ >half monthly average rainfall in any 7 days.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM97	Pre-emptive Site Drainage Programme Management	EIAR Chapter 9	The works programme for the entire construction stage of the development will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of soil/subsoil or vegetation stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast. The following forecasting systems are available and will be used on a daily basis at the site to direct proposed construction activities: ○ General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; ○ MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale; ○ 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events; ○ Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and, ○ Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event. Works will be suspended if forecasting suggests either of the following is likely to occur: ○ >10 mm/hr (i.e. high intensity local rainfall events); ○ >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, ○ >half monthly average rainfall in any 7 days. Prior to works being suspended the following control measures will be completed: ○ All active excavations will be secured and sealed off; ○ Temporary or emergency drainage will be installed to prevent back-up of surface runoff; and, ○ No works will be completed during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.		
MM98	Earthworks : Pre-commencement Temporary Drainage Works	Chapter 9	Prior to the commencement of road upgrades (or new road/hardstand or turbine base installs) the following key temporary drainage measures will be installed: ○ All existing dry forestry drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using forestry check dams/silt traps; ○ Clean water diversion drains will be installed upgradient of the works areas; ○ Check dams/silt fence arrangements (silt traps) will be placed in all existing forestry drains that have surface water flows and also along existing forestry roadside drains; and,		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone.		
Construction Phase					
MM99	Potential Surface Water Quality Effects from Clear Felling	EIAR Chapter 9,7	**Mitigation by Avoidance:** There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document "Forestry and Water Quality Guidelines". With moderate to steep slopes existing across much of the Proposed Development site, a 10 to 15m setback will be established along all aquatic zones. Furthermore, a 5m setback will be established along all relevant watercourses and water hotspots. Buffer zone widths will be increased at vulnerable hotspots where deemed necessary. This will ensure water quality is protected during the felling operations. The setback distance from sensitive hydrological features means that adequate room is maintained for the proposed mitigation measures (discussed below) to be properly installed and operate effectively. The buffer/setback zone will: ○ Avoid physical damage (river/stream banks and river/stream beds) to watercourses and the associated release of sediment; ○ Avoid peat/soil disturbance and compaction within close proximity to surface watercourses; ○ Avoid the entry of suspended sediment from works into watercourses; and,		

<table>
<tr><th>Ref. No.</th><th>Reference Heading</th><th>Reference Location</th><th>Mitigation Measure</th><th>Audit Result</th><th>Action Required</th></tr>
<tr><td></td><td></td><td></td><td>
Avoid the entry of suspended sediment from the drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.
Table 6-2: Recommended minimum buffer zone widths
<table>
<tr><th colspan="2">Average slope leading to the aquatic zone</th><th>Buffer zone width on either side of the aquatic zone</th><th>Buffer zone width for highly erodible soils</th></tr>
<tr><td>Moderate</td><td>(0 – 15%)</td><td>10m</td><td>15m</td></tr>
<tr><td>Steep</td><td>(15 – 30%</td><td>15m</td><td>20m</td></tr>
<tr><td>Very Steep</td><td>(>30%)</td><td>20m</td><td>25m</td></tr>
</table>
Mitigation by Design:

Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which are set out as follows:

Machine combinations will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance. The harvester and the forwarder are designed specifically for the forest environment and are low ground pressure machines;
All machinery will be operated by suitably qualified personnel;
Checking and maintenance of roads and culverts will be on-going through any felling operations. No tracking of vehicle through watercourses will occur, as vehicles will use

</td><td></td><td></td></tr>
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Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works; ○ These machines will traverse the site along specified off-road routes (referred to as racks); ○ The location of racks will be chosen to avoid wet and potentially sensitive areas; ○ Brash mats will be placed on the racks to support the vehicles on soft ground, reducing peat and mineral soil disturbance and erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended during periods of high rainfall; ○ Silt fences will be installed at the outfalls of existing drains downstream of felling areas. No direct discharge of such drains to watercourses will occur. Sediment traps and silt fences will be installed in advance of any felling works and will provide surface water settlement for runoff from work areas and will prevent sediment from entering downstream watercourses. Accumulated sediment will be carefully disposed of at pre-selected peat disposal areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground; ○ In areas particularly sensitive to erosion it will be necessary to install double or triple sediment traps and increase buffer zone width. These measures will be reviewed on site during construction; ○ Double silt fencing will also be put down slope of felling areas which are located in close proximity to streams and/or relevant watercourses;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded; ○ Timber will be stacked in dry areas, and outside watercourse buffer zones. Straw bales and check dams to be emplaced on the down gradient side of timber storage/processing sites; ○ Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water runoff; ○ Refuelling or maintenance of machinery will not occur within 50m of an aquatic zone or within 20m of any other hydrological feature. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required; and, ○ Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors.		
MM100	Silt Traps	Chapter 9	Silt traps will be strategically placed down-gradient of felling areas within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner.		
MM101	Timing of Site Felling Works	Chapter 9	Felling will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses.		
MM102	Drain Inspection and Maintenance	Chapter 9	The following items shall be carried out during inspection pre-felling and after:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines; ○ Inspection of all areas reported as having unusual ground conditions; ○ Inspection of main drainage ditches and outfalls. During pre-felling inspections, the main drainage ditches shall be identified. Ideally the pre-felling inspection shall be carried out during rainfall; ○ Following tree felling all main drains shall be inspected to ensure that they are functioning; ○ Extraction tracks near drains need to be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground; ○ Culverts on drains exiting the site will be unblocked; and, ○ All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.		
MM103	Surface Water Quality Monitoring	Chapter 9	Criteria for the selection of water sampling points include the following: ○ Avoid man-made ditches and drains, or watercourses that do not have year round flows, i.e. avoid ephemeral ditches, drains or watercourses; ○ Select sampling points upstream and downstream of the forestry activities; ○ It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and, ○ The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed. Also, daily surface water monitoring forms will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.		
MM104	Earthworks Resulting in Suspended Solids Entrainment in Surface Waters	Chapter 9	<u>Mitigation by Avoidance</u> The key mitigation measure during the construction phase is the avoidance of sensitive hydrological features, by application of suitable buffer zones (i.e. 50m to main watercourses, and 10m to main drains). All of the key Proposed Development areas (turbines, hardstands, construction compounds etc.) are located away from the delineated 50m watercourse buffer zones. The only works proposed within the hydrological buffer zones are the upgrade of existing watercourse crossings and at new watercourse crossings and upgrades to the existing site access tracks. Similarly, all hardstand areas to be decommissioned are located outside of the delineated 50m hydrological buffer zone. Within the Proposed Development site, road upgrades are proposed over a total of 10 no. existing watercourse crossings. ○ 5 no. crossings are located on tributaries of the Roughty River within the site: ○ An unnamed stream ~500m east/northeast of T3;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ An unnamed stream ~250m west/southwest of T4; ○ An unnamed stream ~150m east/southeast of T6; ○ An unnamed stream ~280m northeast of T7; and, ○ An unnamed stream ~220m east/northeast of T8. ○ An additional 4 no. crossings are located on the main access road from the N22 and cross tributaries of the Flesk River: ○ 1 unnamed stream in the townland of Coomacullen; ○ Coomacullen stream; ○ Cloonkeen stream; and, ○ An unnamed stream in the vicinity of Clonkeen substation. ○ 1 no. existing crossing to be upgraded is located on the Inchamore stream, a tributary of the Bardinch River, within the Sullane River catchment. All of these existing watercourse crossings are culverted. In addition there is 1 no. new proposed watercourse crossing located ~190m north of T11 over an unnamed tributary of the Roughty River. The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will: ○ Avoid physical damage (river/stream banks and river/stream beds) to watercourses and the associated release of sediment;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Avoid excavations within close proximity to surface watercourses; ○ Avoid the entry of suspended sediment from earthworks into watercourses; and, ○ Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone. <u>Mitigation by Design</u> The Proposed Development design has been optimised to utilise the existing infrastructure (roads and hardstands) where practicable. This design prevents the unnecessary disturbance of peat and spoil, significantly reducing the potential for elevated concentrations of suspended solids in runoff. Presented below are temporary and long-term drainage control measures that will be utilised during the construction phase of the Proposed Development. As stated above there is an existing drainage network in some areas of the Proposed Development site which comprises forestry drains and roadside drains and headwater streams. The measures outlined below will be used in conjunction with the existing drainage network to ensure the protection of all rivers and downstream watercourses. ○ Source controls: ○ Interceptor drains, vee-drains, diversion drains. ○ Small working areas, covering temporary stockpiles, weathering off of side-cast peat/spoil, cessation of works in certain areas or other similar/equivalent or appropriate measures. ○ In-Line controls:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Interceptor drains, vee-drains, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems. ○ Treatment systems: ○ Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as "Siltbuster", and/or other similar/equivalent or appropriate systems. It should be noted for this site that an extensive network of forestry and roadside drains already exists, and these will be integrated and enhanced as required and used within the wind farm development drainage system. The integration of the existing forestry drainage network and the proposed wind farm network is relatively simple. The key elements being the upgrading and improvements to water treatment elements, such as in line controls and treatment systems, including silt traps, settlement ponds and buffered outfalls. The main elements of interaction with existing drains will be as follows: ○ Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow management) of runoff from the proposed wind farm drainage into the existing site drainage network. This will reduce the potential for any increased risk of downstream flooding or sediment transport/erosion; ○ Temporary silt traps will be placed in the existing drains downstream of construction works, and these will be diverted into proposed interceptor drains, or culverted under/across the works area; ○ During the operational phase of the wind farm runoff from individual turbine hardstanding areas will be not discharged directly into the existing drainage network		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			but discharged locally at each turbine location through field drains, main drains, and existing settlement ponds; ○ Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across the bog surface and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site; ○ Drains running parallel to the existing roads requiring widening will be upgraded, widening will be targeted to the opposite side of the road. Velocity and silt control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt fences will be used during the upgrade construction works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters; and, ○ Existing culverts will be lengthened where necessary to facilitate access road widening.		
MM105	Earthworks Silt Fences	Chapter 9	○ Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids such as those present in the subsoils/sandstone tills that overlie the site. This will act to prevent entry to water courses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase.		
MM106	Earthworks Silt Bags	Chapter 9	Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location to provide further treatment of the water outfall from the silt		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.		
MM107	Earthworks Settlement Ponds	Chapter 9	The Proposed Development footprint will be divided into drainage catchments (based on topography, outfall locations, catchment size) and stormwater runoff rates based on the 10-year return period rainfall event will be calculated for each catchment. These flows will then be used to design settlement ponds for each drainage catchment. The settlement ponds will either be designed for 4.1hr or 24hr retention times used to settle out medium silt (0.01mm) and fine silt (0.004mm) respectively (EPA, 2006)[3]. Settlement pond at borrow pits will be designed to allow 24hr retention and settlement ponds along access roads and at turbine hardstands will have 4.1hr retention as there is additional in-line drainage controls proposed along access tracks and at hardstands.		
MM108	Earthworks Level Spreaders and Vegetation Filters	Chapter 9	○ The purpose of level spreaders is to release treated drainage flow in a diffuse manner, and to prevent the concentration of flows at any one location thereby avoiding erosion. level spreaders are not intended to be a primary treatment component for development surface water runoff. They are not sand alone but occur as part of a treatment train of systems that will reduce the velocity of runoff prior to be released at the level spreader. In the absence of level spreaders, the potential for ground erosion is significantly greater than not using them. ○ Vegetation filters are essentially end-of-line polishing filters that are located at the end of the treatment train. In fact, vegetation filters are ultimately a positive consequence of not discharging directly into watercourses which is one of the mitigation components of the drainage philosophy. This makes use of the natural vegetation of the site to		

[3] *Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006).*

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			provide a polishing filter for the wind farm drainage prior to reaching the downstream watercourses. ○ Again, vegetation filters are not intended to be a single or primary treatment component for treatment of works area runoff. They are not sand alone but are intended as part of a treatment train of water quality improvement/control systems (i.e. source controls→check dams→silt traps→settlement ponds→level spreaders →silt fences→vegetation filters).		
MM109	Earthworks Water Treatment Train	Chapter 9	A final line of defence will be provided by a water treatment train such as a "Siltbuster". If the discharge water from construction areas fails to be of a high quality during regular inspections, then a filtration treatment system (such as a 'Siltbuster' or similar equivalent treatment train (sequence of water treatment processes) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply for all of the construction phase.		
MM110	Timing of Construction Works	Chapter 9	Construction of the site drainage system will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works.		
MM111	Excavation Dewatering and Potential Effects on Surface Water Quality	Chapter 9	Management of surface water and groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows: ○ Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ If required, pumping of excavation inflows will prevent build-up of water in the excavation; ○ The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters; ○ The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit; ○ There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur; ○ Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken; and, ○ A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed.		
MM112	Potential Effect on Groundwater Levels During Excavation Works	Chapter 9	○ The Proposed Development site is underlain by Locally Important aquifers and contains bedrock which is generally unproductive. The Proposed Development site is elevated and groundwater will flow downslope, discharging into nearby surface water streams and tributaries of the Roughty River. ○ The existing onsite borrow pit was inspected during the site walkover surveys and no groundwater inflows were noted. The borrow pit is located in elevated terrain and no		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			groundwater inflows occur. Similarly due to the location of the borrow pit, it is likely to receive only minimal surface water inflow and therefore no significant dewatering works will be required at the borrow pit location. ○ The proposed turbine bases are located in bedrock which is generally unproductive. No groundwater dewatering will be required due to the relatively shallow nature of the excavations and lack of observed groundwater inflows within the existing excavations such as the onsite borrow pit. ○ The topographical (i.e. the elevation of the turbines, borrow pit and other proposed infrastructures) and hydrogeological setting of the Proposed Development site means that no significant groundwater dewatering is expected to be required. Moreover, direct rainfall and surface water runoff will be the main inflows that will require water volume and water quality management. For the avoidance of doubt. we would generally define dewatering as a requirement to permanently drawdown the local groundwater table by means of over pumping, e.g. as would be required for the operation of a bedrock quarry in a valley floor. ○ Relevant environmental management guidelines from the EPA quarry 2006 guidance document – "Environmental Management in the Extractive Industry" in relation to groundwater issues will be implemented during the construction phase.		
MM113	Potential Release of Hydrocarbons	Chapter 9	Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows: ○ All plant will be inspected and certified to ensure they are leak free and in good working order prior to use on site; ○ On-site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ The fuel bowser, a double-axel custom-built refuelling trailer or truck will be re-filled off site and will be towed/driven around the site to where machinery is located. ○ The 4x4 jeep/fuel truck will also carry fuel absorbent material and pads in the event of any accidental spillages. ○ The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. ○ Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; ○ Onsite refuelling will be carried out by trained personnel only; ○ A permit to fuel system will be put in place; ○ Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the period of the construction; ○ The electrical control building will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals and to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; ○ The plant used will be regularly inspected for leaks and fitness for purpose; ○ An emergency plan for the construction phase to deal with accidental spillages will be contained within the Construction Environmental Management Plan. Spill kits will be available to deal with accidental spillages.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM114	Release of Cement-Based Products	EIAR Chapter 9	○ No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and emplacement of pre-cast elements, will take place; ○ Where possible pre-cast elements for culverts and concrete works will be used; ○ Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be isolated in temporary lined wash-out pits located near proposed site compounds. These temporary lined wash-out pits will be removed from the site at the end of the construction phase; ○ The contractor will use weather forecasting to plan dry days for pouring concrete; and, ○ The contractor will ensure pour site is free of standing water and plastic covers will be ready in case of a sudden rainfall event. No mitigation is required for potential groundwater effects as these are imperceptible at the outset.		
MM115	Groundwater and Surface Water Contamination from Wastewater Disposal	EIAR Chapter 9	○ During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds, maintained by the providing contractor, and removed from the site on completion of the construction works; ○ Water supply for the site office and other sanitation will be brought to site and removed after use by a licensed contractor to be discharged at a suitable off-site treatment location; and, ○ No water or wastewater will be sourced on the site, nor discharged to the site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM116	Morphological Changes to Surface Watercourses	EIAR Chapter 9	The Proposed Development design has been optimised to utilise the existing infrastructure (roads and hardstands) where practicable. As mentioned, road upgrades are proposed over a total of 10 no. existing watercourse crossings within the Existing Kilgarvan Wind Farm site, and only 1 no. new crossing is proposed. This design prevents the unnecessary disturbance of the existing site drainage network and also largely eliminates the requirement for instream works across the Proposed Development site. Mitigation measures are detailed below: ○ The new proposed watercourse crossing between proposed T8 and T11 (upper Lettercannon tributary) will be a pipe culvert (non-fisheries channel in the extreme upper headwater); ○ Section 50 consent (Arterial Drainage Act, 1945) will be required for this new crossing. The Section 50 requirement will determine final pipe culvert dimensions, but will allow for a minimum 300mm embed of the pipe below the existing bed level, plus sufficient freeboard; ○ IFI will be provided with a copy of the finalised pipe crossing dimensions and construction method statement. If the channel is not fully dried out during the construction period, a water management technique will be employed (dam and pump over or temporary piping) to dry out the construction reach. Any additional measures stipulated by IFI will be incorporated into the final design and construction method statement for the proposed crossing; ○ Instream construction will be carried out in the period July to September inclusive. This is a conservative working window that will help ensure construction occurs during very low or no flow and will minimise the risk of entrainment of suspended sediment		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			in surface water runoff to fisheries waters in the lower Lettercannon tributary and the Roughty River; and, ○ During the near-stream construction work, double row silt fences will be placed immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed on-site. The bottom edge of geotextile silt fence material will be installed to a 200mm embed below ground level. Stakes will be placed at the ends, on any bends, and at 2m intervals along the silt fence. Stakes will be driven a minimum of 400mm to provide adequate support. The silt fence will have a tensioned wire backing - a minimum of 2 lines of wire run along the stakes. The top wire is used to clip the geotextile onto to hold it up and provide strength against trapped sediment. Silt fences will be checked and maintained weekly at minimum, and always before any forecasted heavy rain event.		
MM117	Use of Siltbuster and Effect on Downstream Surface Water Quality	EIAR Chapter 9	Chemical dosing is intended to force smaller/lighter particles to join together and therefore be heavy enough to settle out. As such the added chemicals are bound in the flocc and do not get carried over into the treated discharge water. As such, the risk to water quality relates to operational issues, such as spill management and prevention of overdosing. Measures that will be employed to prevent spills and prevent overdosing and potential chemical carryover include: ○ Use of bunded chemical storage areas; ○ Loading and unloading of chemical containers by trained staff; ○ Use of spill kits and emergency response procedures in the event of a spill; ○ The siltbuster system comprises an electronic in-line dosing system which provides an accurate means of adding agents so overdosing does not occur;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Continued monitoring and water analysis of pre and post treated water by means of an inhouse lab and dedicated staff, means the correct amount of chemical is added by the dosing system; ○ Dosing rates of chemical to initiate settlement is small, being in the order of 2-10 mg/L and the vast majority of the chemical is removed in the deposited sediment; ○ Final effluent not meeting the discharge criteria is recycled and retreated, which has a secondary positive effect of reducing carryover; and, ○ Use of biodegradable chemical agents can be used at very sensitive sites (i.e. adjacent to SACs). ○ Siltbusters will only be used in emergency situations		
MM118	Potential Effects on Surface Water Drinking Supplies	EIAR Chapter 9	○ Mitigation measures for felling are detailed in MM99. ○ Mitigation measures for sediment control are detailed in MM104. ○ Mitigation measures for the control of hydrocarbons during construction works are detailed in MM113. ○ Mitigation measures for the control of cement-based products during construction works are detailed in MM114.		
MM119	Potential Effects on Hydrologically Connected Designated sites & Potential Effects on Surface and	EIAR Chapter 7, 9	○ Mitigation measures for felling are detailed in MM99. ○ Mitigation measures for sediment control are detailed in MM104. ○ Mitigation measures for the control of hydrocarbons during construction works are detailed in MM113.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
	Groundwater WFD Status		○ Mitigation measures for the control of cement-based products during construction works are detailed in MM114.		
Operational Phase					
MM120	Progressive Replacement of Natural Surface with Lower Permeability Surfaces	EIAR Chapter 4, 9	The Proposed Development design has been optimised to utilise the existing infrastructure (roads and hardstands) where practicable. This design prevents the unnecessary creating of additional road and hardstand areas which would increase surface water runoff from the Proposed Development site. As part of the proposed wind farm drainage design, it is proposed that runoff from the proposed infrastructure will be collected locally in new proposed silt traps, settlement ponds and vegetated buffer areas prior to release into the existing site drainage network. The new proposed drainage measures will then create significant additional attenuation to what is already present. The operational phase drainage system will be installed and constructed in conjunction with the existing site drainage network and will include the following: ○ Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed into downstream field drains; ○ Collector drains will be used to gather runoff from access roads and turbine hardstanding areas of the site likely to have entrained suspended sediment, and channel it to new local settlement ponds for sediment settling; ○ On sections of access road transverse drains ('grips') will be constructed where appropriate in the surface layer of the road to divert any runoff off the road into swales/roadside drains;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock; ○ Settlement ponds, emplaced downstream of access road sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to existing drains; ○ Settlement ponds will be designed in consideration of the greenfield runoff rate; and, ○ All surface water runoff from the development will have to pass through the proposed settlement ponds prior to release into the existing site drainage network. As described above the proposed integration of the wind farm drainage with the existing forestry drainage is a key component of the proposed drainage management within the development. By integration we mean maintaining surface water flowpaths where they already exist, avoid creation of new or altered surface water flowpaths, and maintaining the drainage regime (i.e. normal flow) within each forestry compartment. Critically, there will be no alternation of the catchment size contributing to each of the main downstream watercourses. All wind farm drainage water captured within individual site sub-catchments will be attenuated and released within the same sub-catchments that it was captured.		
MM121	Runoff Resulting in Contamination of Surface Waters	EIAR Chapter 9	○ Mitigation measures for sediment control are the same as those outlined in MM100. ○ Mitigation measures for the control of hydrocarbons during maintenance works are similar to those outlined in MM113		
Decomissioning Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM122	Decomissioning Phase	EIAR Chapter 9 Appendix 4-5	○ Potential effects will be similar to the construction phase but to a lesser degree. Some of the impacts will be avoided by leaving elements of the Proposed Development in place where appropriate. The onsite 110kV electrical substation and 110kV electrical cabling will be retained as a permanent part of the national grid. The turbine bases will be rehabilitated by covering with local topsoil/peat in order to regenerate vegetation which will reduce runoff and sedimentation effects. ○ Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.		
EIAR Chapter 10 Air					
Construction Phase					
MM123	Exhaust Emissions: Construction	EIAR Chapter 10 Appendix 4-3	○ Proposed Development construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. ○ All plant and materials vehicles shall be stored in dedicated areas (on-site). Machinery will be switched off when not in use. ○ Turbines and construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. Please see Chapter 15 Material Assets for details. ○ All plant and materials vehicles shall be stored in dedicated areas (on-site).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. ○ The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF will be local to the site to reduce the emissions associated with vehicle movements. There are several licenced waste treatment facilities located outside of Killarney and Kenmare, approximately 14.2km northwest and 16km southwest respectively of the site. ○ Aggregate materials for the construction of the Proposed Development infrastructure will be predominantly sourced onsite. ○ A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3).		
MM124	Exhaust Emissions: Transport	EIAR Chapter 10 Appendix 4-3	○ Measures listed in MM106 above pertaining to exhaust emissions will be implemented for the transportation of vehicles to and from the site. ○ Aggregate materials for the construction of site access tracks and all associated infrastructure will all be locally sourced, where possible, which will further reduce potential emissions. ○ Turbines and construction materials will be transported to the site on specified haul routes only. ○ Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the site to reduce the amount of emissions associated with vehicle movements. ○ A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3).		
MM125	Dust Emissions: Construction	EIAR Chapter 10 Appendix 4-3	○ Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff. ○ All plant and materials vehicles shall be stored in dedicated areas within the site. ○ Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. ○ Turbines and construction traffic will be transported to the site on specified haul routes only. ○ The agreed haul route road adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary. ○ The roads adjacent to the site entrances will be checked weekly or damage/potholes and repaired as necessary. ○ The transportation of materials from the borrow pit around the site will be covered by tarpaulin or similar covered vehicles where necessary. ○ The transportation of construction materials from locally sourced quarries for the Proposed Development will be covered by tarpaulin where necessary.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ If necessary, excavated material will be dampened prior to transport to the spoil management areas. ○ A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3). The CEMP includes dust suppression measures.		
MM126	Dust Emissions: Transport	EIAR Chapter 10 Appendix 4-3	○ Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff. ○ All plant and materials vehicles shall be stored in dedicated areas within the site. ○ Turbines and construction vehicles will be transported to the site on specified haul routes only. ○ The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary. ○ The roads adjacent to the site entrances will be checked weekly or damage/potholes and repaired as necessary. ○ The transport of construction materials around the site from the nearby quarry facilities will be covered by tarpaulin where necessary. ○ Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the site to reduce the volume of emissions associated with vehicle movements.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3).		
Operational Phase					
MM127	Exhaust Emissions	EIAR Chapter 10	○ Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise. ○ When stationary, delivery and on-site vehicles will be required to turn off engines. ○ Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the site to reduce the emissions associated with vehicle movements.		
MM128	Dust Emissions	EIAR Chapter 10	○ Maintenance vehicles brought onsite during the operational phase will be maintained in good operational order, thereby minimising any dust emissions that arise. ○ Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the site to reduce the emissions associated with vehicle movements.		
Decomissioning Phase					
MM129	Decomissioning Phase	EIAR Chapter 10 Appendix 4-5	Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less effect. The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential effects.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
EIAR Chapter 11 Climate					
Construction Phase					
MM130	Greenhouse Gas Emissions	EIAR Chapter 11 Appendix 4-3	○ All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. ○ When stationary, delivery and on-site vehicles will be required to turn off engines. ○ Turbines and construction materials will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority (see Section 15.1 Chapter 15 for details) ○ The majority of all rock and hardcore materials for the construction of the Proposed Development will be obtained from the borrow pit on site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. ○ The Construction and Environmental Management Plan (CEMP) (Appendix 4-3) includes a Waste Management Plan (WMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. The WMP will outline the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of the construction of the Proposed Development. ○ Section 3.9 of the CEMP (Appendix 4-3) for this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor, ○ The MRF facility will be local to the Proposed Development site where possible to reduce the amount of emissions associated with vehicle movements. ○ Disposal of waste will be seen as a last resort ○ Where applicable, low carbon intensive construction materials will be sourced and utilised onsite.		
Operational Phase					
MM131	Greenhouse Gas Emissions	EIAR Chapter 11	○ Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise. ○ When stationary, delivery and on-site vehicles will be required to turn off engines. ○ Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the site to reduce the emissions associated with vehicle movements ○ As detailed in Appendix 6-8, a Blanket Bog Enhancement Plan has been developed and will be applied at a suitable location within the site as identified by Dr, John Conaghan, the botanical specialist ○ The restoration area will be monitored for the lifetime of the wind project in accordance with the plan.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ No removal/clearance of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the works area/footprint will be clearly marked for associated site staff. ○ Afforestation of the 8.9ha of forestry being felled for the Proposed Development will be completed as per the Forest Service's policy on granting felling licenses for wind farm development		
Decomissioning Phase					
MM132	Decomissioning Phase	EIAR Chapter 11	Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		
EIAR Chapter 12 Noise					
Construction Phase					
MM133	Construction Noise	EIAR Chapter 12 Appendix 4-3	No significant effects resulting from the removal of the existing turbines and construction of the Proposed Development are predicted. Nevertheless, a range of good practice measures are presented in the Construction Environmental Management Plan (CEMP), included as Appendix 4-3 of this EIAR, and these will be employed to minimise noise impacts. At this stage of the development process, the assessment is based on a precautionary approach, as a detailed construction programme is not available. Good site practices will be implemented to minimise the likely effects. Section 8 of BS5228-1:2009+A1:2014 recommends a number of simple control measures as summarised below that will be employed onsite:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern; ○ All vehicles and mechanical plant will be fitted with effective exhaust silencers and be subject to programmed maintenance; ○ Select inherently quiet plant where appropriate – all major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use; ○ All ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers; ○ Machines will be shut down between work periods (or when not in use) or throttled down to a minimum; ○ Regularly maintain all equipment used on site, including maintenance related to noise emissions; ○ Vehicles will be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation; and ○ All ancillary plant such as generators and pumps will be positioned so as to cause minimum noise disturbance and if necessary, temporary acoustic screens or enclosures will be provided. While it was concluded above that there will be no significant vibration impacts associated with the turbine removal / construction of the Proposed Development, and that no specific mitigation measures were required, it is recommended that vibration from turbine removal or construction activities will be limited to the values set out in Section 12.4.1.2 of Chapter 12.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Given that construction activities are only likely to occur for a short duration, the use of internal vibration limits is likely to be unnecessary. Therefore, no mitigation measures are proposed.		
Operational Phase					
MM134	Operational Noise	EIAR Chapter 12	○ The exact model of wind turbine to be used for the Proposed Development will be the result of a future tendering process. The final choice of turbine will, however, have to meet the derived noise limits and/or noise limits from the Guidelines determined and contained within any planning permission condition imposed. In the event that mitigation is required, modern turbine control systems allow for turbines to operate in a reduced noise mode for a range of wind speeds and wind directions as required, referred to as 'mode management'. ○ The exact model of wind turbine to be used for the proposed development will be the result of a future tendering process. Achievement of the noise limits determined by this assessment would be a key determining factor in the final choice of wind turbines for the site. ○ Based on the candidate wind turbine modelled in the noise assessment, in order to meet the Site Specific Noise Limits at NAL7-12 initial predictions suggest that low noise management would be required at 7 of 11 turbines. The required reductions can be achieved using the standard modes available for the turbine; no turbines will need to be switched off to meet the noise limits. ○ Whilst it is not possible to predict if OAM will occur, in the event that complaints are received regarding OAM, mitigation measures are available. The design of such mitigation measures can only be determined once the wind farm is operational if OAM is found to occur frequently and at sustained levels. For the Proposed Development, the developer is committed to investigating noise complaints, inclusive of any complaint which may relate to OAM (i.e. beyond overall noise levels found in		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			planning conditions). To deal with the eventuality of a complaint, the developer proposes the following: ○ A community liaison officer will be appointed prior to first generation of electricity and contact details made publicly available; ○ Any complaint relating to noise can be reported to the community liaison officer, who will undertake an initial screening of the complaint (review of logs submitted, review of wind conditions and turbine data etc..) and speak to the complainant in person, with an eventual visit to the complainant location if possible; ○ Following initial screening, the community liaison officer will be responsible for commissioning a detailed noise complaint investigation. This will include appointing a qualified acoustic consultant to undertake noise measurements at the complaint location and quantify the occurrence and depth (in dB) of OAM for every 10 minute of the measurement campaign. The measured 10 minute noise levels and OAM depth would also be correlated with 10 minute wind conditions and operational data to find patterns; and, ○ If frequent and sustained OAM is found, then appropriate mitigation would be designed and implemented and the complainant informed by the community liaison officer. Mitigation measures considered would include: changes to the operation of the relevant wind turbine(s) by changing software parameters such as blade pitch for specific wind conditions and time periods, addition of blade furniture (such as vortex generators) to alter the flow of air over the wind turbine blades; and, in extreme cases, targeted wind turbine shutdowns in specific conditions.		
Decomissioning Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM135	Decomissioning Phase	EIAR Appendix 4-3	No specific mitigation measures are required for decommissioning. To ameliorate any potential noise impacts that may present during the decommissioning phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the Construction and Environmental Management Plan (CEMP) that has been prepared for the Proposed Development.		
EIAR Chapter 13 Landscape and Visual					
Pre-Construction Phase					
MM136	Landscape & Visual	EIAR Chapter 13	Mitigation By Design Through the iterative project design process, various best practice tools used for assessing the landscape and visual impact of a proposed wind farm development were used to bring forward the optimum design for the Proposed Development with respect to landscape and visual factors. These tools include, landscape modelling, ZTV mapping and preparation of photomontage visualisations. The final design of the Proposed Development and strategic siting of turbines in the landscape was informed by extensive early-stage impact assessment work conducted throughout 2022, including assessment of various turbine layouts and turbine models. The evolution of the turbine layout included omission of turbines from the project and careful micro-siting of turbines aimed at preventing the potential for significant landscape and visual effects. The final design is also considered in the context of siting and design guidance stated in the *'Wind Energy Development Guidelines for Planning Authorities'* Published by the Department of Environment, Heritage and Local Government in 2006 and the draft revised Wind Energy Development Guidelines - Hereafter referred to as the WEDGs (DoEHLG, 2006) and Draft WEDG's (DoHPLG, 2019). The project layout that is the subject of this LVIA, incorporates the following landscape and visual design considerations for good wind farm design:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ The turbines are sited strategically within an area designated as a 'Potential Repowering Area' within the Kerry County Development Plan (2022-2028). The turbines are located within a landscape where the suitability of wind energy has already been established by the planning system. ○ Strategic containment of the proposed turbines within the extent of the Existing Kilgarvan Wind Farm ensures that the Proposed Development does not increase the horizontal extent of turbines visible within most sensitive landscape views assessed (as demonstrated by visualisations in the Volume 2 Photomontage Booklet). In general, the Proposed Development does not include a novel addition of turbines into new areas of the landscape. ○ The turbines are sited strategically within a landscape capable of accommodating a wind energy development of this scale. The site is an area surrounded by substantial topographical features which both eliminate visibility of the turbines from a large portion of the LVIA Study Area and provide a sense of scale that causes the turbines to appear congruous and appropriately scaled in the landscape type within which they are viewed. ○ Siting of turbines in a sparsely settled upland landscape with large set back distances from residential receptors, large populations centres and other high sensitivity visual receptors. ○ All proposed turbines have been sited greater than 500 metres from residential receptors in order to protect residential visual amenity in accordance with the Guidelines. All the proposed turbines are greater than 900m from residential receptors, adhering to the 4 times tip height set-back distance explicitly set out for residential visual amenity prescribed by the *'Draft Revised Wind Energy Development Guidelines for Planning Authorities'* published by the Department of Housing,		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Planning and Local Government in 2019 - Hereafter referred to as the 'draft Guidelines (DoHPLG, 2019)'. ○ In consideration of visual effects on proximate residential receptors to the east of the site, early-stage photomontage visualisations were used in combination with topography maps to strategically micro site turbines so that they are appropriately positioned at lower contours on the Proposed Development Site (west) of prominent ridgelines (at the east of the site) reducing their prominence in the landscape and impacts on local residential visual amenity. ○ The Proposed Development makes use of the existing wind farm infrastructure of the Existing Kilgarvan Wind Farm. This reduces the requirement for new internal site roads or grid infrastructure, therefore reducing the extent of direct Landscape Effects on the site.		
Construction Phase					
MM137	Landscape	EIAR Chapter 13	○ General housekeeping measures, necessary for Health & Safety requirements, will ensure that the active construction areas will be kept tidy, mitigating localised visual impacts during the construction phase. ○ Every use will be made of the existing wind farm access tracks and other existing tracks on site to reduce the visual effects in the surrounding area.		
Operational Phase					
MM138	Landscape	EIAR Chapter 13,6	The proposed turbines are located within a designated "*Potential Repowering Area*" within the KCDP (2022-28). Therefore, the Proposed Development assimilates within the landuse of the area.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Once planting and reinstatement of roads is implemented and vegetation has re-established, as detailed in Chapter 6, no significant landscape or visual effects will occur.		
Decomissioning Phase					
MM139	Decomissioning Phase	EIAR Chapter 13	Any potential direct impacts effects will already have been resolved through mitigation measures during the construction phase.		
EIAR Chapter 14 Cultural Heritage					
Pre-Construction Phase					
MM140	Recorded Monuments within the EIAR Site Boundary	EIAR Chapter 14 Appendix 4-3	○ All archaeological sites within the EIAR Site Boundary will be highlighted by erecting Keep-out signage prior to construction and a map of all archaeological features will be available to all personnel during construction by way of appearance in the Construction and Environmental and Management Plan. ○ The monuments will be fenced off prior to the commencement of construction with 'Keep Out' signage erected. The fencing will be inspected by the appointed archaeologist. ○ The fencing should be erected 15m from the monuments outer extent which will act as a protective buffer zone within which no machinery will be permitted to access.		
Construction Phase					
MM141	Recorded Monuments within the EIAR Site Boundary	EIAR Chapter 14	○ An archaeologist (under licence) will be present on-site during construction works to monitor all ground works and to ensure that no accidental damage occurs to the identified monuments detailed below. If archaeological finds, features or deposits are uncovered during archaeological monitoring, the developer will be prepared to provide resources for the resolution of such features whether by preservation by		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			record (excavation) or preservation in situ (avoidance). Once the project is completed, a report on the results of the monitoring will be compiled and submitted to the local authorities and the National Monuments Service. The National Monuments Service will be informed of such findings to discuss how best to proceed. ○ A map of all archaeological features will be available to all personnel during construction by way of appearance in the Construction and Environmental and Management Plan.		
MM142	Newly Recorded Archaeological		○ The monuments will be fenced off prior to the commencement of construction with 'Keep Out' signage erected. The fencing will be inspected by the appointed archaeologist. ○ The fencing should be erected 15m from the monuments outer extent which will act as a protective buffer zone within which no machinery will be permitted to access. ○ A map of all archaeological features will be available to all personnel during construction by way of appearance in the Construction and Environmental and Management Plan. ○ An archaeologist (under licence) will be present on-site during construction works to monitor all ground works and to ensure that no accidental damage occurs to the identified monuments detailed below. Once the project is completed, a report on the results of the monitoring will be compiled and submitted to the local authorities and the National Monuments Service. The National Monuments Service will be informed of such findings to discuss how best to proceed.		
MM143	Sub-surface Archaeological Potential	EIAR Chapter 14	○ Archaeological monitoring of ground works during construction. This will include all excavation works within the EIAR Site Boundary, as well as any topsoil removal along the haul route. If archaeological finds, features or deposits are uncovered during		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			archaeological monitoring, the developer will be prepared to provide resources for the resolution of such features whether by preservation by record (excavation) or preservation in situ (avoidance). Once the project is completed, a report on the results of the monitoring will be compiled and submitted to the local authorities and the National Monuments Service. The National Monuments Service will be informed of such findings to discuss how best to proceed.		
Operational Phase					
MM144	Archaeological Sites, Landscapes, monuments and Protected Structures	EIAR Chapter 14	○ It is not possible to mitigate the effect of the turbines on the visual setting of the structures. Therefore, no mitigation measures are being proposed.		
EIAR Chapter 15 Material Assets					
Material Assets - Traffic					
Pre-Construction Phase					
MM145	Traffic	EIAR Chapter 15	**Mitigation by Design** Mitigation by design measures include the following: ○ Selection of the most appropriate delivery route to transport the wind turbine components, requiring the minimum remedial works to accommodate the vehicles as set out in Chapter 15.		
Construction Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM146	Traffic	EIAR Chapter 15	The successful completion of the Proposed Development will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage in order to minimise the effects of the additional traffic generated by the Proposed Development. A detailed Traffic Management Plan (TMP) will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the road's authority and An Garda Síochána prior to construction works commencing. The detailed TMP will include the following: ○ **Traffic Management Coordinator –** a competent Traffic Management Co-ordinator will be appointed for the duration of the construction of the Proposed Development and this person will be the main point of contact for all matters relating to traffic management. ○ **Delivery Programme –** a programme of deliveries will be submitted to Cork County Council and other relevant authorities in advance of deliveries of turbine components to the Proposed Development site. ○ **Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. delivery of turbine components at night, via letter drops and/or posters in public places. Information will include the contact details of the Contract Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided. ○ **A Pre and Post Construction Condition Survey –** A pre-condition survey of roads associated with the Proposed Development will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			carried out after works are completed. Where required the timing of these surveys will be agreed with the local authority. ○ **Liaison with the relevant local authorities** - Liaison with the relevant local authorities including the roads sections of local authorities that the delivery routes traverse, and An Garda Siochana, during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. ○ **Implementation of temporary alterations to road network at critical junctions** – At locations where required highlighted in Section 15.1.8. ○ **Identification of delivery routes** – These routes will be agreed and adhered to by all contractors. ○ **Travel plan for construction workers to Site–** While the assessment above has assumed a robust case that construction workers will drive to the site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of a routes to / from the site and identification of an area for parking. ○ **Delivery times of large turbine components** - The management plan will include the delivery of large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage. ○ **Additional measures** - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including sweeping / cleaning of local roads as required. ○ **Re-instatement works** - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.		
Decomissioning Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM147	Decommissioning Phase	EIAR Chapter 15 Appendix 4-5	In the event that the Proposed Development is decommissioned after the 35 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-5 Decommissioning Plan. This plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning.		
Material Assets - Other					
Pre-Constructions Phase					
MM148	Built Services	EIAR Chapter 3, 15	○ Proposed Development infrastructure have been designed to avoid identified services and utilities. Prior to commencement of construction of the Proposed Development the surveys will be repeated and updated, to ensure any new services and utilities will not be impacted by the Proposed Development.		
Construction Phase					
MM149	Built Services & Waste Management	EIAR Chapter 15	Relevant mitigation measures have been set out which will ensure that no adverse impact is felt on built services or waste management during the construction phase of the Proposed Development. The mitigation measures include the following: ○ Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works. ○ Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified. ○ Excavation permits will be completed, and all plant operators and general operatives will be inducted and informed as to the location of any services.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks. ○ In the event that any unmapped overhead lines are encountered along the turbine delivery route, these will be avoided with appropriate precautions and procedures.		
MM150	Telecommunications	EIAR Chapter 3, 15 Appendix 15–3	○ MKO employed the expertise of Ai Bridges, who compiled specialist reports to identify any remaining issues and propose appropriate mitigation measures. The report received from Ai Bridges is attached to this chapter as Appendix 15-3 and lists mitigation measures to be implemented such as the construction of relay masts and relaying links to existing mast sites. ○ In the event of interference occurring to telecommunications, the Guidelines acknowledge that '*electromagnetic interference can be overcome'* by the use of divertor relay links out of line with the wind farm.		
MM151	Aviation	EIAR Chapter 15	○ The specification for obstacle lighting requested by the Department of Defence will be implemented in full once the proposed turbines have been constructed. ○ Although none was received in this case, scoping responses from the IAA generally set out lighting requirements as set out above. These requirements will still be complied with for the Proposed Development and any further details will be agreed in advance of construction with the IAA, i.e. crane erection. The coordinates and elevations for the as-built turbines will be supplied to the IAA, as is standard practice for wind farm developments.		
MM152	Aviation	EIAR Chapter 15	○ The specification for obstacle lighting requested by the Department of Defence will be implemented in full once the proposed turbines have been constructed.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Although none was received in this case, scoping responses from the IAA generally set out lighting requirements as set out above. These requirements will still be complied with for the Proposed Development and any further details will be agreed in advance of construction with the IAA, i.e. crane erection. The coordinates and elevations for the as-built turbines will be supplied to the IAA, as is standard practice for wind farm developments.		
Decomissioning Phase					
MM153		EIAR Appendix 4-5	The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		

7. MONITORING PROPOSALS

All monitoring proposals relating to the pre-commencement, construction and operational phases of the Proposed Development were set out in various sections of the EIAR, NIS and Biodiversity Enhancement Plan prepared as part of the planning permission application to An Bord Pleanála.

This section of the Construction and Environment Management Plan groups together all of the monitoring proposals presented in the EIAR. The monitoring proposals are presented in the following pages.

By presenting the monitoring proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the future phases of the project. The tabular format in which the below information is presented, can be further expanded upon during the course of future project phases to provide a reporting template for site compliance audits.

Table 7-1 Monitoring Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			Pre-Construction Phase			
MX1	Drainage Maintenance	EIAR Chapter 4 CEMP Section 4	› An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. › Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. › Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. › Daily inspection and recording of surface water management system by on-site clerk of works and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site.	On going	Monthly	Project Hydrologist
MX2	Water Quality and Monitoring	EIAR Chapter 7	› An appointed, qualified, experienced Environmental Clerk of Works (ECoW) will be responsible for daily checks and monthly water sampling that ensures water quality protection measures and guidelines are complied with during the pre-commencement phase.	Once	As Required	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
MX3	Terrestrial Ecology	EIAR chapter 6	› Due to the unavoidable disturbance to Kerry Slug habitat, a derogation license will be sought from the NPWS prior to the commencement of construction. › Bird Vantage Point surveys will be commenced ahead of the construction phase. › A pre-construction mammal survey (including checks for non-volant mammals and passive/active bat surveys) will be carried out immediately before the commencement of vegetation clearance to ensure that there is no evidence of resting/breeding sites of protected mammal species in or directly adjacent to the works footprint. › An updated survey for adult Marsh Fritillary, *Euphydras aurinia*, will be carried out in the year of construction (May/June) ideally before construction commences. An updated survey for adult Marsh Fritillary, will be carried out in the year of construction (May/June) ideally before construction commences.	Once	As Required	Project Ecologist
MX4	Sub-Surface Archaeology	EIAR Chapter 13 CEMP Section 4	› Pre-development archaeological testing of the proposed infrastructure in previously undisturbed greenfield areas of the Site will be carried out under licence from the National Monuments Service. This is in order to identify any archaeological features at the earliest stage possible in the project to allow time to deal with any requirements such as preservation in situ (redesign / avoidance) or preservation by record (archaeological excavation). › A report on the testing will be compiled on completion of the work and submitted to the NMS and the Planning Authority.	Once	As Required	Project Archaeologist
Construction Phase						

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
MX5	Spoil Management	EIAR Chapter 4 CEMP Section 4	› Inspections of the spoil management areas will be made by a Geotechnical Engineer through regular monitoring of the works. The appointed contractor will review work practices at spoil management areas when periods of heavy rainfall are expected so as to prevent excessive dirty water runoff from being generated.	As Required	As Required	Geotechnical Engineer
MX6	Drainage Design	EIAR Chapter 4 CEMP Section 4	› Daily inspection and recording of surface water management system by on-site clerk of works and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site. › Check dams are designed to reduce velocity and control erosion and are not specifically designed or intended to trap sediment, although sediment is likely to build up. If necessary, any excess sediment build up behind the dams will be removed. For this reason, check dams will be inspected and maintained regularly to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam. › Piped drains will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and blockage.	Daily As Required Weekly	As Required	ECoW
MX7	Dust Suppression	EIAR Chapter 4,8	› In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. If necessary, water will be taken from stilling/settlement ponds in the Proposed Wind Farm site's drainage system and will be pumped into a bowser or water	As Required	As Required	PSCS

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
		Appendix 4-5	spreader to dampen down haul roads and temporary construction compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this would transfer the pollutants to the haul roads and generate polluted runoff or more dust. Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff.			
MX8	Health and Safety	EIAR Chapter 5 CEMP	› The PSCS shall monitor the compliance of contractors and others and take corrective action where necessary; and › Notify the Authority and the client of non-compliance with any written directions issued.	Daily	Daily	PSCS
MX9	Terrestrial Ecology	EIAR Chapter 6	› The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS. › To minimise effects on Kerry Slug areas of suitable habitat that occur outside of the footprint of the Proposed Development shall be avoided during the course of construction thereby minimising the loss and disturbance of Kerry Slug habitat. Immediately prior to undertaking works in areas of suitable habitat, the ECoW, or nominated specialist, will check for the presence of Kerry Slug.	As Required	As Required	Project Ecologist/ Ornithologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			The preferred method shall be hand-searching. Should slugs be discovered then they will be transferred to suitable habitat identified outside of the works footprint. Throughout construction, monitoring of suitable habitat within works areas will continue using a combination of metric traps and regular hand-searching. Hand-searching will be undertaken during periods of wet weather when slugs are most active and feeding on the surface and therefore at greater risk of impacts e.g. from site traffic. › Standard Vantage Point Monitoring in accordance with the Survey Methods for Use in Assessing the Impacts of Onshore Wind farms on Bird Communities (Scottish Natural Heritage. 2018) will be carried out during the construction year by competent experienced ornithologists. The survey shall cover the development footprint and all areas within 500m of the works. › A passive bat monitoring programme will be carried out at the site throughout the construction phase.			
MX10	Water Quality Monitoring	EIAR Chapter 7	› Water quality protection mitigation/ control measures shall be inspected daily by the ECoW during working days where there are active earthworks/ excavations / culvert upgrades occurring › Any maintenance and repairs required relating to construction related drainage management, e.g., silt	As required	As Required	Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			fences, settlement ponds, check-dams, will be actioned immediately. › Environmental monitoring and checklists shall be recorded and added to the CEMP on a daily basis. › The ECoW will also attend stakeholder meetings with relevance to aquatic ecology and fisheries throughout the construction (i.e., IFI). The finalised designs of the new culvert in the upper Lettercannon tributary and the culvert extension (as a result of Section 50 consent) plus their Construction Method Statements (CMS) will be provided to IFI no later than 6 weeks in advance of proposed works. The finalised CMS will include any additional measures conditioned within a planning permission. The ECoW, in conjunction with the Site Manager will ensure that IFI are then notified well in advance of instream works commencing. The contractor will employ a professional company with experience in continuous turbidity monitoring to carry out the monitoring. › In addition to the daily on-site visual checks set out above and within the CEMP, a dedicated water sampling programme will be implemented focusing mainly on suspended solids and turbidity on the Roughty River.			
MX11	Turbidity Monitoring	EIAR Chapter 9	› Turbidity sonde deployment, maintenance and data management will be carried out by a professional, experienced company that specialises in continuous turbidity monitoring.	Daily	Daily	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
		CEMP	› Turbidity recording will start 6 months prior to commencement of active on-site construction works (earthworks, excavations, drainage installations and felling). This will establish an up-to-date baseline for comparison during the construction phase. Continuous turbidity monitoring will thereafter continue throughout the main earthworks and forestry felling activities of the construction phase and cease 3 months after their completion. › Action Trigger Points will be identified along the Roughty main channel. If the turbidity/ Total Suspended Solids (TSS) threshold is exceeded on the Roughty main channel, the ECoW will investigate any potential source areas of high suspended solids on the construction site using a hand-held turbidity meter to first check Sites K19, K23 and K27 to determine if there is an obvious source from one or more of the tributaries, then work back upstream from the 'problem' tributary confluence(s) to key junctions in the tributary system to locate any potential construction related source of TSS. Once the source area is identified, the ECoW will instruct additional efforts be made to strengthen sediment control measures as set out in the CEMP.			
MX12	Weather Monitoring	Chapter 7	› Prior and following heavy rainfall, the ECoW will ensure that all sediment loss prevention measures and environmental controls are functioning correctly. › During and immediately after heavy periods of rain, earthmoving activities will be reviewed with temporary restrictions where necessary.	Daily	Daily	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
MX13	Plant and Equipment Inspections	CEMP	› The plant used will be regularly inspected for leaks and fitness for purpose.	As Required	Monthly	ECoW
MX14	Traffic and Transport	CEMP	› The designated public roads outside the site and along the main transport routes to the Site will be regularly inspected by the ECoW for cleanliness, and cleaned as necessary	Daily	Monthly	ECoW
MX15	Archaeology	EIAR Chapter 14 CEMP	› Any new grant of planning permission would be subject to an archaeological monitoring under licence condition. It is noted in Chapter 14, that mitigation will include for an archaeologist (under licence) to be present on-site during construction works to monitor all ground works and to ensure that no accidental damage occurs to the identified monuments detailed below. › Buffer zones would be required around any monuments by means of a fence during the construction phase of the development. It is noted in Chapter 14 that where a buffer is required during the construction phase, this will take the form of fencing and will be erected 15m from the monument's outer extent. This will act as a protective buffer zone within which no machinery will be permitted to access. › Archaeological monitoring will be carried out A report on the monitoring will be compiled on completion of the work and submitted to the NMS and the Planning Authority.	As Required	As Required	Project Archaeologist
Operational Phase						
MX16	Drainage Inspections	CEMP Section 3	› The Project Hydrologist will inspect and review the drainage system after construction has been completed to provide	Monthly	Monthly	Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			guidance on the requirements of an operational phase drainage system. This operational phase drainage system will have been installed during the construction phase in conjunction with the road and hardstanding construction work as described in Section 4.6 of the EIAR. › The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.			
MX17	Water Monitoring	EIAR Chapter 4 CEMP	› Monthly water sampling and laboratory analysis will be undertaken for the first six months following completion of construction works. › Quarterly site inspections by the Project Hydrologist/ ECoW for a period of one year during the operational phase.	Monthly for month 1-6	Monthly for month 1-6	Project Hydrologist
MX18	Botanical Species and Habitats	EIAR Chapter 6 Appendix 6-8	› The peatland restoration plan (Appendix 6-8) will be monitored annually in years 1, 2 and 3 and at five-year intervals thereafter for the lifetime of the wind farm. Status reports will be prepared and any recommendations for additional management presented in these reports will be implemented according to the advice of the habitat specialist. The reports will be provided for the information of the Planning Authority, Kerry County Council and NPWS. ○ The restoration plan will also include monitoring of the restored borrow pit and decommissioned turbine bases, hard stands and access tracks. ○ The presence of any Third Schedule Invasive plant species in the development	Annually	Years 1,2 and 3 and thereafter every 5 years for the duration of the wind farm lifetime	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			area will be noted and advice provided on appropriate control/eradication options.			
MX19	Mammals	EIAR Chapter 6	› Bat activity will be monitored at the site for the first three years of operation using passive detector deployment at the same locations used to monitor activity in the construction phase. Annual reports on the occurrence and activity of Lesser Horseshoe Bat and other bats species detected will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS. ○ As a precautionary mitigation measure, in addition to the creation of buffers between the proposed turbines and surrounding vegetation reduced rotation speed will be implemented when turbines are idling. Automatic 'feathering' of idling blades will be implemented (through SCADA) to reduce rotation speed of blades to below 2 RPM while idling. Feathering blades has been shown to be effective in reducing fatality rates of bats by up to 50% and does not result in a significant loss of energy output (SNH, 2019). › The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An	Years 1,2,3	Annually	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS. › All lighting systems at the site, including at the entrance and around the substation will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness. › All edible and putrescible wastes will be stored and disposed of in an appropriate manner. › Any sightings of mammals on-site will be logged on the wildlife register – these logs will be maintained by the site manager and available for inspection at the site office/substation. Any records of mammal fatalities within the wind farm site and along the access road from Clonkeen will be logged and photographed.			
MX20	Birds	EIAR Chapter 6 Appendix 6-9	› Vantage Point surveys (breeding and winter) will be carried out at the operational site in years 1, 2, 3, 5, 10 and 15 in accordance with guidance (e.g. SNH, 2009). Reports will be prepared and submitted for the information of the Planning Authority, Kerry County Council and NPWS. › The fatality monitoring programme for birds and bats (using dog-based searches) instigated in the construction phase will be continued for the first three years of operation. Monthly searches of turbine bases and met mast will be carried out along with associated searcher efficiency and scavenger removal trials. An annual report will be prepared detailing the results of the fatality monitoring and circulated for the information of the Planning Authority, Kerry County Council and NPWS.	Year 1, 2, 3, 5, , 10 & 15	Annually	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› The White-tailed Eagle mitigation strategy will continue to be implemented as described in Section 6.6.1.4 and Appendix 6-9. A suitably qualified ornithologist will be appointed to oversee the implementation of the plan and prepare annual reports. ○ The 'tags' will provide accurate data on numerous locations per day, providing rapid detection of any regular use of the wind farm site by White-tailed Eagle(s) and enable the Site Manager to focus visual observational efforts (and to investigate any possible cause of regular use e.g. presence of a carcass) before any activity builds to a level where collision risk becomes unacceptable. The Site Manager will be responsible for managing and implementing a potential turbine shut-down system, which will be informed by the following: ○ Any sightings and information from third parties, notably the Reintroduction Programme and information on tagged individuals ○ Based on these information sources, thresholds and a protocol for instigating a shut-down (turbine numbers, locations and stop duration) will be agreed with NPWS and/or the White-tailed Eagle Reintroduction Programme in accordance with the measures agreed at Grousemount			

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			Wind Farm prior to the operation of the new turbines. ○ The proposed mitigation strategy measures for White-tailed Eagle will be applied initially for the first five years of operation. A review will be conducted after five years, including consultation with stakeholders, to consider if these, or other additional measures should continue to be applied for the remainder of the lifetime of the wind farm. A review report with recommendations will be prepared by a suitably qualified ornithologist with actionable recommendations fully implemented. › The installation of warning lights on turbines can help to increase their visibility, and thereby reduce the risk of bird collision. A number of the turbines will be fitted with aviation warning lights in accordance with the requirements of the Irish Aviation Authority in advance of project construction.			
MX21	Other Taxa	EIAR Chapter 6	› A Kerry Slug survey will be carried out in the first year of operation including in areas which have been translocated and a report of the survey results will be prepared for the information of the Planning Authority, Kerry County Council and NPWS. › Casual sightings of rare or protected invertebrates, amphibians etc. made in the course of operational phase ecological monitoring will be recorded and if appropriate this information will be submitted to the National Biodiversity Data Centre.	Years 1, 2, 3, 5, 10 and 15	Years 1, 2, 3, 5, 10 and 15	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			Decommissioning Phase			
MX22	Decommissioning	DP Section 1	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 approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to 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". In this regard, the Decommissioning Plan will be reviewed and updated prior to commencement of decommissioning works to take account of the relevant conditions of the planning permission and current health and safety standards at the time of decommissioning. The Decommissioning Plan (DP) will be agreed in writing with the Planning Authority prior to the commencement of the decommissioning phase.	End of Operational Life	As Required	Developer Appointed/ Contractor
MX23	Decommissioning	DP Section 3	The ECoW will maintain responsibility for monitoring the decommissioning works and Contractors/Sub-contractors from an environmental perspective. The ECoW will act as the regulatory interface on environmental matters. The Site Manager will be responsible for reporting to and liaising with Kerry County Council and other statutory bodies as required.	End of Operational Life	As Required	Site Manager/ ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
MX24	Decommissioning	DP Section 3	The Site Manager in consultation with the ECoW will be responsible for employing the services of a suitably qualified ecologist and any other suitably qualified professionals as required throughout the decommissioning works.	End of Operational Life	As Required	Site Manager/ ECoW
MX25	Decommissioning	DP Section 3	The Site Manager will take steps to ensure the sourcing of suitably clean soil material and verify the quality of the material by having it inspected prior to bringing it to site by a suitably qualified ecologist. Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the Site to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures.	End of Operational Life	As Required	Project Ecologist
MX26	Health and Safety	DP Section 4	› Due to the remoteness of the site it may be necessary to liaise with the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This will form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable. › In this regard, this DP will be reviewed and updated prior to commencement of any decommissioning works to take account of the relevant conditions of the planning permission and current health and safety standards. The DP will be agreed in writing with the Planning Authority prior to the commencement of the decommissioning.	End of Operational Life	As Required	PSCS

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
MX27	Terrestrial Ecology	EIAR Chapter 6 Appendix 4-5	› The potential for impacts during decommissioning are similar in nature, if not in scope, to those assessed for the initial decommissioning and construction phase. All decommissioning works will be governed by the same requirements to control run-off or potential pollution to watercourses as have been implemented during the construction phase. › The site compound will need to conform to the construction phase mitigation measures including those related to lighting design and proper treatment of edible and putrescible wastes. All plant removed during decommissioning of the site will be re-used at other wind farm sites whenever possible. All remaining materials which cannot be re-used will be recycled. This is likely to include scrap metal, plastic and other waste materials. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor in the most environmentally appropriate manner available at the time of the decommissioning by an appropriately licenced contractor. › Following reinstatement, the site will be monitored to determine the progress of revegetation and if necessary to examine the need for supplementary planting with native species. A full site survey by a habitat specialist will be carried out at the end of Year 1 to assess the progression of the restoration and revegetation of the decommissioned areas and to capture photographic evidence of the site vegetation status, drainage management and general site appearance at the end of Year 1.	End of Operational Life	As Required	Project Ecologist

8. PROGRAM OF WORKS

8.1 Construction Schedule

The construction phase will take approximately 18 – 24 months to complete from starting on site to the commissioning of the electrical system and export of electricity from site.

The EIAR stipulated that in the interest of breeding birds, construction would not commence during the breeding bird season, which runs from March to August. The EIAR also stipulated that the removal of conifers (forestry) by felling will take place between the 1st of September and the end of February, thus avoiding the period from the 1st of March to the 31st of August inclusive, as prescribed in the Wildlife Acts.

Works during the construction phase of the development, including delivery of construction materials will generally take place between 7 a.m. and 7 p.m. daily Monday to Friday and 7 a.m. to 2 p.m. on Saturdays, with large concrete pours requiring an earlier start when deemed necessary. Delivery of abnormal loads such as turbine tower sections and blades will take place at night outside of peak traffic hours.

The phasing and scheduling of the main construction task items are outlined in Figure 8-1 below, where 1st January has been selected as an arbitrary start date for construction activities.

Table 8-1 Indicative Construction Tables

			Year 1				Year 2			
ID	Task Name	Task Description	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Site Health and Safety									
2	Site Compounds	site compounds, site access, fencing, gates								
3	Site Roads	Construction/upgrade of roads, install drainage measures, install water protection measures								
4	Removal of existing turbines	Removal of existing turbines onsite, segmentation of blades, transport offsite								
5	Upgrades to substation									
6	Turbine Hardstands	Excavate turbine bases								
7	Turbine Foundations	Fix reinforcing steel and anchorage system, erect shuttering, concrete pour								
8	Backfilling and Landscaping									
9	Turbine delivery and erection									
10	Turbine commissioning									

9. COMPLIANCE AND REVIEW

9.1 Site Inspections and Environmental Monitoring

Routine inspections of construction activities will be carried out on a daily and weekly basis by the ECoW and the Site Supervisor/Construction Manager to ensure all controls to prevent environmental impacts, relevant to the construction activities taking place at the time, are in place.

Environmental inspections will ensure that the works are undertaken in compliance with this CEMP and all other planning application documents. Only suitably trained staff will undertake environmental site inspections.

9.2 Auditing

The Contractor will be responsible for implementing the mitigation and monitoring measures specified throughout the EIAR and compiled in Sections 6 and 7 of this CEMP. The Contractor will also be responsible for ensuring that all construction staff understand the importance of implementing the mitigation measures. The implementation of the mitigation measures will be overseen by the environmental clerk of works or supervising hydrogeologists, environmental scientists, ecologists or geotechnical engineers, depending on who is best placed to advise on the implementation.

Environmental audits will be carried out during the construction phase of the project. In contrast to monitoring and inspection activities, audits are designed to highlight the underlying causes of non-compliance, and not merely detect the non-compliance itself. In addition, audits are the main means by which system and performance improvement opportunities may be identified. Environmental audits will be carried out by contractor staff or alternatively by external personnel acting on their behalf. It is important that an impartial and objective approach is adopted. Environmental audits will be conducted at planned intervals to determine whether the CEMP is being properly implemented and maintained. The results of environmental audits will be provided to project management personnel.

9.3 Environmental Compliance

The following definitions shall apply in relation to the classification of Environmental Occurrences during construction of the proposed renewable energy development:

Environmental Near Miss: An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.

Environmental Incident: Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.

Environmental Exceedance Event: An environmental exceedance event occurs when monitoring results indicate that limits for a particular environmental parameter (as indicated in the Environmental Monitoring Programme) has been exceeded.

An exceedance will immediately trigger an investigation into the reason for the exceedance occurring and the application of suitable mitigation where necessary.

Exceedance events can be closed out on achieving a monitoring result below the assigned limit for a particular environmental parameter.

Environmental Non-Compliance: Non-fulfilment of a requirement and includes any deviations from established procedures, programs and other arrangements related to the EMP.

9.4 Corrective Action Procedure

A corrective action is implemented to rectify an environmental problem on-site. Corrective actions will be implemented by the Site Supervisor/Construction Manager, as advised by the Site Environmental Clerk of Works. Corrective actions may be required as a result of the following;

- Environmental Audits;
- Environmental Inspections and Reviews;
- Environmental Monitoring;
- Environmental Incidents; and,
- Environmental Complaints.

A Corrective Action Notice will be used to communicate the details of the action required to the main contractor. A Corrective Action Notice is a form that describes the cause and effect of an environmental problem on site and the recommended corrective action that is required. The Corrective Action Notice, when completed, will include details of close out and follow up actions.

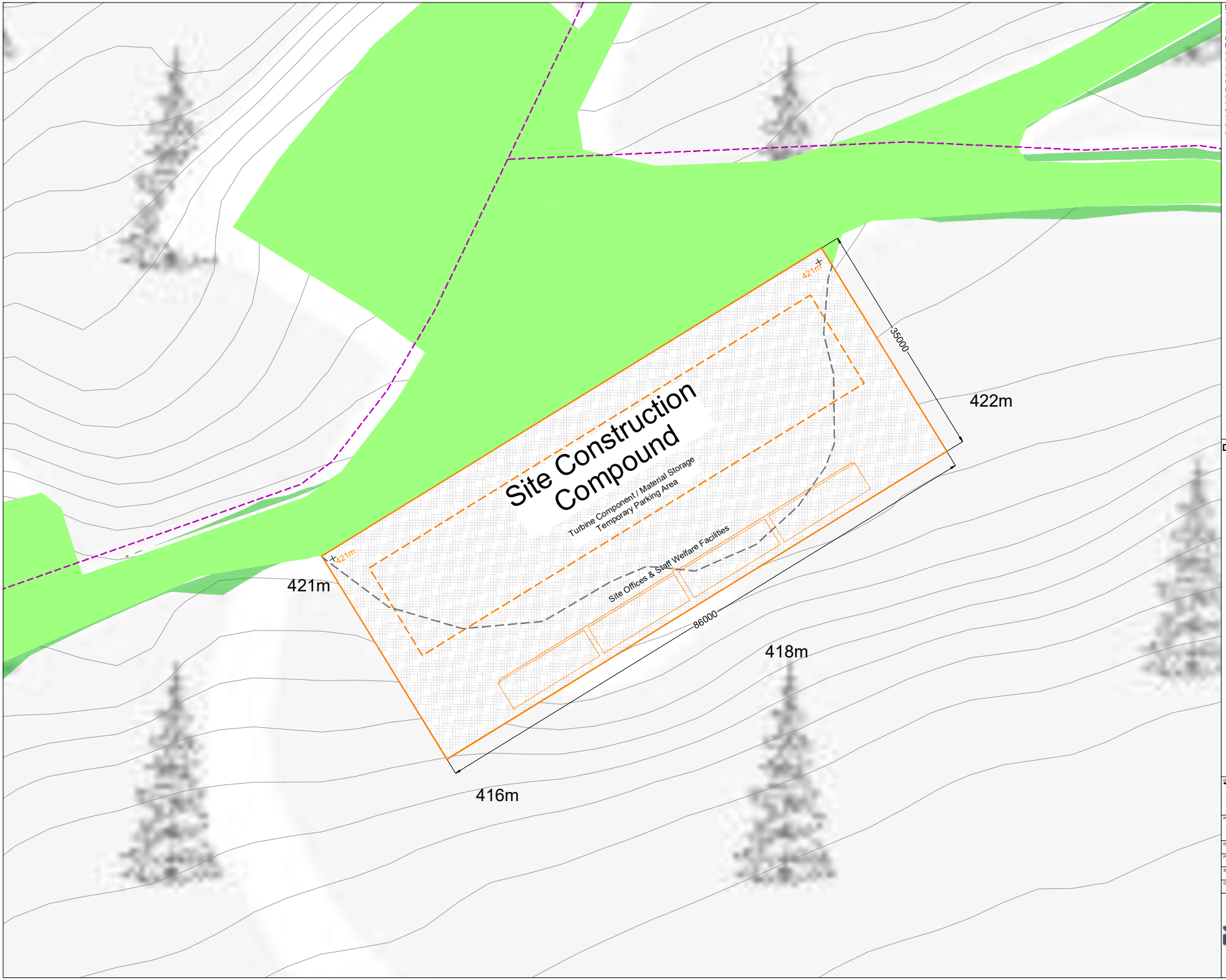
If an environmental problem occurs on site that requires immediate attention direct communications between the Site Supervisor/Construction Manager and the ECoW will be conducted. This in turn will be passed down to the site staff involved. A Corrective Action Notice will be completed at a later date.

9.5 Construction Phase Review

This CEMP will be updated and reviewed prior to commencement of construction, and also every six months thereafter during the construction phase of the project and will comply with the measures set out in the NIS, EIAR and any planning conditions.

APPENDIX E:

Proposed Development Drawings



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6. The use of or reliance upon this drawing shall be deemed to be acceptance of these conditions of use unless otherwise agreed in writing, such written agreement to be sought from and issued by the copyright holder to the use or reliance upon this drawing.
7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
8. Final levels may vary depending on local ground conditions.

Drawing Legend

- Existing Road to be Upgraded
- Electrical Cable Trench
- Existing Infrastructure Footprint
- Cut
- Fill

N

DRAWING TITLE:
Temporary Construction Compound 1

PROJECT TITLE: Kilgarvan Wind Farm Repowering, Co. Kerry

DRAWING BY: Joseph O Brien	CHECKED BY: Orla Murphy
PROJECT No.: 211107	DRAWING No.: 211107 - 31
SCALE: 1:500 @ A3	DATE: 13.05.2024
OS SHEET No.: 6179, 6180, 6181, 6227, 6228, 6229, 6275, 6276, 6277, 6322, 6323, 6324	

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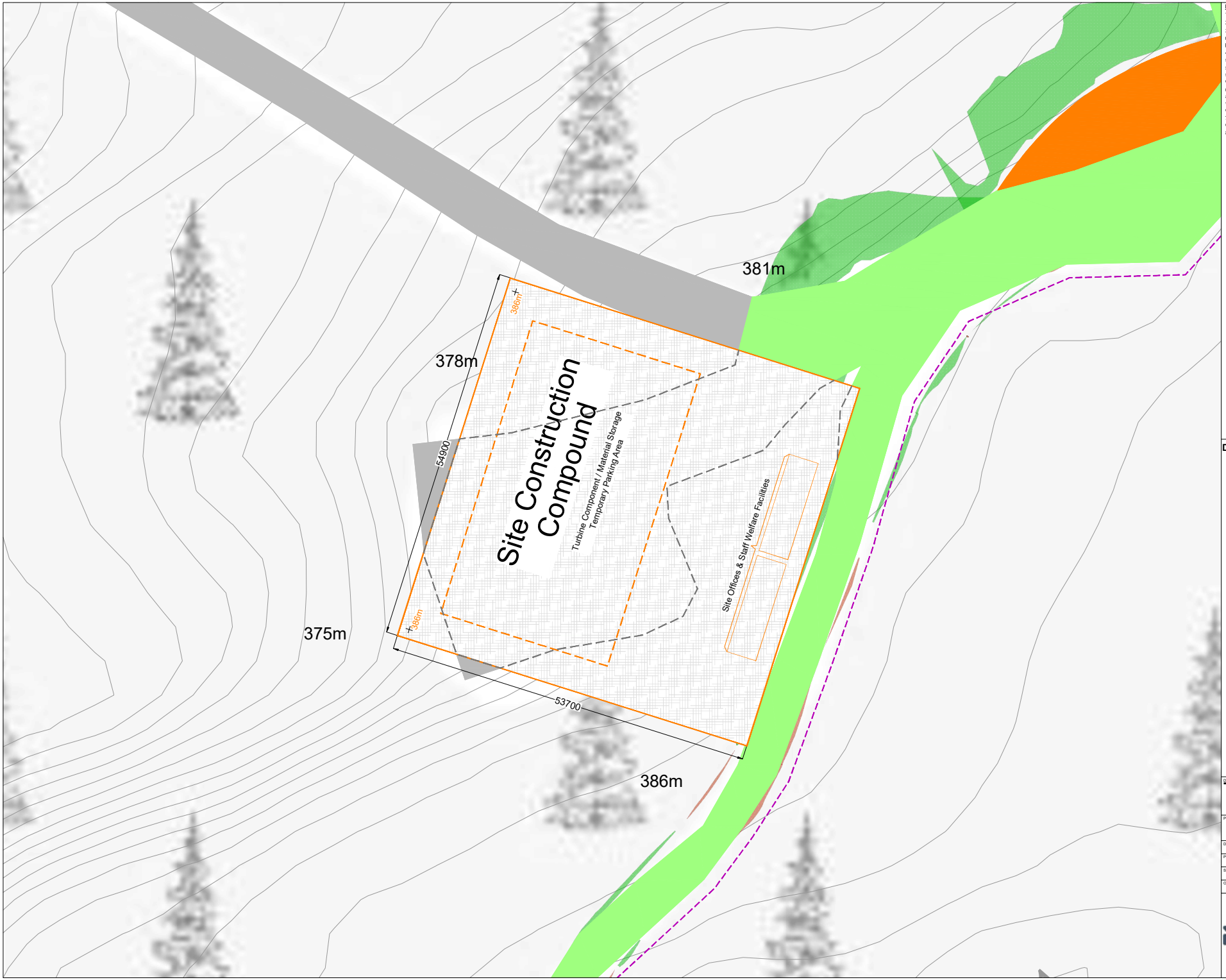
Website: www.mkoireland.ie



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8. Final levels may vary depending on local ground conditions.

Drawing Legend

- Existing Road to be Upgraded
- Proposed Road
- Existing Infrastructure no Upgrade Proposed
- Existing Infrastructure Footprint
- Electrical Cable Trench
- Cut
- Fill

N

DRAWING TITLE:
Temporary Construction Compound 2

PROJECT TITLE:
Kilgarvan Wind Farm Repowering, Co. Kerry

DRAWING BY:	CHECKED BY:
Joseph O Brien	Orla Murphy
PROJECT No.: 211107	DRAWING No.: 211107 - 32
SCALE: 1:500 @ A3	DATE: 13.05.2024

OS SHEET No.: 6179, 6180, 6181, 6227, 6228, 6229, 6275, 6276, 6277, 6322, 6323, 6324

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POLLUTION PREVENTION NOTES:

1. Site management proposals are intended to ensure protection against surface water and groundwater pollution, siltation and erosion.
2. Suitable drainage control measures should be in place at all times to prevent conveyance of significant volumes of silt to off site receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, temporary stockpiles, plant and wheel wash, site roads/tracks, and disturbance of existing field drains and ditches.

Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
5. No excavated material is to be stored within any surface water buffer zone.
6. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge.
7. Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that does not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of splash plates, and other similar discharge controls.
8. Vegetation will not be stripped from existing drains/ditches unless absolutely necessary.

Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

Concrete

15. Care will be taken when completing concrete works on site to ensure no discharges occur.
16. Concrete wash water, and waste concrete will be managed appropriately on site.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

STOP - work in the immediate area should be stopped and the source of the pollution identified.

CONTAIN - the source of the pollution should be bunded using a suitable method. Natural watercourses should be temporarily diverted around the source of pollution.

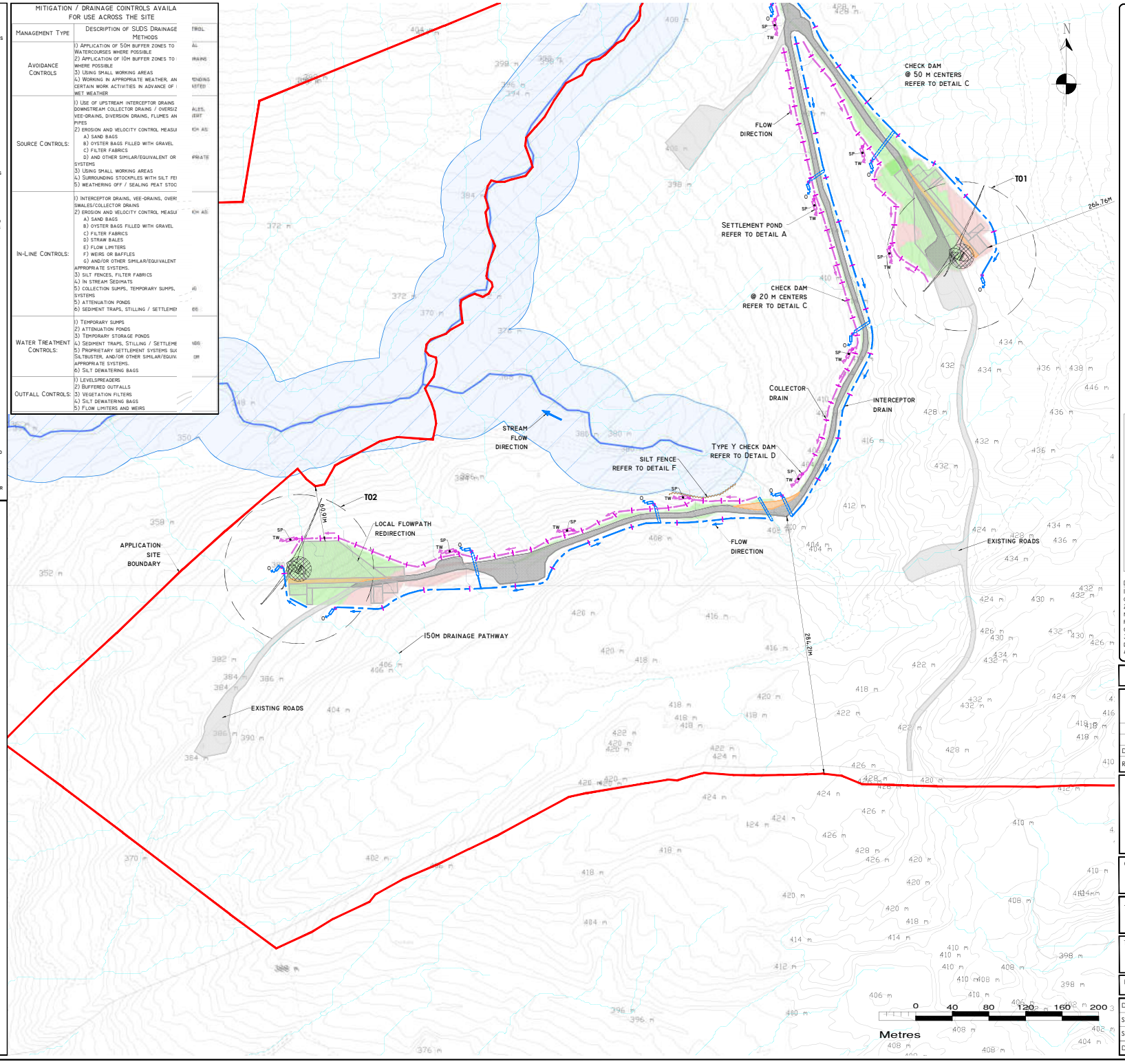
NOTIFY - The relevant authorities (Site Manager / Fisheries / NPWS / Local Authority etc.) should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.

DRAINAGE NOTES:

1. Site Tracks and Roadway surfacing design and construction to Engineer's Specification (i.e. by others).
2. Spare straw bales/silt fencing/ or similar, to be stored on site. The level of silt in runoff during construction is to be monitored visually and excessive silt levels in any area to be temporarily managed by placing silt fences, straw bales / or similar or additional check dams at the problem areas. Mobile siltbuster system to be available on-site for use as required also.
3. SUDS system to be constructed prior to, or at the same time as the access tracks. Interim measures such as the placement of straw bales/silt fencing/or similar approved method or additional check dams and silt fences to be employed in all instances where work carried out to construct the access tracks is likely to cause adverse environmental effects through increased silt loadings being generated during the construction phase.
4. Suitable prevention measures should be in place at all times to prevent the conveyance of significant volumes of silt to receiving watercourses. See notes on pollution prevention.
5. Interceptor swales / ditches to be used to collect upstream surface water flows. Regular cross drains / discharge to field ditches/drains will be required to transfer / discharge surface water in interceptor drains to suitable field drain outfall points.
6. Drainage swales / ditches to be excavated adjacent to the access tracks. Regular cross drains to be located along access tracks to prevent excessive volumes of water collecting in the swales / ditches. Locations of cross drains to be agreed with the Engineer on site. Surface water will not be allowed to discharge directly into existing watercourses.
7. Where possible, a buffer zone of >20m to any existing watercourse will be required where over land discharges are proposed from access track swales / ditches.
8. Batters of all proposed swales / ditches to have a slope of between 1 : 1.5 to 1 : 2 depending upon depth of swale/ditch and will be left as cut to re-vegetate with local species.
9. Track side swales / ditches to be shallow with moderate gradients to prevent scouring. In steep areas check dams should be installed to reduce flow velocities and provide source control of silt containment. Where necessary these have been designated in conjunction with settlement ponds and silt traps, prior to discharge.
10. Settlement ponds to be constructed for silt removal at turbine bases and hard stand areas. Pond sizes depends on the catchment area being served. Sample pond sizes for various catchment areas shown on Drawing D501.
11. Straw bales / or similar and silt fences to be used also around spoil heaps to mitigate silt runoff. Silt fences may be removed when suitable vegetation cover is established.
12. Silt fences to be provide along edge of existing watercourse where works comes within <15m of edge of any ditch / drain / ephemeral channels.
13. Slopes of the swales / ditches to be vegetated or protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel should be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.

MITIGATION / DRAINAGE CONTROLS AVAILA FOR USE ACROSS THE SITE

Management Type	Description of SUDS Drainage Methods	
Avoidance Controls	1) Application of 50m buffer zones to Watercourses where possible 2) Application of 10m buffer zones to where possible 3) Using small working areas 4) Working in appropriate weather, an certain work activities in advance of wet weather	TROL AL RAINS TENDING USTED
Source Controls:	1) Use of upstream interceptor drains downstream collector drains / oversiz vee-drains, diversion drains, flumes an pipes 2) Erosion and velocity control measu A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) and other similar/equivalent or systems 3) Using small working areas 4) Surrounding stockpiles with silt fe 5) Weathering off / sealing peat stoc	ALES, IERT ION AS PRIATE
In-Line Controls:	1) Interceptor drains, vee-drains, overs swales/collector drains 2) Erosion and velocity control measu A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) Straw bales E) Flow limiters F) Weirs or baffles G) And/or other similar/equivalent appropriate systems. 3) Silt fences, filter fabrics 4) In stream Sediments 5) Collection sumps, temporary sumps, systems 5) Attenuation ponds 6) Sediment traps, stilling / settlemer	ION AS IG DS
Water Treatment Controls:	1) Temporary sumps 2) Attenuation ponds 3) Temporary storage ponds 4) Sediment traps, Stilling / Settleme 5) Proprietary settlement systems su Siltbuster, and/or other similar/equiv appropriate systems. 6) Silt dewatering bags	NDS ER
Outfall Controls:	1) Levelspreaders 2) Buffered outfalls 3) Vegetation filters 4) Silt dewatering bags 5) Flow limiters and weirs	



DRAWING LEGEND :

- RIVERS/STREAMS (WC - WATERCOURSE)
- RIVERS/STREAMS 50M BUFFER
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- TEMPORARY PUMPING SUMP (USED AT TURBINE BASES DURING CONSTRUCTION PHASE)

Existing Drainage / Proposed Drainage

- APPLICATION SITE BOUNDARY
- EXISTING LEASE BOUCHETTE BOUNDARY
- EXISTING ROW COILTE BOUNDARY
- EXISTING GROUND SURFACE MINOR CONTOUR (2 M INTERVAL)
- TURBINE AND SWEPT AREA
- PROPOSED HARDCORED AREAS
- EXISTING ROADS PROPOSED TO BE UPGRADED
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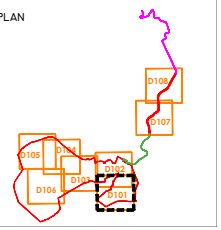
KEY PLAN



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Date	Description	Chkd	Signed

Revisions

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tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: ØRSTED

Job: Proposed Repowering of Kilgarvan Wind Farm, Co. Kerry

Title: Proposed Drainage Layout

Figure No: D101

Drawing No: P1585-0-0524-A1-D101-00C	
Sheet Size: A1	Project No.: P1585-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/05/2024	Checked By: MG

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14. Areas stripped of vegetation should be kept to a minimum.
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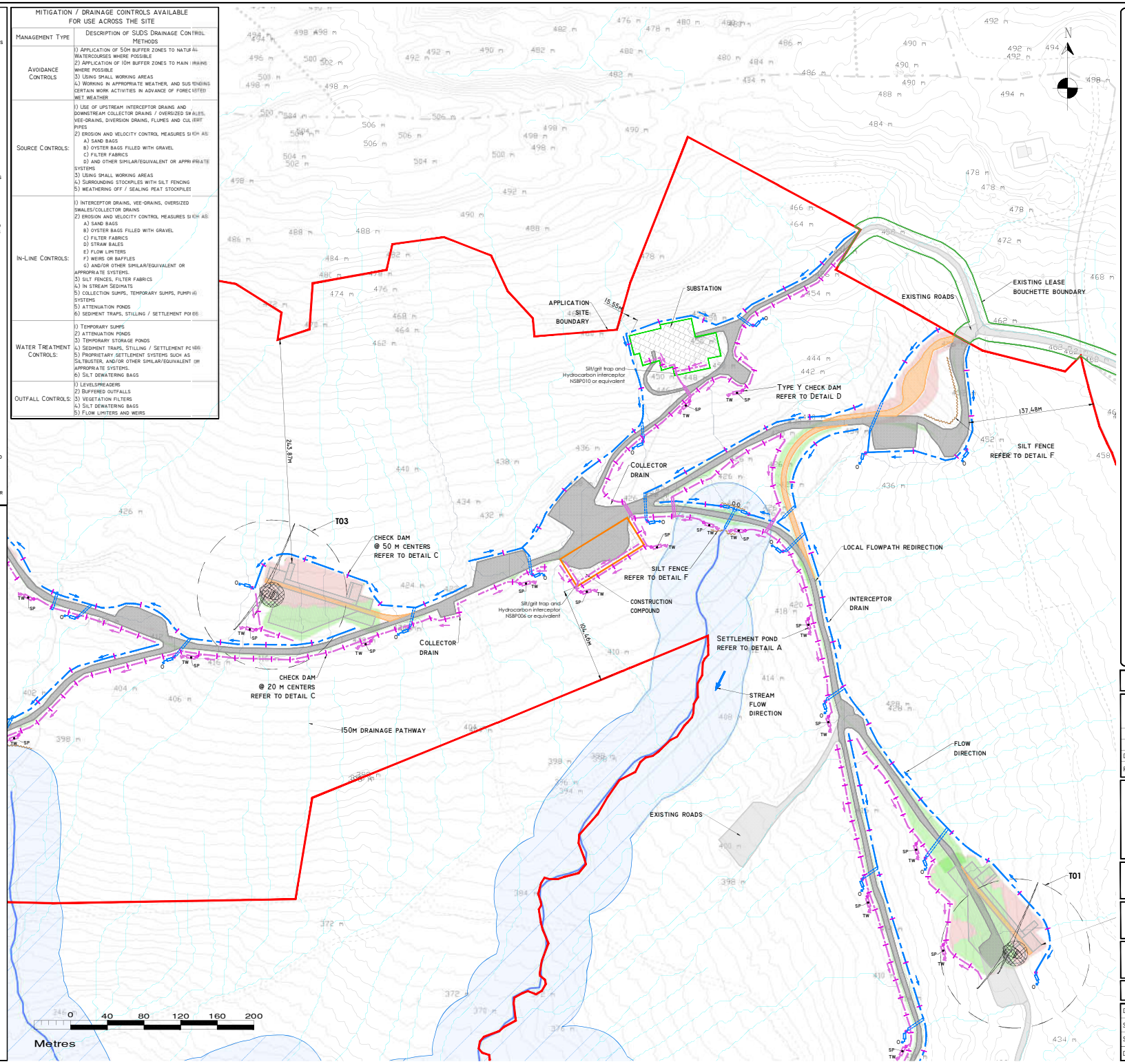
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel should be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

Management Type	Description of SUDS Drainage Control Methods
Avoidance Controls	1) Application of 50m buffer zones to natural watercourses where possible 2) Application of 10m buffer zones to main drains where possible 3) Using small working areas 4) Working in appropriate weather, and suspending certain work activities in advance of forecasted wet weather
Source Controls:	1) Use of upstream interceptor drains and downstream collector drains / oversized swales, vee-drains, diversion drains, flumes and culvert pipes 2) Erosion and velocity control measures such as: A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) And other similar/equivalent or appropriate systems 3) Using small working areas 4) Surrounding stockpiles with silt fencing 5) Weathering off / sealing peat stockpiles
In-Line Controls:	1) Interceptor drains, vee-drains, oversized swales/collector drains 2) Erosion and velocity control measures such as: A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) Straw bales E) Flow limiters F) Weirs or baffles G) And/or other similar/equivalent or appropriate systems. 3) Silt fences, filter fabrics 4) In stream Sedimats 5) Collection sumps, temporary sumps, pumping systems 5) Attenuation ponds 6) Sediment traps, stilling / settlement pools
Water Treatment Controls:	1) Temporary sumps 2) Attenuation ponds 3) Temporary storage ponds 4) Sediment traps, Stilling / Settlement ponds 5) Proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems. 6) Silt dewatering bags
Outfall Controls:	1) Levelspreaders 2) Buffered outfalls 3) Vegetation filters 4) Silt dewatering bags 5) Flow limiters and weirs



DRAWING LEGEND :

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- RIVERS/STREAMS 50M BUFFER
- LAKES
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- STREAM FLOW DIRECTION
- DRAINAGE FLOW PATHWAYS >150M LONG
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- CHECK DAM 'TYPE A'
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- PROPOSED DRAINAGE
- APPLICATION SITE BOUNDARY
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- TURBINE AND SWEPT AREA
- PROPOSED HARDCORED AREAS
- EXISTING ROADS PROPOSED TO BE UPGRADED
- EXISTING ROADS
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- SUBSTATION
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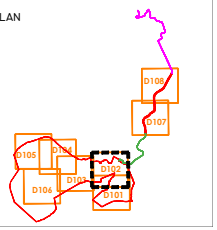
- FILL AREA

KEY PLAN



DRAWING NOTES

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Date	Description	Chkd	Signed
Revisions			

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Client: ØRSTED

Job: Proposed Repowering of Kilgarvan Wind Farm, Co. Kerry

Title: Proposed Drainage Layout

Figure No: DI02

Drawing No: P1585-0-0524-A1-D102-00C	
Sheet Size: A1	Project No.: P1585-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/05/2024	Checked By: MG

POLLUTION PREVENTION NOTES:

1. Site management proposals are intended to ensure protection against surface water and groundwater pollution, siltation and erosion.
2. Suitable drainage control measures should be in place at all times to prevent conveyance of significant volumes of silt to off site receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, temporary stockpiles, plant and wheel wash, site roads/tracks, and disturbance of existing field drains and ditches.

Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
5. No excavated material is to be stored within any surface water buffer zone.
6. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge.
7. Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that does not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of splash plates, and other similar discharge controls.
8. Vegetation will not be stripped from existing drains/ditches unless absolutely necessary.

Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

Concrete

15. Care will be taken when completing concrete works on site to ensure no discharges occur.
16. Concrete wash water, and waste concrete will be managed appropriately on site.

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NOTIFY - The relevant authorities (Site Manager / Fisheries / NPWS / Local Authority etc.) should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.

DRAINAGE NOTES:

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2. Spare straw bales/silt fencing/ or similar, to be stored on site. The level of silt in runoff during construction is to be monitored visually and excessive silt levels in any area to be temporarily managed by placing silt fences, straw bales / or similar or additional check dams at the problem areas. Mobile siltbuster system to be available on-site for use as required also.
3. SUDS system to be constructed prior to, or at the same time as the access tracks. Interm measures such as the placement of straw bales/silt fencing/or similar approved method or additional check dams and silt fences to be employed in all instances where work carried out to construct the access tracks is likely to cause adverse environmental effects through increased silt loadings being generated during the construction phase.
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6. Drainage swales / ditches to be excavated adjacent to the access tracks. Regular cross drains to be located along access tracks to prevent excessive volumes of water collecting in the swales / ditches. Locations of cross drains to be agreed with the Engineer on site. Surface water will not be allowed to discharge directly into existing watercourses.
7. Where possible, a buffer zone of >20m to any existing watercourse will be required where over land discharges are proposed from access track swales / ditches.
8. Batters of all proposed swales / ditches to have a slope of between 1 : 1.5 to 1 : 2 depending upon depth of swale/ditch and will be left as cut to re-vegetate with local species.
9. Track side swales / ditches to be shallow with moderate gradients to prevent scouring. In steep areas check dams should be installed to reduce flow velocities and provide source control of silt containment. Where necessary these have been designated in conjunction with settlement ponds and silt traps, prior to discharge.
10. Settlement ponds to be constructed for silt removal at turbine bases and hard stand areas. Pond sizes depends on the catchment area being served. Sample pond sizes for various catchment areas shown on Drawing D501.
11. Straw bales / or similar and silt fences to be used also around spoil heaps to mitigate silt runoff. Silt fences may be removed when suitable vegetation cover is established.
12. Silt fences to be provide along edge of existing watercourse where works comes within <15m of edge of any ditch / drain / ephemeral channels.
13. Slopes of the swales / ditches to be vegetated or protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel should be stored within bunded containment structures.
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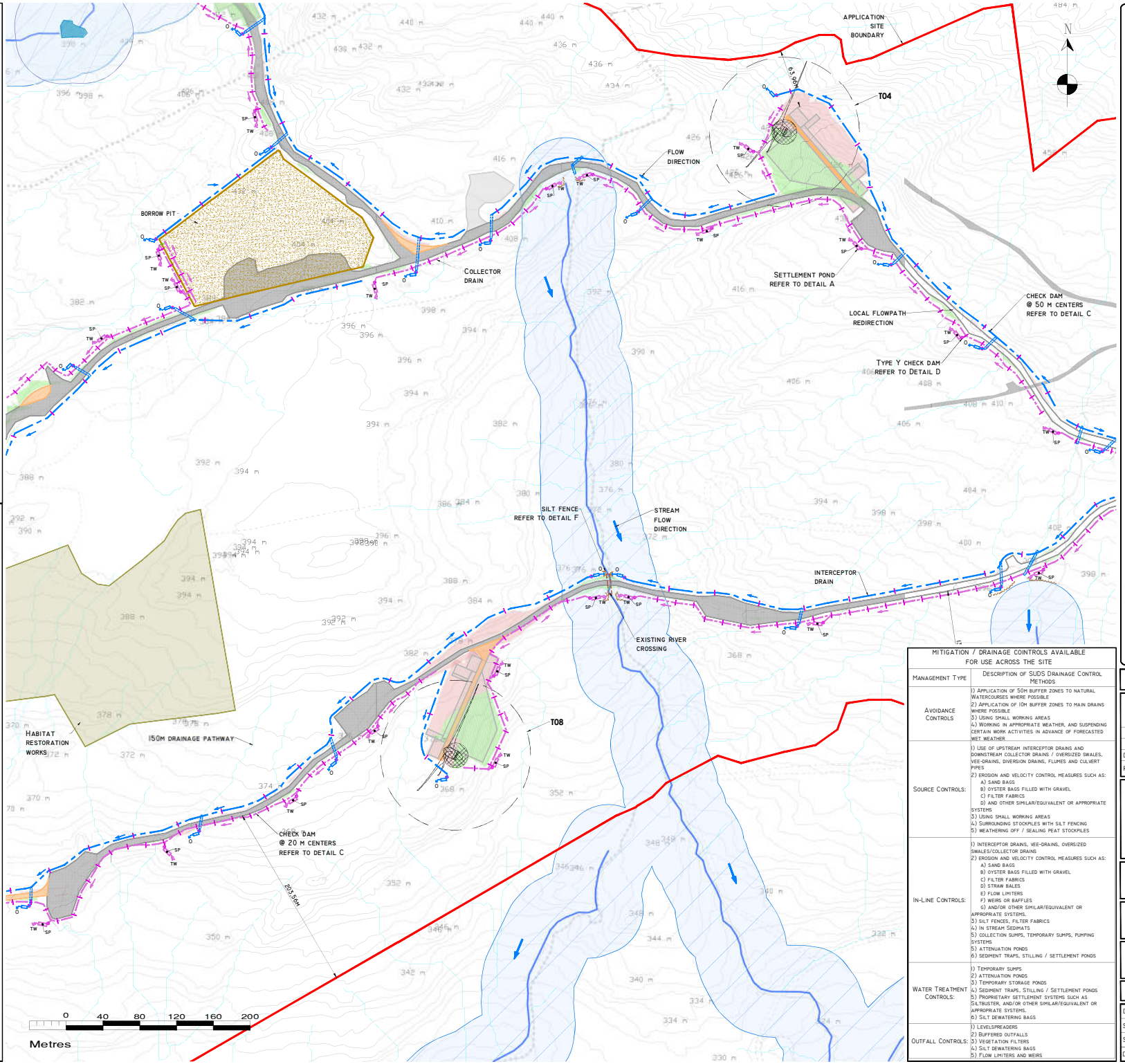

DRAWING LEGEND :

- EXISTING DRAINAGE
  - RIVERS/STREAMS (WC - WATERCOURSE)
  - RIVERS/STREAMS 50m BUFFER
  - LAKES
  - LAKES 50m BUFFER
  - STREAM FLOW DIRECTION
  - DRAINAGE FLOW PATHWAYS >50m LENGTH
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- EXISTING LEASE BOUCHETTE BOUNDARY
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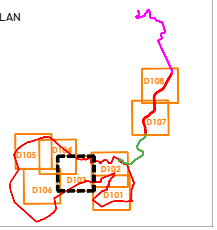
- EXISTING GROUND SURFACE MINOR CONTOUR (2 M INTERVAL)
- TURBINE AND SWEPT AREA
- PROPOSED HARDCORED AREAS
- EXISTING ROADS PROPOSED TO BE UPGRADED
- EXISTING ROADS
- HARDSTAND
- SUBSTATION
- CONSTRUCTION COMPOUND
- BORROW PIT
- CUT AREA
- FILL AREA
- HABITAT RESTORATION WORKS

KEY PLAN



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MITIGATION / DRAINAGE COINTROLS AVAILABLE FOR USE ACROSS THE SITE

Management Type	Description of SUDS Drainage Control Methods
Avoidance Controls	1) Application of 50m buffer zones to natural watercourses where possible 2) Application of 10m buffer zones to main drains where possible 3) Using small working areas 4) Working in appropriate weather, and suspending certain work activities in advance of forecasted wet weather
Source Controls:	1) Use of upstream interceptor drains and downstream collector drains / oversized swales, vee-drains, diversion drains, flumes and culvert pipes 2) Erosion and velocity control measures such as: A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) and other similar/equivalent or appropriate systems 3) Using small working areas 4) Surrounding stockpiles with silt fencing 5) Weathering off / sealing peat stockpiles
In-Line Controls:	1) Interceptor drains, vee-drains, oversized swales/collector drains 2) Erosion and velocity control measures such as: A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) Straw bales E) Flow limiters F) Weirs or baffles G) and/or other similar/equivalent or appropriate systems. 3) Silt fences, filter fabrics 4) In stream Sedimats 5) Collection sumps, temporary sumps, pumping systems 5) Attenuation ponds 6) Sediment traps, stilling / settlement ponds
Water Treatment Controls:	1) Temporary sumps 2) Attenuation ponds 3) Temporary storage ponds 4) Sediment traps, Stilling / Settlement ponds 5) Proprietary Settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems. 6) Silt dewatering bags
Outfall Controls:	1) Levelspreaders 2) Buffered outfalls 3) Vegetation filters 4) Silt dewatering bags 5) Flow limiters and weirs

Date	Description	Chkd	Signed

Revisions

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Client: ØRSTED

Job: Proposed Repowering of Kilgarvan Wind Farm, Co. Kerry

Title: Proposed Drainage Layout

Figure No: D103

Drawing No: P1585-0-0524-A1-D103-00D	
Sheet Size: A1	Project No.: P1585-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/05/2024	Checked By: MG

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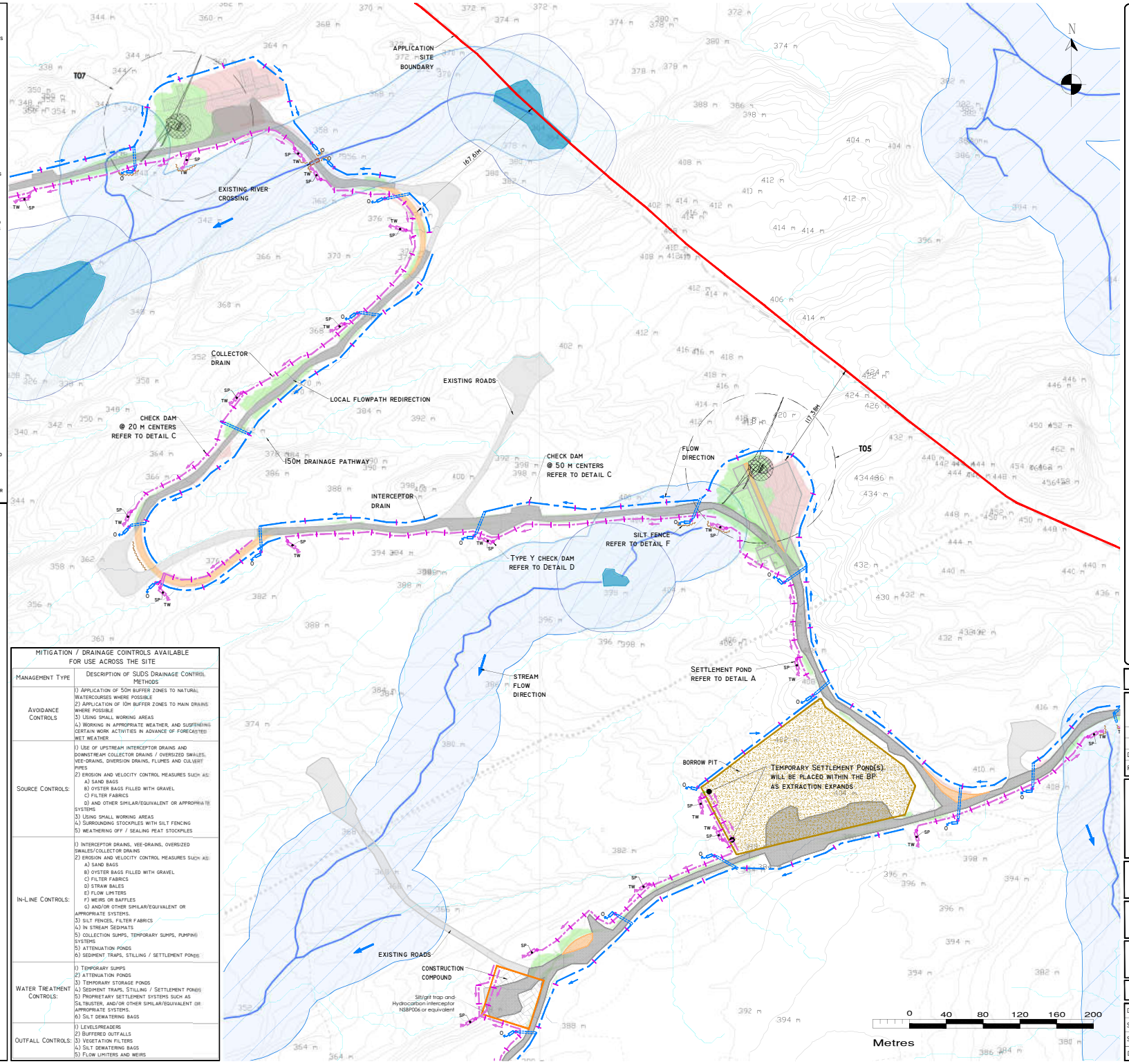

DRAWING LEGEND :

- RIVERS/STREAMS (WC - WATERCOURSE)
- RIVERS/STREAMS 50M BUFFER
- LAKES
- LAKES 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINAGE FLOW PATHWAYS >150M LONG
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- SUBSTATION
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- BORROW PIT
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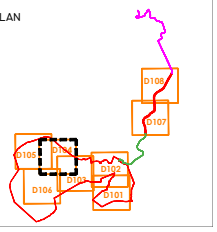
EXISTING DRAINAGE

PROPOSED DRAINAGE

KEY PLAN



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Revisions

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Client: ØRSTED

Job: Proposed Repowering of Kilgarvan Wind Farm, Co. Kerry

Title: Proposed Drainage Layout

Figure No: D104

Drawing No: P1585-0-0524-A1-D104-00C	
Sheet Size: A1	Project No.: P1585-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/05/2024	Checked By: MG

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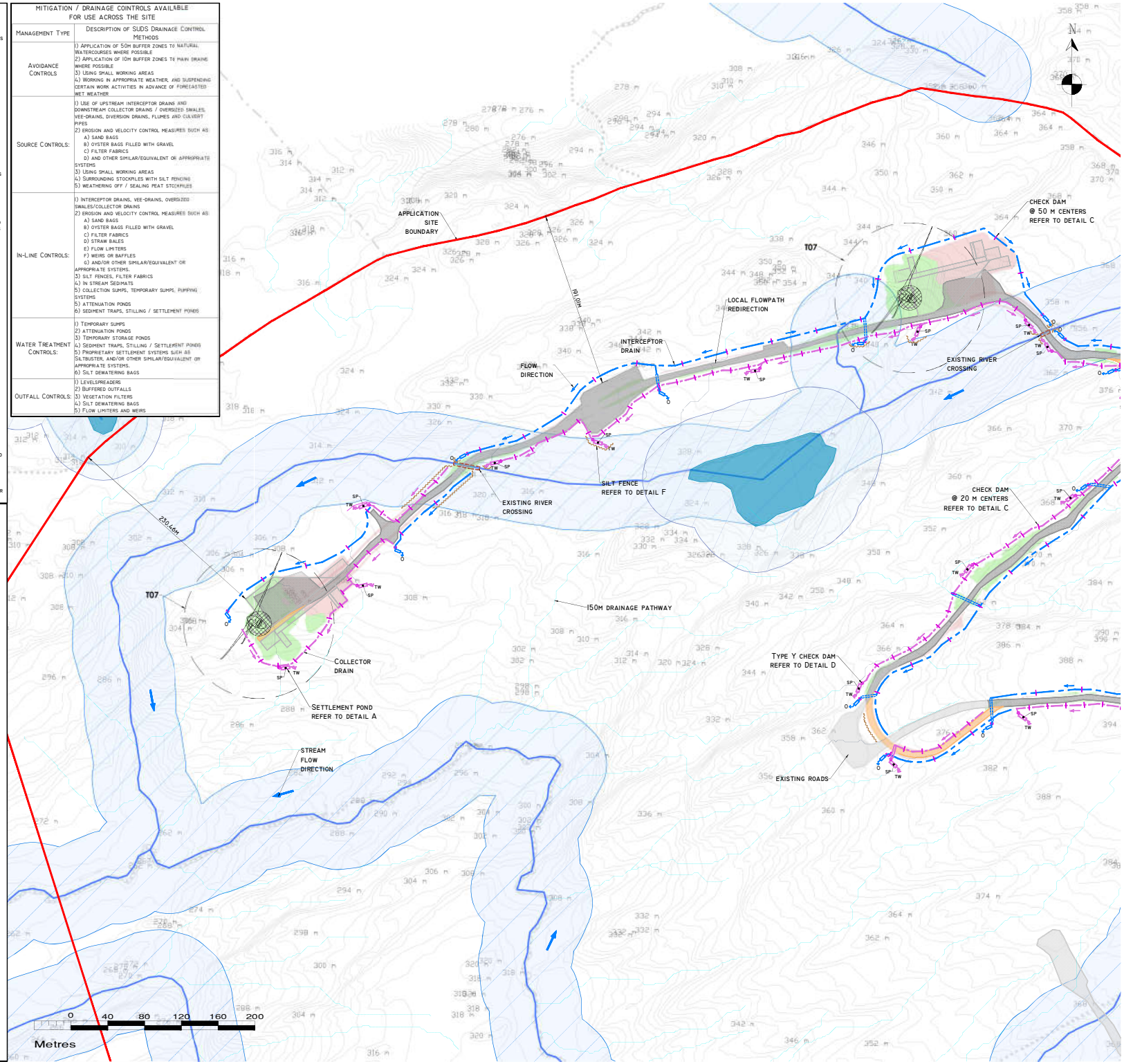
10. Settlement ponds to be constructed for silt removal at turbine bases and hard stand areas. Pond sizes depends on the catchment area being served. Sample pond sizes for various catchment areas shown on Drawing D501.
11. Straw bales / or similar and silt fences to be used also around spoil heaps to mitigate silt runoff. Silt fences may be removed when suitable vegetation cover is established.
12. Silt fences to be provide along edge of existing watercourse where works comes within <15m of edge of any ditch / drain / ephemeral channels.
13. Slopes of the swales / ditches to be vegetated or protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40m check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel should be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

Management Type	Description of SUDS Drainage Control Methods
Avoidance Controls	1) Application of 50m buffer zones to natural watercourses where possible 2) Application of 10m buffer zones to main drains where possible 3) Using small working areas 4) Working in appropriate weather, and suspending certain work activities in advance of forecasted wet weather
Source Controls:	1) Use of upstream interceptor drains and downstream collector drains / oversized swales, vee-drains, diversion drains, flumes and culvert pipes 2) Erosion and velocity control measures such as A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) and other similar/equivalent or appropriate systems 3) Using small working areas 4) Surrounding stockpiles with silt fencing 5) Weathering off / sealing peat stockpiles
In-Line Controls:	1) Interceptor drains, vee-drains, oversized swales/collector drains 2) Erosion and velocity control measures such as A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) Straw bales E) Flow limiters F) Weirs or baffles G) And/or other similar/equivalent or appropriate systems. 3) Silt fences, filter fabrics 4) In stream Sedimats 5) Collection sumps, temporary sumps, pumping systems 5) Attenuation ponds 6) Sediment traps, stilling / settlement ponds
Water Treatment Controls:	1) Temporary sumps 2) Attenuation ponds 3) Temporary storage ponds 4) Sediment traps, Stilling / Settlement ponds 5) Proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems. 6) Silt dewatering bags
Outfall Controls:	1) Levelspreaders 2) Buffered outfalls 3) Vegetation filters 4) Silt dewatering bags 5) Flow limiters and weirs



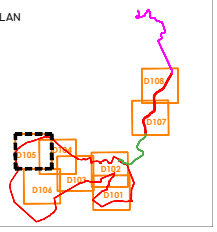
DRAWING LEGEND :

- RIVERS/STREAMS (WC - WATERCOURSE)
- RIVERS/STREAMS 50M BUFFER
- LAKES
- LAKES 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINAGE FLOW PATHWAYS >150M LONG
- LOCAL FLOWPATH REDIRECTION
- UPSTREAM INTERCEPTOR DRAIN
- SWALES/DOWNSTREAM COLLECTOR DRAIN
- DIRECTION OF FLOW
- SILT FENCES
- DOUBLE/TRIPLE SILT FENCES
- SETTLEMENT POND - LEVEL SPREADER
- CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED WC CROSSING
- EXISTING WC CROSSING
- INTERCEPTOR DITCH CULVERT
- COLLECTOR DITCH CULVERT
- O OVERLAND FLOW DISCHARGE
- TW TREATED WATER DISCHARGE
- SP SETTLEMENT POND
- VS SEMI-NATURAL VEGETATION SWALE / FILTER BED /SECONDARY SP
- TEMPORARY PUMPING SUMP (SEE AT TURBINE BASE DURING CONSTRUCTION PHASE)
- APPLICATION SITE BOUNDARY
- EXISTING LEASE BOUCHETTE BOUNDARY
- EXISTING ROW COILTE BOUNDARY
- EXISTING GROUND SURFACE MINOR CONTOUR (2 M INTERVAL)
- TURBINE AND SWEPT AREA
- PROPOSED HARDCORED AREAS
- EXISTING ROADS PROPOSED TO BE UPGRADED
- EXISTING ROADS
- HARDSTAND
- SUBSTATION
- CONSTRUCTION COMPOUND
- BORROW PIT
- CUT AREA
- FILL AREA

EXISTING DRAINAGE

PROPOSED DRAINAGE

KEY PLAN



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Date	Description	Chkd	Signed
Revisions			

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Client: ØRSTED

Job: Proposed Repowering of Kilgarvan Wind Farm, Co. Kerry

Title: Proposed Drainage Layout

Figure No: DI05

Drawing No: P1585-0-0524-A1-D105-00C	
Sheet Size: A1	Project No.: P1585-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/05/2024	Checked By: MG

POLLUTION PREVENTION NOTES:

1. Site management proposals are intended to ensure protection against surface water and groundwater pollution, siltation and erosion.
2. Suitable drainage control measures should be in place at all times to prevent conveyance of significant volumes of silt to off site receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, temporary stockpiles, plant and wheel wash, site roads/tracks, and disturbance of existing field drains and ditches.

Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
5. No excavated material is to be stored within any surface water buffer zone.
6. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge.
7. Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that does not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of splash plates, and other similar discharge controls.
8. Vegetation will not be stripped from existing drains/ditches unless absolutely necessary.

Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

Concrete

15. Care will be taken when completing concrete works on site to ensure no discharges occur.
16. Concrete wash water, and waste concrete will be managed appropriately on site.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

STOP - work in the immediate area should be stopped and the source of the pollution identified.

CONTAIN - the source of the pollution should be bunded using a suitable method. Natural watercourses should be temporarily diverted around the source of pollution.

NOTIFY - The relevant authorities (Site Manager / Fisheries / NPWS / Local Authority etc.) should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.

DRAINAGE NOTES:

1. Site Tracks and Roadway surfacing design and construction to Engineer's Specification (i.e. by others).
2. Spare straw bales/silt fencing/ or similar, to be stored on site. The level of silt in runoff during construction is to be monitored visually and excessive silt levels in any area to be temporarily managed by placing silt fences, straw bales / or similar or additional check dams at the problem areas. Mobile siltbuster system to be available on-site for use as required also.
3. SUDS system to be constructed prior to, or at the same time as the access tracks. Interm measures such as the placement of straw bales/silt fencing/or similar approved method or additional check dams and silt fences to be employed in all instances where work carried out to construct the access tracks is likely to cause adverse environmental effects through increased silt loadings being generated during the construction phase.
4. Suitable prevention measures should be in place at all times to prevent the conveyance of significant volumes of silt to receiving watercourses. See notes on pollution prevention.
5. Interceptor swales / ditches to be used to collect upstream surface water flows. Regular cross drains / discharge to field ditches/drains will be required to transfer / discharge surface water in interceptor drains to suitable field drain outfall points.
6. Drainage swales / ditches to be excavated adjacent to the access tracks. Regular cross drains to be located along access tracks to prevent excessive volumes of water collecting in the swales / ditches. Locations of cross drains to be agreed with the Engineer on site. Surface water will not be allowed to discharge directly into existing watercourses.
7. Where possible, a buffer zone of >20m to any existing watercourse will be required where over land discharges are proposed from access track swales / ditches.
8. Batters of all proposed swales / ditches to have a slope of between 1 : 1.5 to 1 : 2 depending upon depth of swale/ditch and will be left as cut to re-vegetate with local species.
9. Track side swales / ditches to be shallow with moderate gradients to prevent scouring. In steep areas check dams should be installed to reduce flow velocities and provide source control of silt containment. Where necessary these have been designated in conjunction with settlement ponds and silt traps, prior to discharge.
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12. Silt fences to be provide along edge of existing watercourse where works comes within <15m of edge of any ditch / drain / ephemeral channels.
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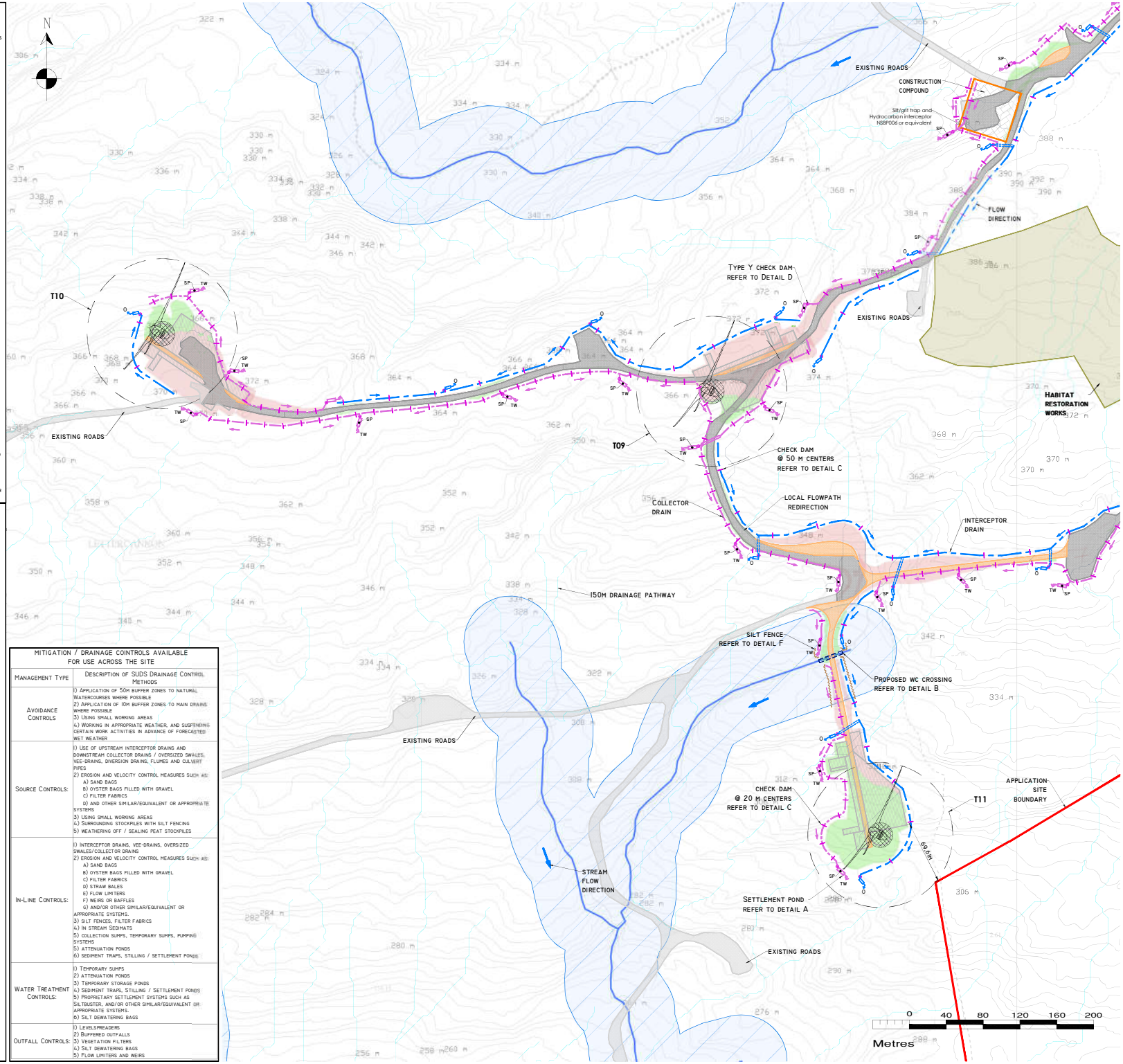
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel should be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.

MITIGATION / DRAINAGE COINTROLS AVAILABLE FOR USE ACROSS THE SITE

Management Type	Description of SUDS Drainage Control Methods
Avoidance Controls	1) Application of 50m buffer zones to natural watercourses where possible 2) Application of 10m buffer zones to main drains where possible 3) Using small working areas 4) Working in appropriate weather, and suspending certain work activities in advance of forecasted wet weather
Source Controls:	1) Use of upstream interceptor drains and downstream collector drains / oversized swales, vee-drains, diversion drains, flumes and culvert pipes 2) Erosion and velocity control measures such as: A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) And other similar/equivalent or appropriate systems 3) Using small working areas 4) Surrounding stockpiles with silt fencing 5) Weathering off / sealing peat stockpiles
In-Line Controls:	1) Interceptor drains, vee-drains, oversized swales/collector drains 2) Erosion and velocity control measures such as: A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) Straw bales E) Flow limiters F) Weirs or baffles G) And/or other similar/equivalent or appropriate systems. 3) Silt fences, filter fabrics 4) In stream Sedimats 5) Collection sumps, temporary sumps, pumping systems 5) Attenuation ponds 6) Sediment traps, stilling / settlement ponds
Water Treatment Controls:	1) Temporary sumps 2) Attenuation ponds 3) Temporary storage ponds 4) Sediment traps, Stilling / Settlement ponds 5) Proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems. 6) Silt dewatering bags
Outfall Controls:	1) Levelspreaders 2) Buffered outfalls 3) Vegetation filters 4) Silt dewatering bags 5) Flow limiters and weirs



DRAWING LEGEND :

- Rivers/Streams (WC - Watercourse)
- Rivers/Streams 50m buffer
- Lakes
- Lakes 50m buffer
- Stream flow direction
- Drainage flow pathways >50m length

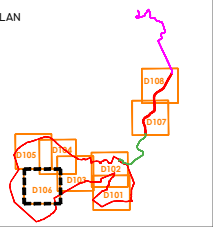
(Existing Drainage)

- Local flowpath redirection
- Upstream interceptor drain
- Swales/Downstream collector drain
- Direction of flow
- Silt fences
- Double/triple silt fences
- Settlement pond - level spreader
- Check dam 'type A'
- Check dam 'type B'
- Proposed WC crossing
- Existing WC crossing
- Interceptor ditch culvert
- Collector ditch culvert
- O Overland flow discharge
- TW Treated water discharge
- SP Settlement pond
- VS Semi-natural vegetation swale / filter bed /secondary SP
- Temporary pumping sump (used at turbine bases during construction phase)

(Proposed Drainage)

- Application site boundary
- Existing lease bouchette boundary
- Existing row coillte boundary
- Existing ground surface minor contour (2 m interval)
- Turbine and swept area
- Proposed hardcored areas
- Existing roads proposed to be upgraded
- Existing roads
- Hardstand
- Substation
- Construction compound
- Borrow pit
- Cut area
- Fill area
- Habitat restoration works

KEY PLAN



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Revisions

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Client: ØRSTED

Job: Proposed Repowering of Kilgarvan Wind Farm, Co. Kerry

Title: Proposed Drainage Layout

Figure No: DI06

Drawing No: P1585-0-0524-A1-D106-00D	
Sheet Size: A1	Project No.: P1585-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/05/2024	Checked By: MG

POLLUTION PREVENTION NOTES:

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Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
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Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

Concrete

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Management Type	Description of SUDS Drainage Control Methods
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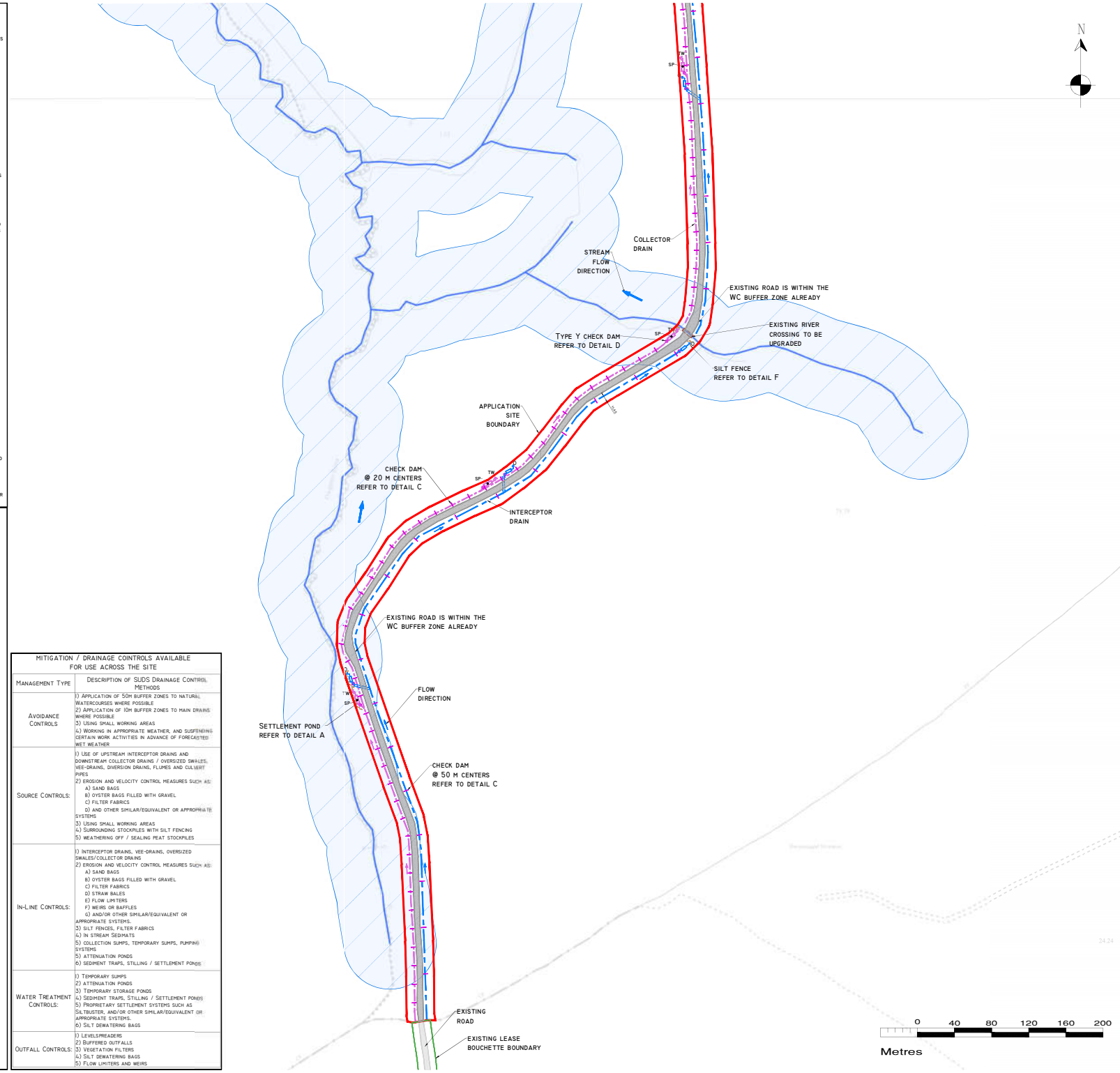

Drawing Legend :

- Rivers/streams (WC - watercourse)
- Rivers/streams 50m buffer
- Stream flow direction
- Upstream Interceptor Drain
- Swales/Downstream Collector Drain
- Direction of Flow
- Silt Fences
- Settlement pond - level spreader
- Check Dam 'type A'
- Check Dam 'type B'
- Existing WC crossing
- Interceptor Ditch Culvert
- Collector Ditch Culvert
- O Overland Flow Discharge
- TW Treated Water Discharge
- SP Settlement Pond
- VS Semi-Natural Vegetation Swale / Filter Bed /Secondary SP
- Pumping Sump
- Application Site Boundary
- Existing Lease Bouchette Boundary
- Existing ROW Coillte Boundary
- Existing Roads
- Existing Roads Proposed to be Upgraded

Existing Drainage

Proposed Drainage

KEY PLAN

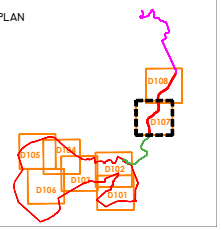

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Figure No: DI07

Drawing No: P1585-0-0524-A1-D107-00C	
Sheet Size: A1	Project No.: P1585-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/05/2024	Checked By: MG

POLLUTION PREVENTION NOTES:

1. Site management proposals are intended to ensure protection against surface water and groundwater pollution, siltation and erosion.
2. Suitable drainage control measures should be in place at all times to prevent conveyance of significant volumes of silt to off site receiving watercourses.
3. Silty water can arise from dewatering excavations, erosion of exposed/disturbed ground, temporary stockpiles, plant and wheel wash, site roads/tracks, and disturbance of existing field drains and ditches.

Discharges

4. Water containing silt will not be pumped directly to any natural watercourse. All discharges to be made over open ground or into existing field drain with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated.
5. No excavated material is to be stored within any surface water buffer zone.
6. Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge.
7. Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that does not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of splash plates, and other similar discharge controls.
8. Vegetation will not be stripped from existing drains/ditches unless absolutely necessary.

Excavations

9. Where deep excavations are proposed cut-off drains will be use to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.

Exposed Ground & Stockpiles

10. The amount of exposed ground and temporary stockpiles open at any one time will be minimised, as far as practicable.

Site tracks

11. Use of track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required.
12. Check dams to be inspected and cleaned regularly.

Refueling

13. Refuelling of mobile plant will be completed in designated refueling areas only, preferably on an impermeable surface and away from field drains / ditches and watercourses / waterbodies.
14. Spill kits and drip trays will be available on site for use as required.

Concrete

15. Care will be taken when completing concrete works on site to ensure no discharges occur.
16. Concrete wash water, and waste concrete will be managed appropriately on site.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

STOP - work in the immediate area should be stopped and the source of the pollution identified.

CONTAIN - the source of the pollution should be bunded using a suitable method. Natural watercourses should be temporarily diverted around the source of pollution.

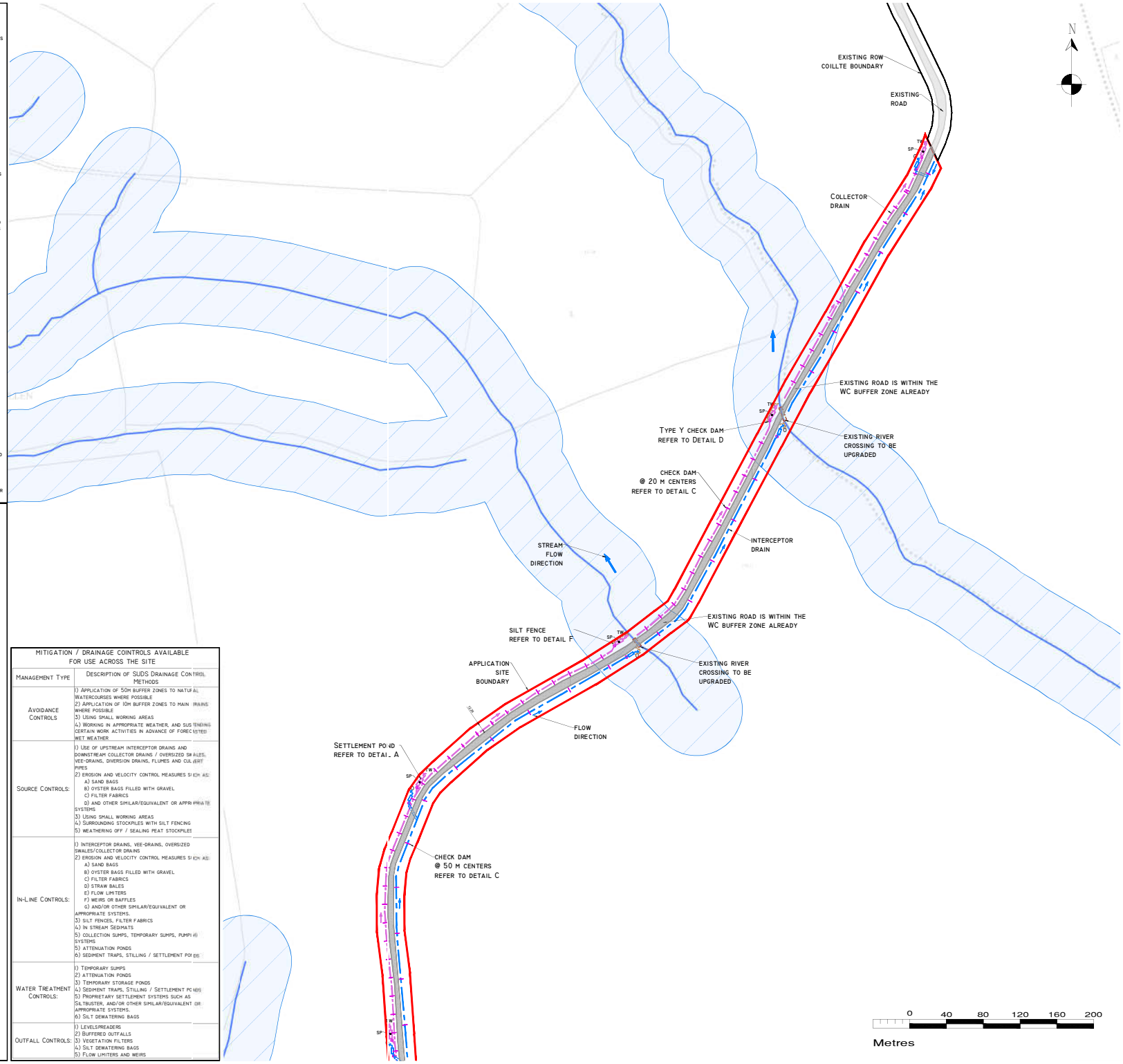
NOTIFY - The relevant authorities (Site Manager / Fisheries / NPWS / Local Authority etc.) should be notified immediately to ensure that measures can be implemented downstream to protect fisheries and other sensitive areas.

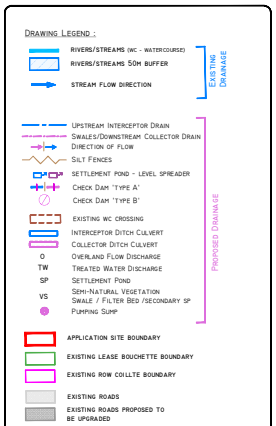
DRAINAGE NOTES:

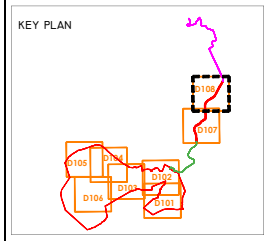
1. Site Tracks and Roadway surfacing design and construction to Engineer's Specification (i.e. by others).
2. Spare straw bales/silt fencing/ or similar, to be stored on site. The level of silt in runoff during construction is to be monitored visually and excessive silt levels in any area to be temporarily managed by placing silt fences, straw bales / or similar or additional check dams at the problem areas. Mobile siltbuster system to be available on-site for use as required also.
3. SUDS system to be constructed prior to, or at the same time as the access tracks. Interm measures such as the placement of straw bales/silt fencing/or similar approved method or additional check dams and silt fences to be employed in all instances where work carried out to construct the access tracks is likely to cause adverse environmental effects through increased silt loadings being generated during the construction phase.
4. Suitable prevention measures should be in place at all times to prevent the conveyance of significant volumes of silt to receiving watercourses. See notes on pollution prevention.
5. Interceptor swales / ditches to be used to collect upstream surface water flows. Regular cross drains / discharge to field ditches/drains will be required to transfer / discharge surface water in interceptor drains to suitable field drain outfall points.
6. Drainage swales / ditches to be excavated adjacent to the access tracks. Regular cross drains to be located along access tracks to prevent excessive volumes of water collecting in the swales / ditches. Locations of cross drains to be agreed with the Engineer on site. Surface water will not be allowed to discharge directly into existing watercourses.
7. Where possible, a buffer zone of >20m to any existing watercourse will be required where over land discharges are proposed from access track swales / ditches.
8. Batters of all proposed swales / ditches to have a slope of between 1 : 1.5 to 1 : 2 depending upon depth of swale/ditch and will be left as cut to re-vegetate with local species.
9. Track side swales / ditches to be shallow with moderate gradients to prevent scouring. In steep areas check dams should be installed to reduce flow velocities and provide source control of silt containment. Where necessary these have been designated in conjunction with settlement ponds and silt traps, prior to discharge.
10. Settlement ponds to be constructed for silt removal at turbine bases and hard stand areas. Pond sizes depends on the catchment area being served. Sample pond sizes for various catchment areas shown on Drawing D501.
11. Straw bales / or similar and silt fences to be used also around spoil heaps to mitigate silt runoff. Silt fences may be removed when suitable vegetation cover is established.
12. Silt fences to be provide along edge of existing watercourse where works comes within <15m of edge of any ditch / drain / ephemeral channels.
13. Slopes of the swales / ditches to be vegetated or protected from erosion until vegetation has been established. Stripped vegetative layer (peat 'sod' or 'scraw') from excavations to be stored locally and used to line slopes and base of swales / ditches or longitudinal mounds of vegetation swales at field drain discharge points.
14. Areas stripped of vegetation should be kept to a minimum.
15. Clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile.
16. Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt.
17. Spacing and frequency of check dams will be dependent upon longitudinal gradient of swale.
18. Location of filtration check dams (if required) to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond.
19. Oil fuel should be stored within bunded containment structures.
20. Silt bags will be used on site at field drain discharge locations, as necessary.

MITIGATION / DRAINAGE COINTROLS AVAILABLE FOR USE ACROSS THE SITE

Management Type	Description of SUDS Drainage Control Methods
Avoidance Controls	1) Application of 50m buffer zones to natural watercourses where possible 2) Application of 10m buffer zones to main drains where possible 3) Using small working areas 4) Working in appropriate weather, and suspending certain work activities in advance of forecasted wet weather
Source Controls:	1) Use of upstream interceptor drains and downstream collector drains / oversized swales, vee-drains, diversion drains, flumes and culvert pipes 2) Erosion and velocity control measures such as: A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) And other similar/equivalent or appropriate systems 3) Using small working areas 4) Surrounding stockpiles with silt fencing 5) Weathering off / sealing peat stockpiles
In-Line Controls:	1) Interceptor drains, vee-drains, oversized swales/collector drains 2) Erosion and velocity control measures such as: A) Sand bags B) Oyster bags filled with gravel C) Filter fabrics D) Straw bales E) Flow limiters F) Weirs or baffles G) And/or other similar/equivalent or appropriate systems. 3) Silt fences, filter fabrics 4) In stream Sedimats 5) Collection sumps, temporary sumps, pumping systems 5) Attenuation ponds 6) Sediment traps, stilling / settlement pods
Water Treatment Controls:	1) Temporary sumps 2) Attenuation ponds 3) Temporary storage ponds 4) Sediment traps, Stilling / Settlement Ponds 5) Proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems. 6) Silt dewatering bags
Outfall Controls:	1) Levelspreaders 2) Buffered outfalls 3) Vegetation filters 4) Silt dewatering bags 5) Flow limiters and weirs







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4. All dimensions are in metres.

Date	Description	Chkd	Signed

Revisions

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Client: ØRSTED

Job: Proposed Repowering of Kilgarvan Wind Farm, Co. Kerry

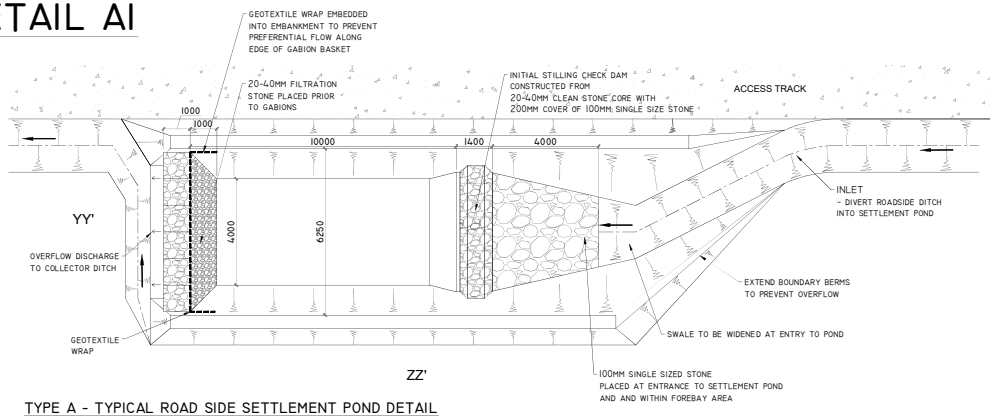
Title: Proposed Drainage Layout

Figure No: DI08

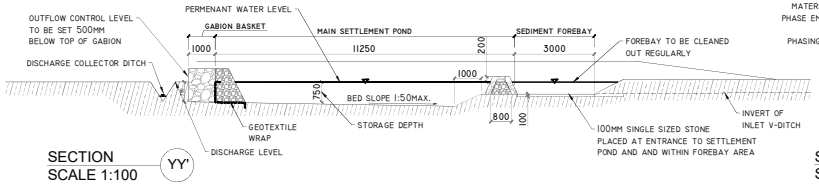
Drawing No: P1585-0-0524-A1-D108-00C	
Sheet Size: A1	Project No.: P1585-0
Scale: 1:2,000 (A1)	Drawn By: GA
Date: 07/05/2024	Checked By: MG

0 40 80 120 160 200
Metres

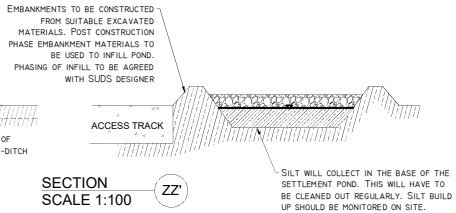
DETAIL AI



TYPE A - TYPICAL ROAD SIDE SETTLEMENT POND DETAIL
SCALE 1:200 (NOTE DIMENSIONS VARY DEPENDING ON CATCHMENT SIZE - SEE ATTACHED TABLE)



SECTION YY' SCALE 1:100



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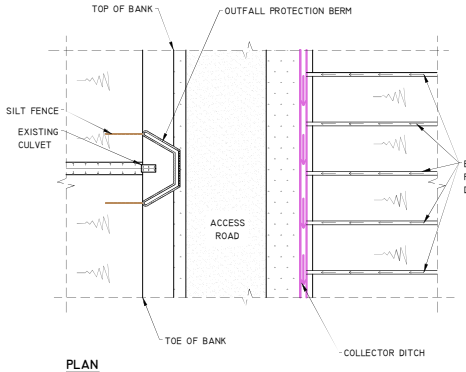
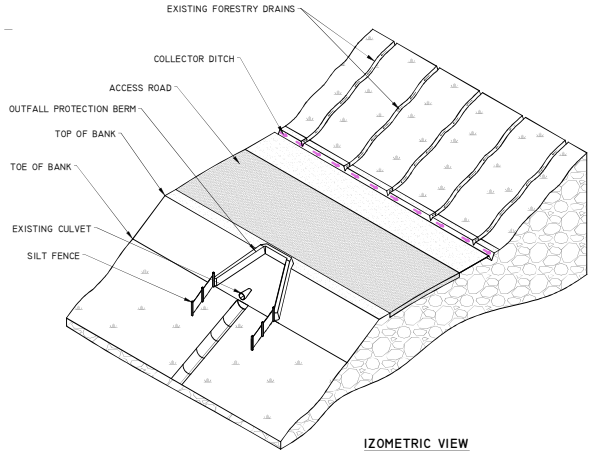
DETAIL BI



PLAN

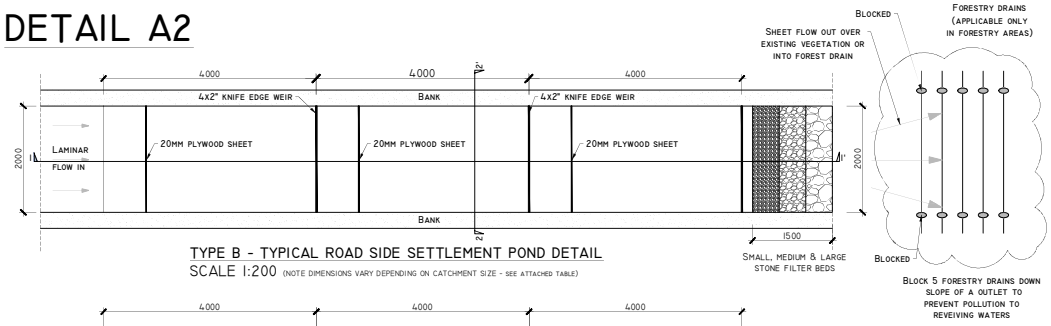
CULVET - OUTFALL PROTECTION DETAIL



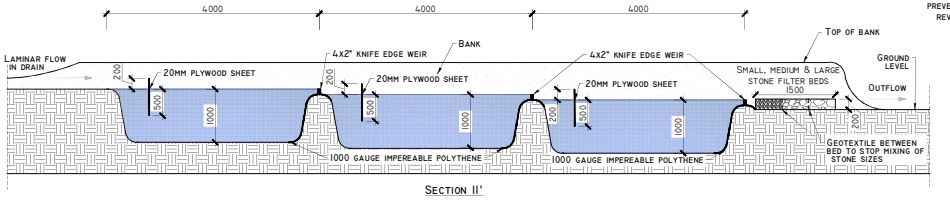
IZOMETRIC VIEW

SCHEMATIC - NOT TO SCALE

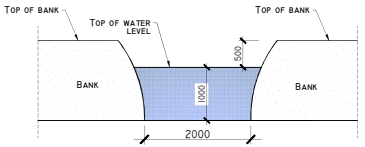
DETAIL A2



TYPE B - TYPICAL ROAD SIDE SETTLEMENT POND DETAIL
SCALE 1:200 (NOTE DIMENSIONS VARY DEPENDING ON CATCHMENT SIZE - SEE ATTACHED TABLE)

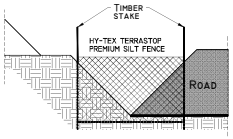


SECTION II'



SECTION 22'

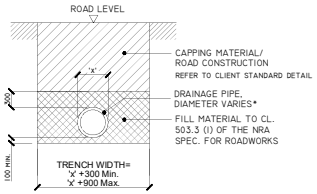
SEDIMENT FENCE/CHECK DAM DETAIL



POND SIZE W [M] x L [M] x D [M]			TRACK/HARDSTAND CATCHMENT SIZE (M²)			BORROW PIT (M³)*
RETURN PERIOD	10 YRS	STORM DURATION	500	1000	2000	22609
6HR RETENTION FOR COARSE SILT		6 HRS	3.8 x 12.0 x 1 M	5.5 x 16.5 x 1 M	7.5 x 24.5 x 1 M	N/A
11HR RETENTION FOR MEDIUM SILT		12 HRS	4.5 x 14.0 x 1 M	6.5 x 19.2 x 1 M	8.5 x 29.5 x 1 M	N/A
24HR RETENTION FOR FINE SILT		24 HRS	5.2 x 16.5 x 1 M	7.5 x 23 x 1 M	10 x 34.5 x 1 M	50 x 175 x 1 M**

*INCLUDES GW INFLOW
**COMBINATIONS OF 2 OR 3 SMALLER PONDS MAY BE USED

DETAIL B



'TYPE B' CULVERT - DRAINAGE CROSSING BENEATH EXCAVATED ROAD
SCALE 1:50

*WHERE SECTION 50 APPLIES, MINIMUM PIPE DIA WILL BE 900MM, WITH MIN 300MM PIPE EMBEDMENT

Date	Description	Chkd	Signed
07/02/24	Planning	MG	MG

Revisions

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Client: ØRSTED

Job: PROPOSED REPOWERING OF KILGARVAN WIND FARM, CO. KERRY

Title: DRAINAGE DETAILS 1

Figure No: D501

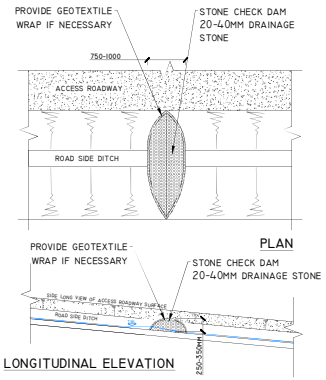
Drawing No: P1585-0-0224-A1-D501-00A

Sheet Size: A1 | Project No.: P1585-0

Scale: as shown (A1) | Drawn By: MG/GA

Date: 07/02/2024 | Checked By: MG

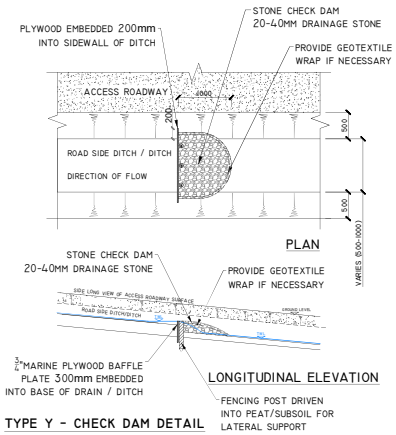
DETAIL C



TYPE X - CHECK DAM DETAIL

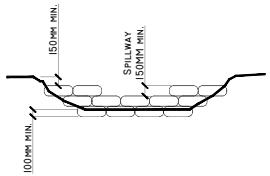
SCALE 1:50

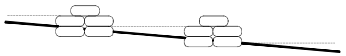
DETAIL D



TYPE Y - CHECK DAM DETAIL

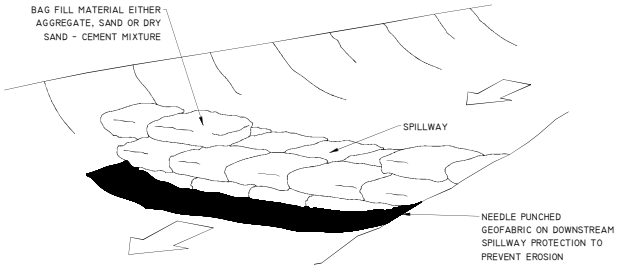
SCALE 1:100





NOTE: SPACING OF CHECK DAMS ALONG CENTRELINE AND SCOUR PROTECTION BELOW EACH CHECK DAM

DETAIL CI



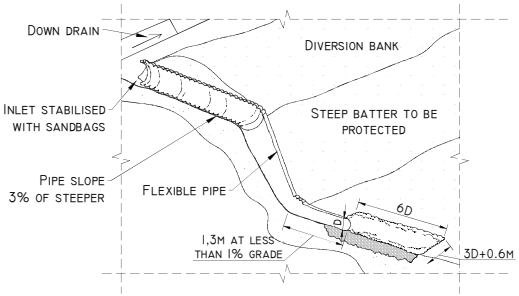
TEMPORARY CHECK DAM / SETTLEMENT POND OVERFLOW
SAND FILLED BAG CONSTRUCTION

SCHEMATIC - NOT TO SCALE

DETAIL G

TYPICAL PIPE SPILLWAY DETAIL

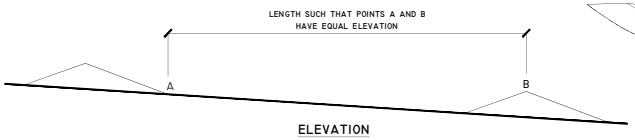
SCHEMATIC - NOT TO SCALE

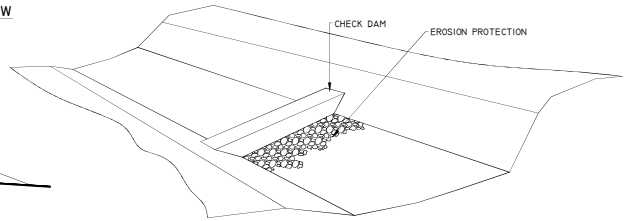


DETAIL C2

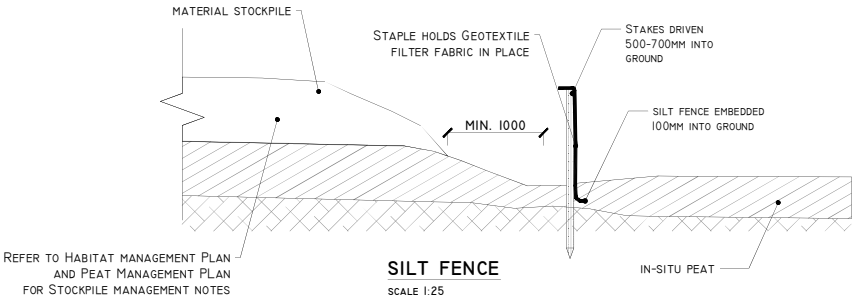
TEMPORARY CHECK DAM / SETTLEMENT POND OVERFLOW

SCHEMATIC - NOT TO SCALE





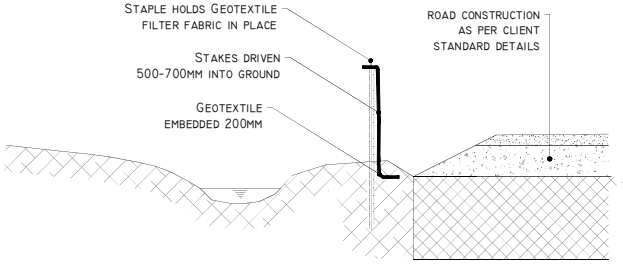
DETAIL F-I



SILT FENCE

SCALE 1:25

DETAIL F-II



SILT FENCE FOR WATERCOURSE PROTECTION

SCALE 1:25

Date	Description	Chkd	Signed
07/02/24	Planning	MG	MG

Revisions

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Job: PROPOSED REPOWERING OF KILGARVAN WIND FARM, CO. KERRY

Title: DRAINAGE DETAILS 2

Figure No: D502

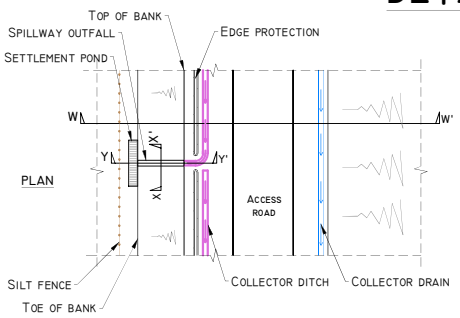
Drawing No: P15850-0224-A1-D502-00A

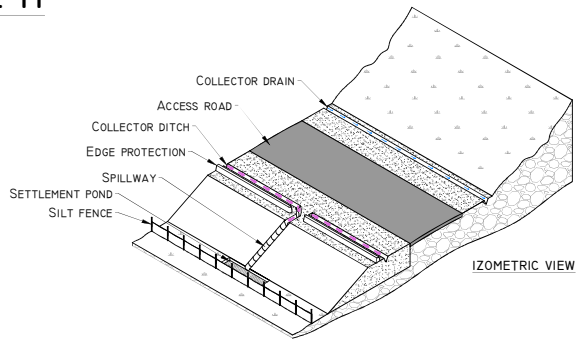
Sheet Size: A1 | Project No.: P1585-0

Scale: as shown (A1) | Drawn By: MG/GA

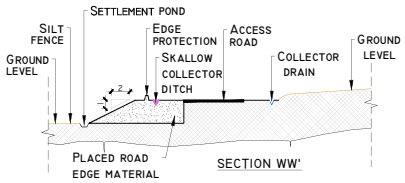
Date: 07/02/2024 | Checked By: MG

DETAIL H



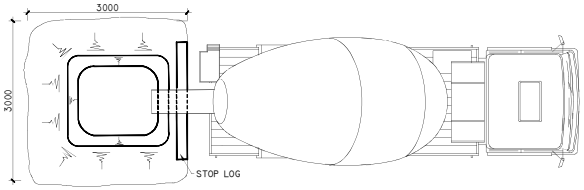


SPILLWAY OUTFALL PLAN
SCHEMATIC - NOT TO SCALE



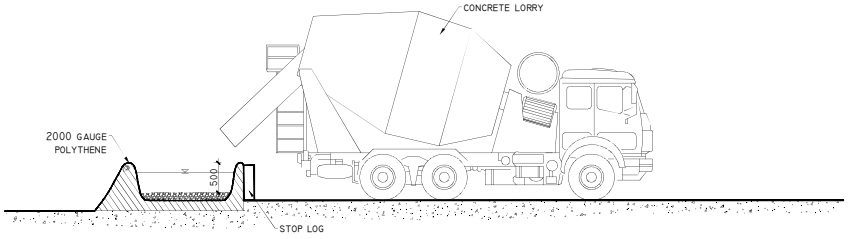
TEMPORARY CONCRETE WASH OUT PIT
SCALE 1:50

PLAN



ELEVATION

DETAIL I



DETAIL J-1

LEVEL SPREADER DETAIL
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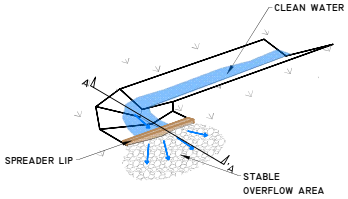
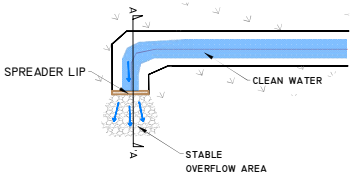
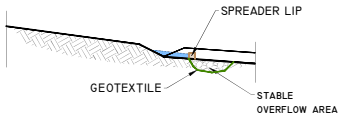


PLAN



SECTION AA'



DETAIL J-2

LEVEL SPREADER DETAIL
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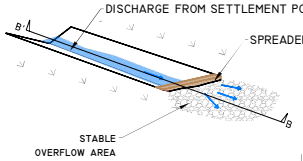
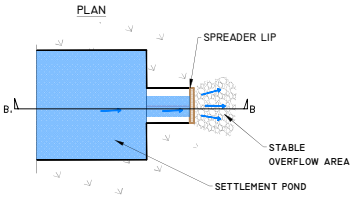


PLAN



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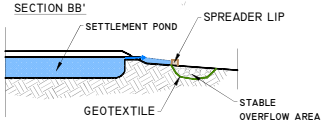

Date	Description	Chkd	Signed
07/02/24	Planning	MG	MG

Revisions

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Client: ØRSTED

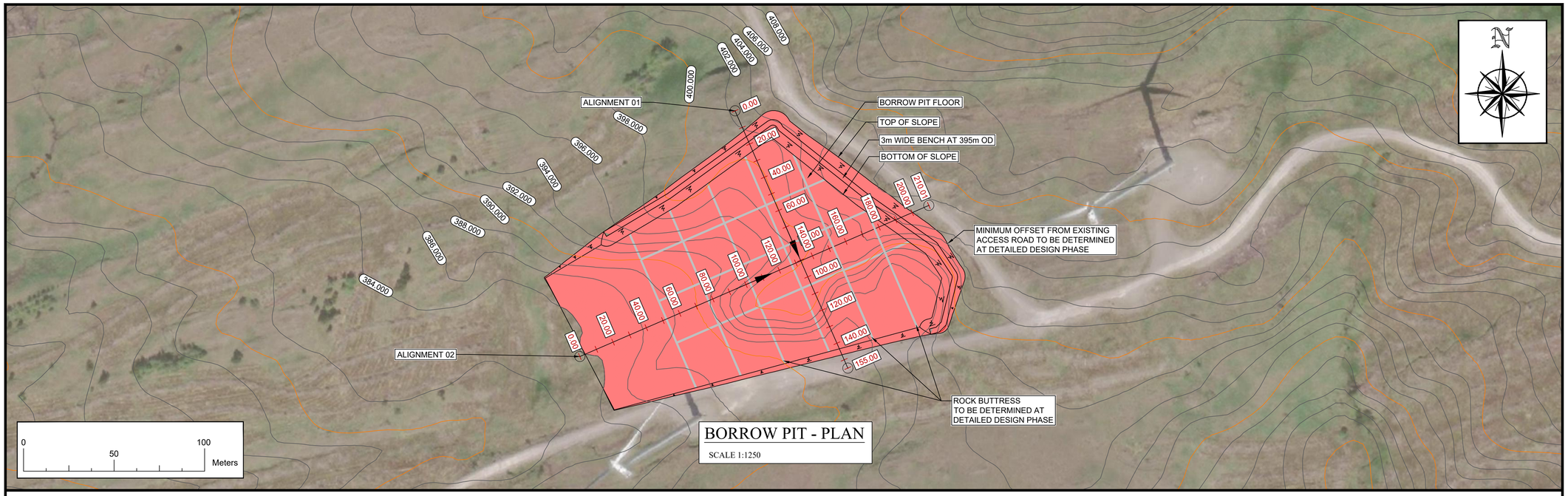
Job: PROPOSED REPOWERING OF KILGARVAN WIND FARM, CO. KERRY

Title: DRAINAGE DETAILS 3

Figure No: D503

Drawing No: P1585-0-0124-A1-D503-00A

Sheet Size: A1	Project No.: P1585-0
Scale: as shown (A1)	Drawn By: MG/GA
Date: 07/02/2024	Checked By: MG

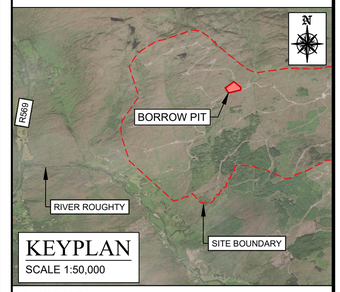


BORROW PIT - PLAN

SCALE 1:1250

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED
2. USE DIMENSIONS ON DRAWINGS (DO NOT SCALE FROM DRAWINGS).
3. EXISTING GROUND LEVEL ARE BASED ON DTM 5m BLUESKY 2018 CONTOURS 2m.
4. PLAN SHOWS BORROW PIT EXCAVATION ONLY.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS DRAWINGS AND SPECIFICATIONS.
6. THE OUTLINE AND CROSS SECTIONS ARE INDICATIVE AND ARE SUBJECT TO DETAILED DESIGN AND SLOPE STABILITY ASSESSMENT.
7. ENGINEERED ROCK BUTTRESS MAY BE LEFT IN-SITU TO RESTRAIN CELLS OF PLACED PEAT AND OVERBURDEN.
8. EXCAVATION SHOULD BE OPTIMISED TO AVOID AREAS OF DEEPER PEAT.
9. IN-SITU ROCK SLOPE SHALL BE FORMED AT STABLE INCLINATIONS TO SUIT LOCAL ROCK CONDITIONS AND SUBJECT TO DETAILED DESIGN.
10. GEOGRID TO BE PLACED TO STRENGTHEN SURFACE OF PLACED PEAT & SPOIL, AS REQUIRED.
11. THE LOCATION OF THE ROCK BUTTRESSES SHOWN FOR THE BORROW AREAS ARE INDICATIVE ONLY AND SUBJECT TO DETILED DESIGN.
12. THE EXCAVATABILITY OF THE ROCK AND DEPTH TO TOP OF ROCK WITHIN THE BORROW PIT WILL NEED TO BE DETERMINED FROM FURTHER CONFIRMATORY GROUND INVESTIGATION.
13. REINSTATEMENT OF PEAT TO BE CARRIED OUT IN LINE WITH 22022-R-02-PMP-00 PEAT MANAGEMENT PLAN .
14. EXCAVATION TECHNIQUES TO BE CONFIRMED FOLLOWING GROUND INVESTIGATION.
15. GEOGRID REINFORCEMENT TO BE LAID NEAR SURFACE TO MAXIMISE STABILITY FOR SURFACE LAYER.
16. BORROW PIT ACCESS AND DRAINAGE PROVISIONS (UP SLOPE CUT OFF DRAINS ETC.) TO BE DETERMINED THROUGH DETAILED DESIGN.



KEYPLAN

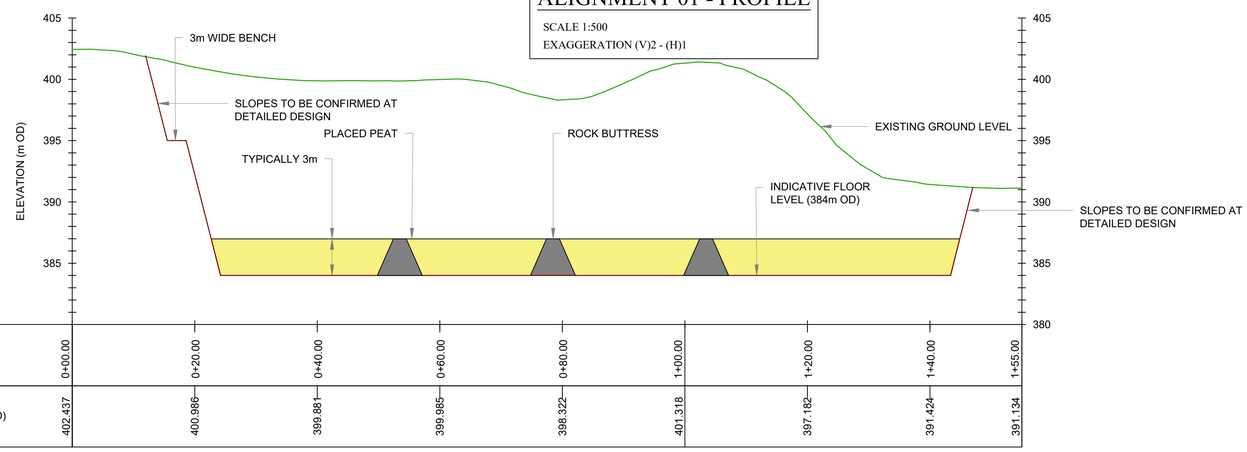
SCALE 1:50,000

LEGEND:

BORROW PIT CUT AREA
(ESTIMATED VOLUME = 207,379 m³)

ALIGNMENT 01 - PROFILE

SCALE 1:500
EXAGGERATION (V)2 - (H)1



CHAINAGE (m)	0+00.00	0+20.00	0+40.00	0+60.00	0+80.00	1+00.00	1+20.00	1+40.00	1+55.00
EXISTING LEVELS (m OD)	402.437	400.986	399.881	399.985	398.322	401.318	397.182	391.424	391.134

ALIGNMENT 02 - PROFILE

SCALE 1:500
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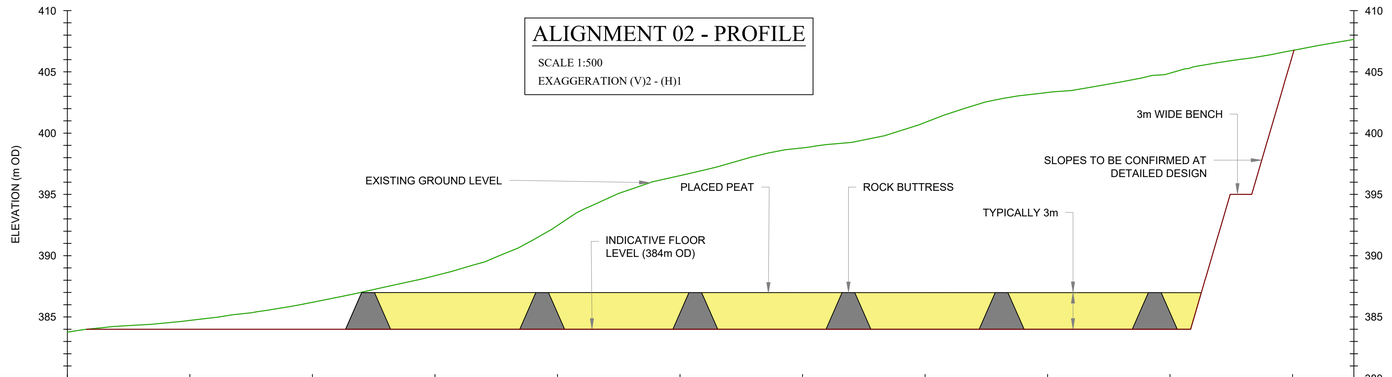

CHAINAGE (m)	0+00.00	0+20.00	0+40.00	0+60.00	0+80.00	1+00.00	1+20.00	1+40.00	1+60.00	1+80.00	2+00.00	2+10.00
EXISTING LEVELS (m OD)	383.762	384.719	386.196	388.371	392.464	396.536	398.796	400.872	403.320	404.896	406.746	407.638

DRAFT

INDICATIVE DESIGN ONLY, ELEMENTS OF DESIGN MAY NEED TO BE REVISED OR FURTHER DEVELOPED. PLEASE CHECK WITH DESIGN ENGINEER INITIALED IN TITLEBLOCK PRIOR TO REFERRING TO INFORMATION WITHIN THIS DRAWING.

REV:	FI -01	DATE:	30/11/23	DRAWN BY:	E.F.C.	CHECKED BY:	C.E.
DESCRIPTION:	UPDATED BORROW PIT LEVELS AND SLOPES						
REV:	FI -00	DATE:	24/10/22	DRAWN BY:	J.F.G	CHECKED BY:	S.C.
DESCRIPTION:	ISSUED FOR INFORMATION						

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ISSUED AS: FOR INFORMATION

CLIENT: MKO

PROJECT TITLE: KILGARVAN WIND FARM REPOWERING

DRAWING No: 22022-GDG-ZZ-XX-DR-C-0001

Revision: -FI -01

DRAWING TITLE: BORROW PIT PLAN AND SECTIONS

SCALE:	SHOWN	SHEET SIZE:	A1	DATE:	24/10/2022
DRAWN BY:	J.F.G	CHECKED BY:	S.C.	APPROVED BY:	J.O'D

APPENDIX F:

Proposed Decommissioning Plan

APPENDIX 4-5

DECOMMISSIONING PLAN

Appendix 4-5 Decommissioning Plan

Proposed Repowering of the Existing Kilgarvan Wind Farm, Co. Kerry

DOCUMENT DETAILS

Client:	**Orsted Onshore Ireland Midco Ltd**
Project Title:	**Proposed Repowering of the Existing Kilgarvan Wind Farm, Co. Kerry**
Project Number:	**211107**
Document Title:	**Appendix 4-5 Decommissioning Plan**
Document File Name:	**Decommissioning Plan - F - 2024.05.01 - 211107**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Draft	12/04/2023	NMcH	ÓM
01	Final	01/05/2024	NMcH	ÓM

Table of Contents

TABLE OF TABLES

TABLE OF FIGURES

1. INTRODUCTION

The Decommissioning Plan (DP) has been prepared by MKO on behalf of Orsted Onshore Ireland Midco Ltd (Orsted) for the decommissioning of the Proposed Repowering of the Existing Kilgarvan Wind Farm development and relevant infrastructure which is hereafter referred to as the 'Proposed Development'. This document has been prepared, to accompany an Environmental Impact Assessment Report (EIAR), as part of an application for planning permission for the Proposed Development to An Bord Pleanála. Decommissioning of the Proposed Development will be scheduled to take place after the proposed 35-year lifespan of the project. This DP provides the environmental management framework to be adhered to during the decommissioning phase of the Proposed Development and it incorporates the mitigating principles to ensure that the work is carried out in a way that minimises the potential for any environmental impacts to occur.

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 approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to 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'.*

In this regard, this DP will be reviewed and updated prior to commencement of any decommissioning works to take account of the relevant conditions of the planning permission and current health and safety standards. The DP will be agreed in writing with the Planning Authority prior to the commencement of the decommissioning phase.

1.1 Scope of the Decommissioning Plan

This document is presented as a plan for the decommissioning of the Proposed Development. Where the term 'site' is used in the DP it refers to the site of the Proposed Development and all works associated with the Proposed Development including the enabling works. The DP clearly outlines the mitigation measures and monitoring proposals that are required to be adhered to in order to complete the works in an appropriate manner.

The report is divided into eight sections, as outlined below:

Section 1 provides a brief introduction as to the scope of the report

Section 2 outlines the site and project details, detailing the targets and objectives of this plan along with providing an overview of works methodologies that will be adopted throughout decommissioning.

Section 3 sets out details of the environmental controls to be implemented on site including the mechanisms for implementation. A waste management plan is also included in this section.

Section 4 outlines the Emergency Response Procedure to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

Section 5 sets out a programme for the timing of the works

Section 6 consists of a summary table of all mitigation measures to be adhered to during the decommissioning phase.

Section 7 outlines the proposals for reviewing compliance with the provisions of this report.

2. SITE AND PROJECT DETAILS

2.1 Site Location and Description

The Proposed Development site is used for wind energy, low-intensity agriculture and commercial forestry. The Proposed Development is located within the townlands of Inchincoosh, Lettercannon, Inchee, Coomacullen and Cloonkeen in Co. Kerry. The site is located approximately 5.5km northeast of the village of Kilgarvan Co. Kerry, and approximately 6km west of Coolea, Co. Cork. The site location is shown in Figure 2-1.

Access to and egress from the site, for Heavy Goods Vehicles (HGVs) and abnormal loads (e.g. turbine components) will be via the existing site entrance off the N22 at Cloonkeen to the northeast of the site. Within the site itself, there is a vast road network already existing which will be used to facilitate the Proposed Development.

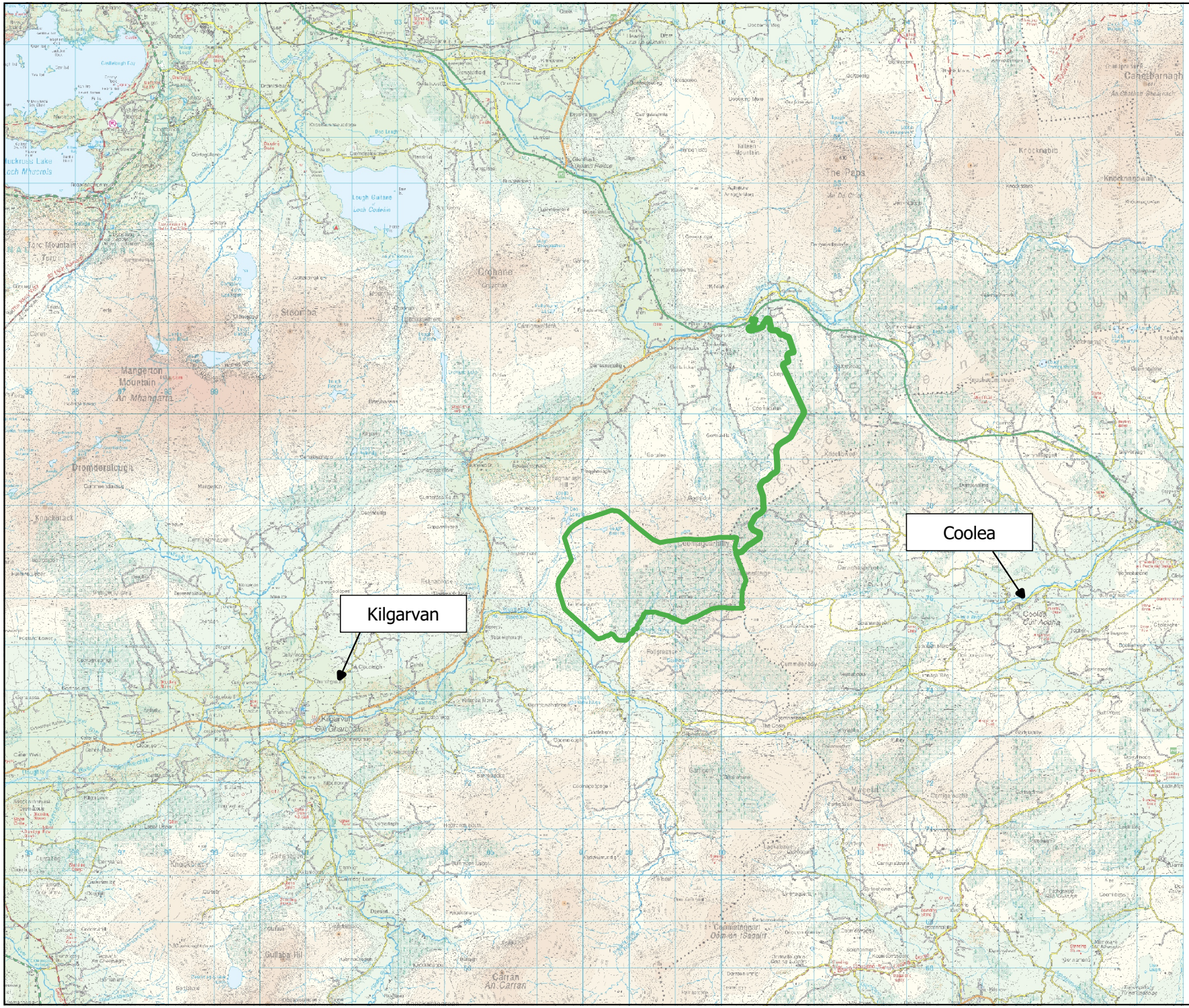
It is proposed to connect the development to the national electricity grid via the existing onsite Coomagearlahy 110kV electrical substation. The onsite substation is connected to the existing Clonkeen 110kV substation via an overhead line. It is not proposed to alter this grid connection in order to facilitate the Proposed Development. There are minor upgrades proposed to the existing onsite Coomagearlahy 110kV electrical substation in order to facilitate the connection of the Proposed Development. The onsite grid connection is currently, and will remain, under the ownership of the ESB on decommissioning of the wind farm. This grid connection forms a permanent part of the national electricity grid.

2.2 Description of the Development

This section describes the Proposed Development. A full description of the Proposed Development is provided in Chapter 4: Description of the Proposed Development.

This application seeks a ten-year permission and a 35-year operational life from the date of full commissioning of the Proposed Development.

The Proposed Development site location is illustrated on Figure 2-1 below, with the full Proposed Development layout being illustrated on Figure 2-2 below.



Map Legend

EIAR Site Boundary

Drawing Title

Site Location

Project Title: Proposed Repowering of the Existing Kilgarvan Wind Farm	
Drawn By: EL	Checked By: NMcH
Project No.: 211107	Drawing No.: Figure 2-1
Scale: 1:110,000	Date: 2024-04-12

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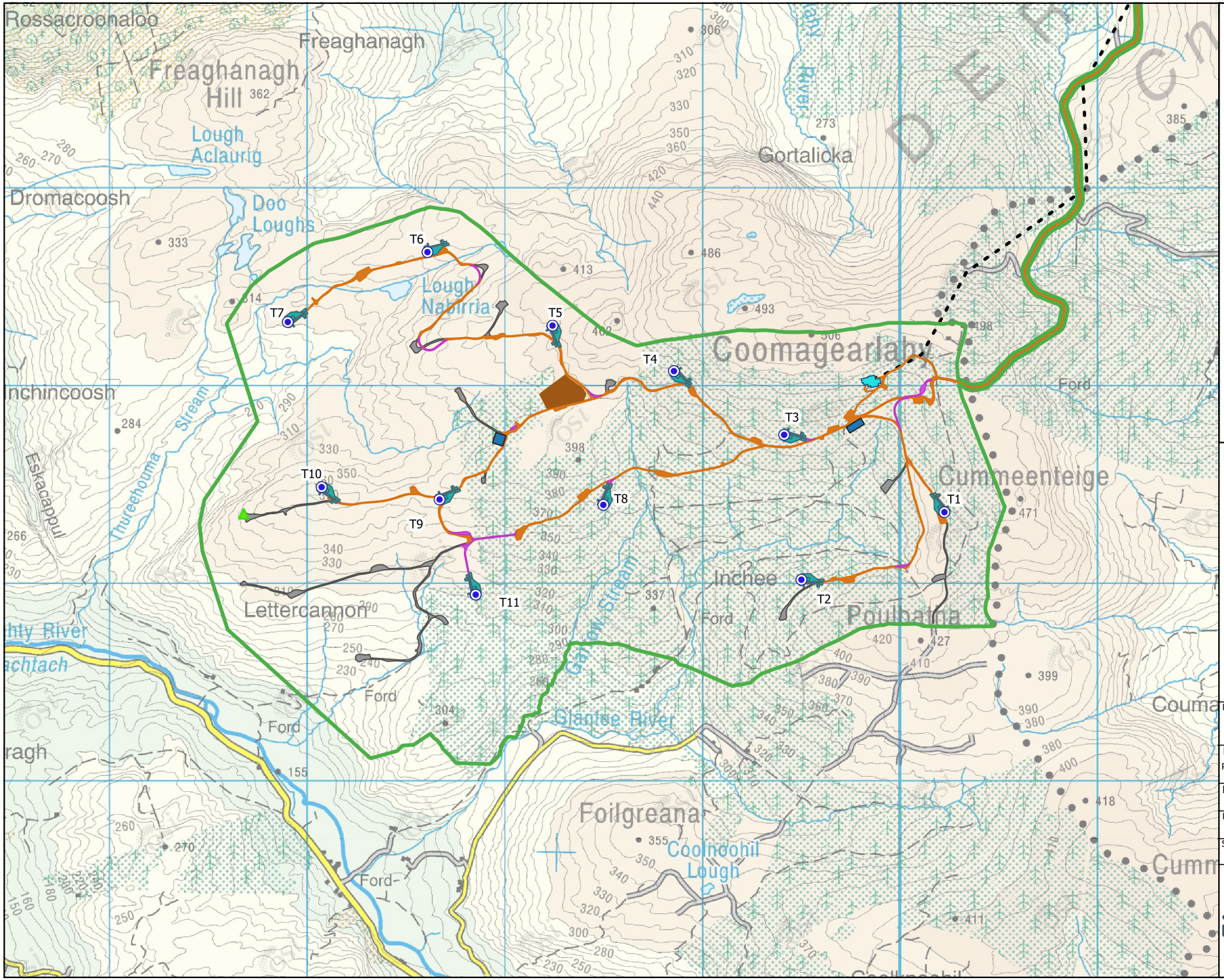

Drawing Title
Proposed Development Layout Wind Farm

Project Title
Proposed Repowering of the Existing Kilgarvan Wind Farm

Drawn By	Checked By
EL	NMcH
Project No.	Drawing No.
211107	Figure 2-2
Scale	Date
1:25,000	2024-04-15

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2.3 Targets and Objectives

The decommissioning phase works will be completed to the approved standards at the time of decommissioning, which include specified materials, standards, specifications and codes of practice. The decommissioning plan has considered environmental issues and this is enhanced by the works proposals as part of decommissioning.

The key site targets are as follows:

- Ensure decommissioning works and activities are completed in accordance with mitigation and best practice approach presented in the accompanying Environmental Impact Assessment Report (EIAR) and associated planning documentation.
- Ensure decommissioning works and activities have an imperceptible impact/disturbance to local landowners and the local community.
- Ensure decommissioning works and activities have an imperceptible impact on the natural environment.
- Adopt a sustainable approach to decommissioning; and
- Provide adequate environmental training and awareness (to the approved standards at the time of decommissioning) for all project personnel.

The key site objectives are as follows:

- Using recycled materials if possible, e.g. soil and overburden material for backfilling and reinstatement.
- Ensure sustainable sources for materials supply where possible.
- Avoidance of any pollution incident or near miss as a result of working around or close to an existing watercourse and have emergency measures in place
- Avoidance of vandalism.
- Keeping all watercourses free from obstruction and debris.
- Correct implementation of the sustainable drainage system (SuDS) drainage design principles.
- Keep impact of decommissioning works to a minimum on the local environment, watercourses and wildlife.
- Correct fuel storage and refuelling procedures to be followed.
- Good waste management and housekeeping to be implemented
- Air and noise pollution prevention to be implemented.
- Monitoring of the works and any adverse effects it may have on the environment

2.4 Decommissioning Methodologies Overview

2.4.1 Introduction

An experienced main contractor will be appointed to undertake the decommissioning of the Proposed Development. The main contractors will comply with the DP prepared for the decommissioning phase. An overview of the decommissioning methodologies is provided below.

2.4.2 Decommissioning Methodology

The proposed decommissioning methodology is summarised under the following main headings:

- Wind Turbines and Met Mast; dismantling and removal off site;
- Turbine and Met Mast Foundations: turbine and met mast foundation backfilling following dismantling and removal of wind turbines (foundations that protrude above

ground level will be backfilled with soil – underground reinforced concrete remaining in-situ);
- Underground Cabling: removal (ducting remaining)
- Transport Route Accommodation Works

2.4.2.1 Wind Turbines and Met Mast

The existing 28 no. turbines onsite will be removed from site in accordance with Orsted policy, whereby all elements of the turbines will be recycled and reused, and no components will be sent to landfill. A methodology for the decommissioning of the turbine blades is set out below:

- Blades will be segmented into approximately 9 pieces using an excavator mounted shear;
- Technicians will remove root rings and any other associated metal for recycling;
- The construction crew will ensure that there are no contaminants present (e.g. oils, brake dust, grease rubber hoses);
- Blade segments will then be lifted via telehandler to a suitable container for transport (e.g. 40 cubic yard RORO skips and/or trailer mounted articulated bulk carriers);
- Segments will then be transported to suitable licenced processing facilities, such as Kenmare Transfer Station (W0086), Coolcaslagh Transfer Station (W0072) or Killarney Waste Disposal Unlimited Company (W0217) to be shredded;
- The shredded output will be used in a suitable licenced cement co-processing or a waste-to-energy facility.

The turbine nacelle and tower sections are metallic and can therefore also be recycled. The tower will be broken out into its original tower sections and will be transported offsite to a suitable licenced or waste processing facility, such as Kenmare Transfer Station (W0086), Coolcaslagh Transfer Station (W0072) or Killarney Waste Disposal Unlimited Company (W0217).

Prior to any works being undertaken on wind turbines, they will be disconnected from the grid by the site operator in conjunction with ESB Networks and Eirgrid. The dismantling and removal of wind turbines on this scale is a specialist operation which will be undertaken by the turbine supplier or competent subcontractor. Turbine dismantling will be undertaken in reverse order to methodology employed during their construction. Cranes will be brought back to the site utilising the hard stand areas adjacent to each turbine. The dismantling of turbines will be bound by the same safety considerations as will be the case during the construction in terms of weather conditions. Works will not be undertaken during adverse weather conditions and in particular not during high winds.

The turbines will be disassembled in reverse order to how they were initially constructed i.e. blades will be removed from the nacelle, the nacelle will then be removed from the top of the tower, and the tower sections will then be removed. A crane will be used to remove the blades from the hub. The blades will then be decommissioned following the methodology set out in Section 4.3.1.1 of Chapter 4. A more detailed breakdown of the construction methodology is outlined below:

Enabling Works:

- The temporary construction compounds will be established;
- Vegetation and scrub clearance along with some levelling works will be carried out at the turbine hardstand areas and access tracks as necessary;
- Improvements to existing tracks

Decommissioning of the Existing Turbines:

- Dismantle turbines as per above
- Appropriate running surface for cranes will be constructed;
- Decommissioning of the existing onsite cabling via the method outlined above

The met mast will be removed in a similar fashion. The details of transport to and from site are assessed in Chapter 14 of the EIAR, which accompanies this application.

2.4.2.2 Turbine and Met Mast Foundations

On the dismantling of turbines, it is not intended to remove the concrete foundation from the ground. It is considered that its removal will be the least preferred options in terms of potential effects on the environment. Therefore, the 11 no. turbine foundations will be backfilled and covered, following the dismantling and removal of the wind turbines, with soil material and allowed to naturally regenerate. The very small volumes of soil material will be sourced locally and imported to site on heavy goods vehicles (HGVs). The imported soil will be spread and graded over the foundation using a tracked excavator. The existing met mast hardstand will be decommissioned and left to naturally regenerate.

2.4.2.3 Internal Onsite Electrical Cabling

Removal of the existing onsite electrical cabling will be dependent on how the cabling was placed during the construction of the Existing Kilgarvan Wind Farm. There will be two standard approaches to this based on the two methods of cable laying employed on the site:

- Where the cables have been direct buried in peat soils, they will be cut and left in situ;
- Where the cables have been ducted, the cable will be cut at both ends and pulled from the cable duct.

The 2 no. options above have been determined to be the most environmentally prudent methods to deal with the decommissioning of the onsite electrical cabling. It should be noted that, where onsite electrical cables facilitating the connection of the Proposed Development follow the same route as the Existing Kilgarvan Wind Farm cables, these existing cables will be removed once safe to do so.

2.4.2.4 Transport Route Accommodation Works

In order to facilitate the delivery of turbine components to the Proposed Development site, it may be necessary switch the turbine blades from the standard Superwing Carrier to a specialised Blade Adapter trailer. The swapping of the blade from one trailer to another requires a set down area as described in Section 4.4.2.1 of Chapter 4. The decommissioning of the set down area will be carried out by completing the following works:

- Reinstatement of soil berms
- Spreading of local topsoil over areas of cleared vegetation to allow regeneration and revegetation
- Reinstatement of sheep-wire fence and rehanging of set of double gates.

3. ENVIRONMENTAL MANAGEMENT

The following sections give an overview of the drainage, dust and noise control measures, a waste management plan for the site and implementation of the environmental management procedures for the site.

3.1 Site Drainage

The site drainage features for the site during its construction and operation are outlined in the EIAR and drainage plan which accompany this application. When the final DP is prepared prior to decommissioning and presented as a standalone document, all drainage management measures, which will include maintenance of the operational drainage measures, will be included in this document, as required.

3.2 Refuelling; Fuel and Hazardous Materials Storage

Wherever possible, vehicles will be refuelled off-site. This will be the case for regular, road-going vehicles. However, for construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site in bunded areas.

On-site refuelling of machinery will be carried out at dedicated refuelling locations using a mobile double skinned fuel bowser. The fuel bowser, a double-axle custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. It is not practical for all construction machinery to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the Proposed Development. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use.

Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays, spill kits and fuel absorbent mats will be used during all refuelling operations.

3.3 Dust Control

Dust can be generated from on-site activities during decommissioning such as reinstatement of foundations and travelling on site roads during prolonged periods of dry weather. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. soil and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Site traffic movements also have the potential to generate dust as they travel along the haul route.

Proposed measures to control dust, which are the same as those proposed for the construction phase, include:

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by the ECoW for cleanliness, and cleaned as necessary;
- Material handling systems and material storage areas will be designated and laid out to minimise exposure to wind;

- Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods;
- Water misting or bowsers will operate on site as required to mitigate dust in dry weather conditions;
- The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary;
- All construction related traffic will have speed restrictions on un-surfaced roads to 15kph
- Daily inspection of construction sites to examine dust measures and their effectiveness;
- When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper, and;
- All vehicles leaving the construction areas of the site will pass through a wheel-washing area prior to entering the local road network.

3.4 Noise Control

The operation of plant and machinery, including site vehicles, is a source of potential impact that will require mitigation at all locations within the site. Proposed measures, which are the same as those proposed for the construction phase, to control noise include:

- Diesel generators will be enclosed in sound proofed containers to minimise the potential for noise impacts.
- Plant and machinery with low inherent potential for generation of noise and/or vibration will be selected. All plant and equipment to be used on-site will be modern equipment and will comply with the S.I. No. 359/1996 - European Communities (Construction Plant and Equipment) (Permissible Noise Levels) (Amendment) Regulations.
- Regular maintenance of plant will be carried out in order to minimise noise emissions. Particular attention will be paid to the lubrication of bearings and the integrity of silencers.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the works.
- Compressors will be of the “sound reduced” models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools will be fitted with suitable silencers.
- Machines, which are used intermittently, will be shut down during those periods when they are not in use.
- Training will be provided by the Site Manager to drivers to ensure smooth machinery operation/driving, and to minimise unnecessary noise generation; and,

3.5 Invasive Species Management

Any soil material that will be imported to site as part of the foundation reinstatement will be free of any invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). The site manager will take steps to ensure the sourcing of suitably clean soil material and verify the quality of the material by having it inspected prior to bringing it to site by a suitably qualified ecologist. Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the Proposed Development to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures.

3.6 Traffic Management

A Traffic Management Plan will be prepared in advance of any decommissioning works. As it is proposed to segment the blades onsite and transport them away from site using a HGV rather than a

blade trailer, a specialist haulier will not be needed, and so this will not form part of any Traffic Management Plan. The traffic management arrangements for the decommissioning phase of the Proposed Development, although similar to what will be implemented for the construction phase as outlined in the EIAR, EIAR will be agreed in advance of decommissioning with Kerry County Council.

3.7 Waste Management

This section of the DP provides a waste management plan (WMP) which outlines the best practice procedures during the decommissioning of the Proposed Development. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of decommissioning. In line with Orsted company policy, none of the turbine components will be sent to landfill after being decommissioned and removed from site.

3.7.1 Legislation

The Waste Management Act 1996 and its subsequent amendments provide for measures to improve performance in relation to waste management, recycling and recovery. The Act also provides a regulatory framework for meeting higher environmental standards set out by other national and EU legislation.

The Act requires that any waste related activity has to have all necessary licenses and authorisations. It will be the duty of the Waste Manager on the site of the Proposed Development to ensure that all contractors hired to remove waste from the site have valid Waste Collection Permits. It will then be necessary to ensure that the waste is delivered to a licensed or permitted waste facility. The hired waste contractors and subsequent receiving facilities must adhere to the conditions set out in their respective permits and authorisations. Waste removal-related traffic volumes during the decommissioning phase, will be less than those anticipated and assessed for the construction phase.

The Department of the Environment provides a document entitled, '*Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects'* (2006). It is important to emphasise that no demolition will take place at this site, however, this document was referred to throughout the process of completing this WMP.

3.7.2 Waste Management Hierarchy

The waste management hierarchy sets out the most efficient way of managing waste in the following order:

Prevention and Minimisation:

The primary aim of the WMP will be to prevent and thereby reduce the amount of waste generated at each stage of the project.

Reuse of Waste:

Reusing as much of the waste generated on site as possible will reduce the quantities of waste that will have to be transported off site to recovery facilities or landfill.

Recycling of Waste:

There are several established markets available for the beneficial use of Construction and Demolition waste such as, for example, using waste concrete as fill for new roads.

At all times during the implementation of the WMP, disposal of waste to landfill will be considered only as a last resort.

3.7.3 Waste Arising from Decommissioning

The relevant components will be removed from site for re-use, recycling. In line with Orsted company policy, none of the turbine components will be sent to landfill after being decommissioned and removed from site. All lubrication fluids will be drained down and put aside for appropriate collection, storage, transport and disposal.

The waste types arising from the decommissioning of the Proposed Development are outlined in Table 3-1 below.

Table 3-1 waste types arising during the Decommissioning Phase

Material Type	Example	EWC Code
Cables	Electrical wiring	17 04 11
Metals	Copper, aluminium, lead and iron	17 04 07
Fibreglass	Turbine blade component	10 11 03
Hydrocarbons	Oils and lubricants drained from the turbines	13 01 01,13 02 04

3.7.3.1 Reuse

Many wind farm materials can be reused several times before they have to be disposed of:

- Electrical wiring can be reused on similar wind energy projects
- Elements of the turbine components can be reused but this will be determined by the condition that they are in.
- Particular turbine components

None of the turbine components will be sent to landfill after being decommissioned and removed from site. As outlined in Section 4.3.1.1 of Chapter 4, all turbine components will be broken down before their removal from site and will be reused in varying capacities where possible.

3.7.3.2 Recycling

If a certain type of material cannot be reused onsite, then recycling is the most suitable option. The opportunity for recycling during decommissioning will be limited and restricted to components of the wind turbines.

As was described in Section 2.4.2, the turbine components will be segmented as appropriate and removed from the site for use in recycling.

As outlined in Section 3.7.3.1 above, all turbine components will be reused where possible upon decommissioning and removal from the site. Where reuse is not possible, components will be recycled as appropriate.

All waste that is produced during the decommissioning phase including dry recyclables will be deposited in the on-site skip initially and sent for subsequent segregation at a remote facility. The anticipated volume of all waste material to be generated at the Proposed Development is low which provides the justification for adopting this method of waste management.

3.7.3.3 Implementation

3.7.3.3.1 *Roles and Responsibilities*

Prior to the commencement of the decommissioning, a Decommissioning Waste Manager will be appointed by the Contractor. The Decommissioning Waste Manager will oversee the implementation of the objectives of the plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated will have sufficient authority so that they can ensure everyone working on the decommissioning adheres to the management plan.

3.7.3.3.2 *Training*

It is important for the Decommissioning Waste Manager to communicate effectively with colleagues in relation to the aims and objectives of the waste management plan. All employees working on site during the decommissioning phase of the project will be trained in materials management and thereby, will be able to:

- Distinguish reusable materials from those suitable for recycling.
- Ensure maximum segregation at source.
- Co-operate with site manager on the best locations for stockpiling reusable materials.
- Separate materials for recovery; and
- Identify and liaise with waste contractors and waste facility operators.

3.7.3.3.3 *Record Keeping*

The WMP will provide systems that will enable all arisings, movements and treatments of decommissioning waste to be recorded. This system will enable the contractor to measure and record the quantity of waste being generated. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The WMP can then be adapted with changes that are seen through record keeping.

The fully licensed waste contractor employed to remove waste from the site will be required to provide documented records for all waste dispatches leaving the site. Each record will contain the following:

- Consignment Reference Number
- Material Type(s) and EWC Code(s)
- Company Name and Address of Site of Origin
- Trade Name and Collection Permit Ref. of Waste Carrier
- Trade Name and Licence Ref. of Destination Facility
- Date and Time of Waste Dispatch
- Registration no. of Waste Carrier vehicle
- Weight of Material
- Signature of Confirmation of Dispatch detail
- Date and Time of Waste Arrival at Destination
- Site Address of Destination Facility

3.7.3.4 Waste Management Plan Conclusion

The WMP will be properly adhered to by all staff involved in the project and will be outlined within the induction process for all site personnel. The waste hierarchy will be employed when designing the plan to ensure that the least possible amount of waste is produced during decommissioning. Reuse of certain types of construction wastes will cut down on the cost and requirement of raw materials therefore further minimising waste levels.

This WMP has been prepared to outline the main objectives that are to be adhered to.

3.8 Environmental Management Implementation

3.8.1 Roles and Responsibilities

A Contractor will be appointed to undertake the decommissioning activities. The Site Manager and/or Environmental Clerk of Works (ECoW) will be key members of the Contractors team and are the points of contact relating to decommissioning-related environmental issues.

In general, the ECoW will maintain responsibility for monitoring the decommissioning works and Contractors/Sub-contractors from an environmental perspective. The ECoW will act as the regulatory interface on environmental matters. The Site Manager will be responsible for reporting to and liaising with the local authority and other statutory bodies as required.

The Site Manager in consultation with the ECoW will be responsible for employing the services of a suitably qualified ecologist and any other suitably qualified professionals (e.g. geotechnical engineer, hydrologist etc.) as required throughout the decommissioning works.

4. EMERGENCY RESPONSE PLAN

An Emergency Response Plan (ERP) is presented in this section of the DP. It provides details of procedures to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

4.1 Emergency Response Procedure

The site ERP includes details the response required and the responsibilities of all personnel in the event of an emergency. The ERP will require updating and submissions from the contractor/PSCS and sub-contractors as decommissioning progresses. Where sub-contractors that are contracted on site are governed by their own emergency response procedure a bridging arrangement will be adopted to allow for inclusion of the sub-contractor's ERP within this document.

4.1.1 Roles and Responsibilities

The chain of command during an emergency response sets out who is responsible for coordinating the response. The Site Supervisor/Construction Manager will lead the emergency response which makes him responsible for activating and coordinating the emergency response procedure. The other site personnel who can be identified at this time who will be delegated responsibilities during the emergency response are presented in Figure 4-1. In a situation where the Site Supervisor/ Construction Manager is unavailable or incapable of coordinating the emergency response, the responsibility will be transferred to the next person in the chain of command outlined in Figure 4-1. This will be updated throughout the project.

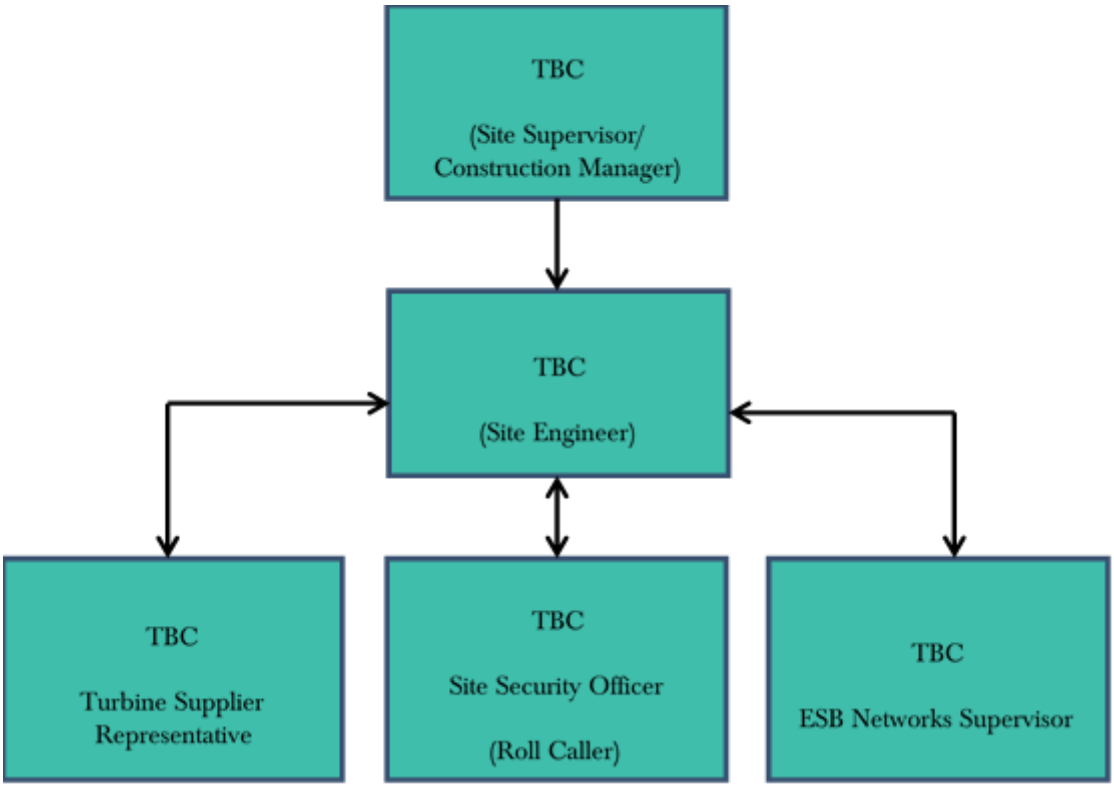

Figure 4-1 Emergency Response Procedure Chain of Command

4.1.2 Initial Steps

To establish the type and scale of potential emergencies that may occur, the following hazards have been identified as being potential situations that may require an emergency response in the event of an occurrence.

Table 4-1 Hazards associated with potential emergency situations

Hazard	Emergency Situation
Construction Vehicles: Dump trucks, tractors, excavators, cranes etc.	Collision or overturn which has resulted in operator or third-party injury.
Peat Instability	Excessive movement of peat on site; onset of peat slide.
Abrasive wheels/Portable Tools	Entanglement, amputation or electrical shock associated with portable tools
Contact with services	Electrical shock or gas leak associated with an accidental breach of underground services
Fire	Injury to operative through exposure to fire
Falls from heights including falls from scaffold towers, scissor lifts, ladders, roofs and turbines	Injury to operative after a fall from a height
Sickness	Illness unrelated to site activities of an operative e.g. heart attack, loss of consciousness, seizure
Turbine Specific Incident	This will be included the turbine manufacturers' emergency response plan.

In the event of an emergency situation associated with, but not restricted to, the hazards outlined in Table 4-2 the Site Supervisor/Construction Manager will carry out the following:

- Establish the scale of the emergency situation and identify the number of personnel, if any, have been injured or are at risk of injury.
- Where necessary, sound the emergency siren/foghorn that activates an emergency evacuation on the site. The Site Supervisor/Decommissioning Manager must proceed to the assembly point if the emergency poses any significant threat to their welfare **and if there are no injured personnel at the scene that require assistance**. The Site Supervisor/Decommissioning Manager will be required to use their own discretion at that point. In the case of fire, the emergency evacuation of the site should proceed, without exception. The site evacuation procedure is outlined in Section 4.1.3.
- Make safe the area if possible and ensure that no identifiable risk exists with regard to dealing with the situation e.g. if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured.
- Contact the required emergency services or delegate the task to someone. If delegating the task, ensure that the procedures for contacting the emergency services as set out in Section 4.2 is followed.
- Take any further steps that are deemed necessary to make safe or contain the emergency incident e.g. cordon off an area where an incident associated with electrical issues has occurred.
- Contact any regulatory body or service provider as required e.g. ESB Networks the numbers for which as provided in Section 4.3.
- Contact the next of kin of any injured personnel where appropriate.

4.1.3 Site evacuation/Fire Drill

A site evacuation/fire drill procedure will provide basis for carrying out the immediate evacuation of all site personnel in the event of an emergency. The following steps will be taken:

- Notification of the emergency situation. Provision of a siren or foghorn to notify all personnel of an emergency situation.
- An assembly point within the site will be designated and will be marked with a sign. All site personnel will assemble at this point.
- A roll call will be carried out by the Site Security Officer to account for all personnel on site.
- The Site Security Officer will inform the Site Supervisor/Decommissioning Manager when all personnel have been accounted for. The Site Supervisor/Decommissioning Manager will decide the next course of action, which be determined by the situation that exists at that time and will advise all personnel accordingly.

All personnel will be made aware of the evacuation procedure during site induction. The Fire Services Acts of 1981 and 2003 require the holding of fire safety evacuation drills at specified intervals and the keeping of records of such drills.

4.1.4 Spill Control Measures

Every effort will be made to prevent an environmental incident during the decommissioning phase of the project. Oil/fuel spillages are one of the main environmental risks that will exist on the site which will require an emergency response procedure. The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. The following steps provide the procedure that will be followed in the event of such an incident:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident.
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats.
- If possible, clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the ECoW immediately giving information on the location, type and extent of the spill so that they can take appropriate action.
- The ECoW will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The ECoW will notify the appropriate regulatory body such as the local authority, and the Environmental Protection Agency (EPA), if deemed necessary.

Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident will be investigated in accordance with the following steps.

- The ECoW must be immediately notified.
- If necessary, the ECoW will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident.
- The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions and remedial

measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident.
- If the incident has impacted on a sensitive receptor such as an archaeological feature the ECoW will liaise with the Project Archaeologist.
- A record of all environmental incidents will be kept on file by the ECoW and the Main Contractor. These records will be made available to the relevant authorities such as the local authority and EPA, if required.

The ECoW will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative works methodologies or environmental sampling, and will advise the Main Contractor as appropriate.

4.2 Contact the Emergency Services

In the event of requiring the assistance of the emergency services the following steps should be taken:

Stay calm. It is important to take a deep breath and not get excited. Any situation that requires 999/112 is, by definition, an emergency. The dispatcher or call-taker knows that and will try to move things along quickly, but under control.

Know the location of the emergency and the number you are calling from. This may be asked and answered a couple of times but do not get frustrated. Even though many emergency call centres have enhanced capabilities meaning they are able to see your location on the computer screen they are still required to confirm the information. If for some reason you are disconnected, at least emergency crews will know where to go and how to call you back.

Wait for the call-taker to ask questions, then answer clearly and calmly. If you are in danger of assault, the dispatcher or call-taker will still need you to answer quietly, mostly "yes" and "no" questions.

If you reach a recording, listen to what it says. If the recording says your call cannot be completed, hang up and try again. If the recording says all call takers are busy, WAIT. When the next call-taker or dispatcher is available to take the call, it will transfer you.

Let the call-taker guide the conversation. He or she is typing the information into a computer and may seem to be taking forever. There is a good chance, however, that emergency services are already being sent while you are still on the line.

Follow all directions. In some cases, the call-taker will give you directions. Listen carefully, follow each step exactly, and ask for clarification if you do not understand.

Keep your eyes open. You may be asked to describe victims, suspects, vehicles, or other parts of the scene.

Do not hang up the call until directed to do so by the call taker.

Due to the remoteness of the site it may be necessary to liaise with the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This will form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable. A list of emergency contacts for the construction phase is presented in Table 4-2. This list will be updated as necessary ahead of the decommissioning phase.

Table 4-2 Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Doctor – Ballyvourney Medical Centre	+353 26 45687
Hospital – Bantry General Hospital	(027) 50133
ESB Emergency Services	1850 372 999
Gas Networks Ireland Emergency	1850 20 50 50
Gardaí – Ballyvourney Garda Station.	(026) 45002
Health and Safety Co-ordinator - Health & Safety Services	TBC
Health and Safety Authority	1890 289 389
Inland Fisheries Ireland (IFI)	1890 347 424
Project Supervisor Construction Stage (PSCS): TBC	TBC
Project Supervisor Design Stage (PSDS): TBC	TBC
Orsted Project Delivery Manager	TBC
Natural Power – Operational Wind Farm Controller	1800 200 817
Orsted Regional O&M Supervisor	TBC

4.3 Procedure for Personnel Tracking

All operatives on site without any exception will have to undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.

In the event of a site operative becoming involved in an emergency situation where serious injury has occurred and hospitalisation has taken place, it will be the responsibility of the Site Manager or next in command if unavailable to contact the next of kin to inform them of the situation that exists.

4.4 Induction Checklist

Table 4-3 provides a list of items highlighted in this ERP which will be included or obtained during the mandatory site induction of all personnel that will work on the site. This will be updated throughout the various stages of the project.

Table 4-3 Emergency Response Plan Items Applicable to the Site Induction Process

ERP Items to be included in Site Induction	Status
All personnel will be made aware of the evacuation procedure during site induction	

ERP Items to be included in Site Induction	Status
Due to the remoteness of the site it may be necessary to liaise with and assist the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This will form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.	
All operatives on site without any exception will have undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.	

5. PROGRAMME OF WORKS

5.1 Decommissioning Schedule

The decommissioning phase will take approximately 6 – 9 months to complete from commencing the removal of turbines to the final reinstatement of the site.

At this time, it is not possible to determine when exactly decommissioning will take place, however, it will be 35-years after the commissioning of the Proposed Development.

The phasing and scheduling of the main decommissioning task items are outlined in Figure 5-1 below, where the 1st January has been shown as an indicative start date for decommissioning to commence.

ID	Task Name	Task Description	Month 1-3	Month 3-6	Month 6-9
1	Site Health and Safty				
2	Turbine Decommissioning	Disconnect Power Output			
3	Turbine Dismantling	Disassemble Turbine Components			
4	Turbine Removal	Tranpsort of all Turbine Componetns off Site			
5	Cable Removal	Remove Undeground Cables from Ducting			
6	Turbine Foundations Backfill	Reinstate Foundation Areas by Covering with Soil Material			
7	Accommodation Areas Reinstatement	Reinstate Soil Berm and Boundary Treatments			

Figure 5-1 Indicative Decommissioning Schedule

6. MITIGATION & MONITORING PROPOSALS

All mitigation measures and monitoring measures relating to decommissioning of the Proposed Development were set out in the various sections of the Environmental Impact Assessment Report (EIAR) and NIS prepared as part of the planning permission application to An Bord Pleanála.

This section of the Decommissioning Plan (DP) groups together all of the mitigation and monitoring measures presented in the above documents. The Mitigation Measures and Monitoring Measures are presented in the following pages.

By presenting the mitigation and monitoring proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the decommissioning phase of the project.

Table 6-1 Mitigation Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
EIAR Chapter 4 – Description of the Proposed Project					
MM34	Decommissioning	EIAR Chapter 4	› Prior to the end of the operational period the Decommissioning Plan (Appendix 4-5 of the EIAR) will be updated in line with decommissioning methodologies that may exist at the time and will agree with the competent authority at that time.		
MM35	Decommissioning	EIAR Chapter 4	› Upon decommissioning of the Proposed Development, the wind turbines would be disassembled in reverse order to how they were erected. › 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 environment nuisances such as noise, dust and/or vibration. › Site roadways will be left in situ, for future forestry operations and for local landowners to access their lands. Underground cables will be removed and the ducting left in place.		
MM36	Decommissioning	EIAR Chapter 4 CEMP	› The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential effects.		
Chapter 5: Population and Human Health					
Decommissioning Phase					
MM51	Human Health	EIAR Chapter 5	› Any effect and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase,		

			however to a lesser extent, and the mitigation measures outlined above will be implemented during the decommissioning phase also. A Decommissioning Plan will be agreed with the local authorities three months prior to decommissioning the Proposed Development. The principles that will inform the final decommissioning plan are contained in the Construction and Environmental Management Plan (CEMP) in Appendix 4-9.		
			EIAR Chapter 6 Terrestrial Biodiversity		
MM67	decommissioning	EIAR Chapter 6 Appendix 4-7	The final decommissioning of the Proposed Development will be carried out according to a decommissioning plan (Appendix 4-7). › The potential for impacts during decommissioning are similar in nature, if not in scope, to those assessed for the initial decommissioning and construction phase. All decommissioning works will be governed by the same requirements to control run-off or potential pollution to watercourses as have been implemented during the construction phase. › The site compound will need to conform to the construction phase mitigation measures including those related to lighting design and proper treatment of edible and putrescible wastes. All plant removed during decommissioning of the site will be re-used at other wind farm sites whenever possible. All remaining materials which cannot be re-used will be recycled. This is likely to include scrap metal, plastic and other waste materials. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor in the most environmentally appropriate manner available at the time of the decommissioning by an appropriately licenced contractor. › Following reinstatement, the site will be monitored to determine the progress of revegetation and if necessary to examine the need for supplementary planting with native species. A full site survey by a habitat specialist will be carried out at the end of Year 1 to assess the progression of the restoration and revegetation of the decommissioned areas and to capture photographic		

			evidence of the site vegetation status, drainage management and general site appearance at the end of Year 1.		
EIAR Chapter 7 Aquatic Ecology					
MM84	Decomissioning Phase	EIAR Chapter 7	› Mitigation as set out in MM72-MM82, above.		
EIAR Chapter 8 Land, Soils and Geology					
MM95	Decomissioning Phase	EIAR Chapter 8 Appendix 4-5	Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant. › Some of the effects will be avoided by leaving elements of the Proposed Development in place where appropriate. The existing onsite 110kV Coomagearlahy substation is part of the national grid. The turbine bases will be rehabilitated by covering with local topsoil/peat in order to regenerate vegetation which will reduce runoff and sedimentation effects. Internal roads will remain as amenity pathways. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.		
EIAR Chapter 9 Hydrology and Hydrogeology					
MM122	Decomissioning Phase	EIAR Chapter 9 Appendix 4-5	› Potential effects will be similar to the construction phase but to a lesser degree. Some of the impacts will be avoided by leaving elements of the Proposed Development in place where appropriate. The onsite 110kV electrical substation and 110kV electrical cabling will be retained as a permanent part of the national grid. The turbine bases will be rehabilitated by covering with local topsoil/peat in order to regenerate vegetation which will reduce runoff and sedimentation effects. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.		

EIAR Chapter 10 Air					
MM129	Decomissioning Phase	EIAR Chapter 10 Appendix 4-5	› Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less effect. The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential effects.		
EIAR Chapter 11 Climate					
MM132	Decomissioning Phase	EIAR Chapter 11	› Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		
EIAR Chapter 12 Noise					
MM135	Decomissioning Phase	EIAR Appendix 4-3	› No specific mitigation measures are required for decommissioning. To ameliorate any potential noise impacts that may present during the decommissioning phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the Construction and Environmental Management Plan (CEMP) that has been prepared for the Proposed Development.		
EIAR Chapter 13 Landscape and Visual					
MM139	Decomissioning Phase	EIAR Chapter 13	› Any potential direct impacts effects will already have been resolved through mitigation measures during the construction phase.		
EIAR Chapter 15 Material Assets					
Material Assets - Traffic					

MM147	Decommissioning Phase	EIAR Chapter 15 Appendix 4-5	› In the event that the Proposed Development is decommissioned after the 35 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-5 Decommissioning Plan. This plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning.		
Material Assets – Other					
MM153		EIAR Appendix 4-5	› The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		

Table 6-2 Monitoring Measures

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX22	Decommissioning	DP Section 1	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 approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to 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".	End of Operational Life	As Required	Developer Appointed/ Contractor

			In this regard, the Decommissioning Plan will be reviewed and updated prior to commencement of decommissioning works to take account of the relevant conditions of the planning permission and current health and safety standards at the time of decommissioning. The Decommissioning Plan (DP) will be agreed in writing with the Planning Authority prior to the commencement of the decommissioning phase.			
MX23	Decommissioning	DP Section 3	The ECoW will maintain responsibility for monitoring the decommissioning works and Contractors/Sub-contractors from an environmental perspective. The ECoW will act as the regulatory interface on environmental matters. The Site Manager will be responsible for reporting to and liaising with Kerry County Council and other statutory bodies as required.	End of Operational Life	As Required	Site Manager/ ECoW
MX24	Decommissioning	DP Section 3	The Site Manager in consultation with the ECoW will be responsible for employing the services of a suitably qualified ecologist and any other suitably qualified professionals as required throughout the decommissioning works.	End of Operational Life	As Required	Site Manager/ ECoW
MX25	Decommissioning	DP Section 3	The Site Manager will take steps to ensure the sourcing of suitably clean soil material and verify the quality of the material by having it inspected prior to bringing it to site by a suitably qualified ecologist. Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the Site to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures.	End of Operational Life	As Required	Project Ecologist
MX26	Health and Safety	DP Section 4	› Due to the remoteness of the site it may be necessary to liaise with the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This will form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.	End of Operational Life	As Required	PSCS

			› In this regard, this DP will be reviewed and updated prior to commencement of any decommissioning works to take account of the relevant conditions of the planning permission and current health and safety standards. The DP will be agreed in writing with the Planning Authority prior to the commencement of the decommissioning.			
MX27	Terrestrial Ecology	EIAR Chapter 6 Appendix 4-5	› The potential for impacts during decommissioning are similar in nature, if not in scope, to those assessed for the initial decommissioning and construction phase. All decommissioning works will be governed by the same requirements to control run-off or potential pollution to watercourses as have been implemented during the construction phase. › The site compound will need to conform to the construction phase mitigation measures including those related to lighting design and proper treatment of edible and putrescible wastes. All plant removed during decommissioning of the site will be re-used at other wind farm sites whenever possible. All remaining materials which cannot be re-used will be recycled. This is likely to include scrap metal, plastic and other waste materials. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor in the most environmentally appropriate manner available at the time of the decommissioning by an appropriately licenced contractor. › Following reinstatement, the site will be monitored to determine the progress of revegetation and if necessary to examine the need for supplementary planting with native species. A full site survey by a habitat specialist will be carried out at the end of Year 1 to assess the progression of the restoration and revegetation of the decommissioned areas and to capture photographic evidence of the site vegetation status, drainage management and general site appearance at the end of Year 1.	End of Operational Life	As Required	Project Ecologist

7. COMPLIANCE AND REVIEW

7.1 Site Inspections and Environmental Audits

Environmental inspections will ensure that the works are undertaken in compliance with this DP and all other planning application documents. Only suitably trained staff will undertake environmental site inspections.

Environmental inspections will ensure that the works are undertaken in compliance with this DP and all other planning application documents. Only suitably trained staff will undertake environmental site inspections.

7.2 Auditing

In contrast to monitoring and inspection activities, audits are designed to shed light on the underlying causes of non-compliance, and not merely detect the non-compliance itself. In addition, audits are the main means by which system and performance improvement opportunities may be identified. Environmental audits will be carried out by the ECoW on behalf of the appointed contractor. It is important that an impartial and objective approach is adopted. Environmental audits will be conducted at planned intervals to determine whether the DP is being properly implemented and maintained. The results of environmental audits will be provided to the contractor.

An audit of compliance with the decommissioning mitigation measures will be completed by the ECoW during the decommissioning phase of the development. The findings of each audit will be documented by the ECoW in an audit report within the DP for the site. The audit report will be made available to the local authority on request.

7.3 Environmental Compliance

The following definitions shall apply in relation to the classification of Environmental Occurrences during decommissioning of the proposed wind farm development:

Environmental Near Miss: An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.

Environmental Incident: Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.

Environmental Exceedance Event: An environmental exceedance event occurs when monitoring results indicate that limits for a particular environmental parameter (as indicated in the Environmental Monitoring Programme) has been exceeded.

An exceedance will immediately trigger an investigation into the reason for the exceedance occurring and the application of suitable mitigation where necessary.

Exceedance events can be closed out on achieving a monitoring result below the assigned limit for a particular environmental parameter.

Environmental Non-Compliance: Non-fulfilment of a requirement and includes any deviations from established procedures, programs and other arrangements related to the EMP.

7.4 Corrective Action Procedure

A corrective action is implemented to rectify an environmental problem on-site. Corrective actions will be implemented by the Site Supervisor/Decommissioning Manager, as advised by the Site Environmental Clerk of Works. Corrective actions may be required as a result of the following.

- Environmental Audits.
- Environmental Inspections and Reviews.
- Environmental Monitoring.
- Environmental Incidents; and,
- Environmental Complaints.

A Corrective Action Notice will be used to communicate the details of the action required to the main contractor. A Corrective Action Notice is a form that describes the cause and effect of an environmental problem on site and the recommended corrective action that is required. The Corrective Action Notice, when completed, will include details of close out and follow up actions.

If an environmental problem occurs on site that requires immediate attention direct communications between the Site supervisor/Decommissioning Manager and the ECoW will be conducted. This in turn will be passed down to the site staff involved. A Corrective Action Notice will be completed at a later date.

7.5 Decommissioning Plan Review

This Decommissioning Plan will be reviewed and updated prior to commencement of decommissioning works. It will be agreed with the Planning Authority prior to the commencement of decommissioning. Further updates will be completed to the plan during decommissioning works to adapt to specific situations or site conditions that are encountered that need to be considered by the plan.