ABWP Phase I Decommissioning

Description of Alternatives

Volume 2, Chapter 2

Bright ideas.
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Project name ABWP Phase I Decommissioning

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2.1	Comparative Assessment Report

Statement of Authority

Author	Qualifications	Relevant Experience
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Matt Royall	BSc (Hons) Natural Environmental Science (Earth Sciences), University of Sheffield (UK) MSc Environmental Pollution Control, University of Leeds (UK) Chartered Environmentalist (CEnv)	Over 25 years experience of environmental impact assessment for a wide range of sectors, including windfarms. Experience is across a number of geographies including Ireland, UK, Poland, Lithuania and Romania.

Glossary

Term	Meaning
Arklow Bank Wind Park (ABWP) Phase I	Arklow Bank Wind Park (ABWP) Phase I comprises: • Offshore infrastructure seaward of High Water Mark (HWM), including: – Seven Wind Turbine Generators (WTG) with a combined capacity of 25.2 MW; – One meteorological (met) mast; – Inter-array cables connecting the WTGs and met mast; and – One offshore export cable connecting WTG T4 with landfall at HWM; • Onshore infrastructure landward of HWM including: – One onshore cable connecting landfall at HWM with the onshore substation; and – One onshore substation compound, where the onshore substation and ancillary infrastructure are located.
Arklow Energy	Arklow Energy Limited, the entity seeking planning permission for the Proposed Works, i.e. the applicant.
Alternatives	A description of other options that have been considered during the conception of the Proposed Works (Environmental Protection Agency (EPA), 2022). Article 5(1) and Annex IV of the Environmental Impact Assessment (EIA) Directive) require "a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, including a comparison of the environmental effects" (EIA Directive 2011/92/EU (as amended)).
Backfilling	Placement of excavated material back into the trench or excavation after removal.
Baseline	A description of the relevant aspects of the current state of the environment (baseline scenario) (EIA Directive 2014/52/EU).
Bathymetry	Ocean's depth relative to sea level.
Bed-level Change	A change in seabed elevation resulting from sediment erosion, transport, or deposition.
Comparative Assessment	Systematic process that evaluates different decommissioning options in a structured way providing the information needed to make a robust decommissioning recommendation (International Association for Oil & Gas Producers (IOGP), 2024).

Term	Meaning
Competent authority	Are those authorities that are entitled to give authorisation or consent to a plan or project. In the planning system, this means planning authorities and An Coimisiún Pleanála. There are, however, a wide range of other competent authorities in respect of other consent regimes e.g. EPA (environmental licencing), Minister for Agriculture, Food and the Marine (forestry, aquaculture and foreshore management), and various state bodies that have authority to undertake development under Part 9 of the Planning and Development Regulations (e.g. An Garda Síochána, defence forces, the courts service). The competent authority for this planning application is An Coimisiún Pleanála (ACP).
Decommissioning	The final closing down and putting into a state of safety of a development, project or process when it has come to the end of its useful life (EPA, 2022).
Draught	Vertical distance between the waterline and the lowest point of a vessel's hull (usually the keel). It essentially measures how deep a vessel sits in the water.
Dredged material	Seabed material arising from localised dredging potentially required to faciitate safe vessel access during Proposed Works Offshore, and / or extraction of seabed material located inside monopile (MP) foundations, as part of MP decommissioning.
Effect	The consequence of an impact on a receptor. For example, in the offshore environment, vessel activity (activity) results in increased levels of underwater noise (impact), with the potential to disturb marine mammals (effect).
EIA Scoping	The scoping stage provides an opportunity for both developers and the Competent Authority to determine those key environmental impacts and issues of concern that are likely to be of the utmost importance to the project proposal's decision-making and eliminates those that are less of a concern (European Commission (EC,) 2017).
EIA Scoping Presentation	Presentation scoping the likely environmental impacts of the Proposed Works to be further considered in the Environmental Impact Assessment Report (EIAR). The EIA Scoping Presentation is included in **Volume 3, Appendix 1.1** of the EIAR.
Environmental Impact Assessment (EIA)	Process of assessment of the effects of a project or development proposal on the environment. In the planning area, it is undertaken by a planning authority or An Coimisiún Pleanála during the consideration of applications for planning permission, taking account of an Environmental Impact Assessment Report (EIAR). The projects which require EIA are listed in Annex I and Annex II of the EIA Directive, as amended (Office of the Planning Regulator, n.d.).
Environmental Impact Assessment Report (EIAR)	A report or statement of the effects, if any, that Proposed Works, if carried out, would have on the environment. It is prepared by the developer to inform the EIA process (Office of the Planning Regulator, n.d.).
Foreshore	The bed and shore, below the line of high water of ordinary or medium tides, of the sea and of every tidal river and tidal estuary and of every channel, creek, and bay of the sea or of any such river or estuary. Its outer limit is coterminous with the seaward limit of the territorial sea (Foreshore Act 1933 (as amended)), which is at a distance of 12 nm from the nearest point of the baseline or otherwise prescribed (Maritime Jurisdiction Act 2021 (as amended)).
High Water Mark (HWM)	Level reached by the sea at high tide, measured as the mean of high tides.
Impact	A change brought about by the Proposed Works.
Inter-array cables	Subsea power lines that link individual wind turbine generators (WTGs) together in an offshore wind farm, forming an electrical network. In ABWP Phase I, inter-array cables connect WTGs and the met mast to each other and have an overall length of 7.4 km.
Landfall	The point where the offshore export cable transitions from the offshore marine environment to the onshore terrestrial environment.
Maritime Area Consent (MAC)	State-issued right required to occupy a specific part of the maritime area for development. Maritime Area Consents (MACs) are managed by the Maritime Area Regulatory Authority (MARA).

Term	Meaning
Meteorological (Met) mast	A mast with a number of meteorological sensors located at different heights to record meteorological and sea condition data
Mitigation measures	Measures to avoid, prevent or reduce impacts (EPA, 2022), which comprise both embedded and additional mitigation, see separate definitions for these.
Monitoring	The periodic or continuous observation of biodiversity indicators and of other parameters that may affect biodiversity for any changes that may occur over time, so as to confirm predictions made with respect to likely effects and identify adverse changes that may require remedial action (Office of the Planning Regulator, n.d.).
Monopile (MPs)	Hollow steel cylinder driven into the seabed typically used to anchor an offshore wind turbine generator (WTG). In ABWP Phase I, MPs support the seven WTGs as well as the meteorological (met) mast.
Nautical mile (nm)	Measurement used for distances at sea. 1 nm equates to 1.852 km.
Noise	The terms noise and sound are often used interchangeably. Noise usually refers to unwanted or disturbing sounds that interfere with normal hearing and can be unpleasant or harmful. It is often characterised by irregularities in the sound waves and is considered a form of sound pollution.
Offshore export cable	Subsea power cable that transports the total generated power from an offshore wind farm to the onshore power grid. In ABWP Phase I, the offshore export cable connects the wind turbine generator (WTG) T4 to landfall with an approximate overall length of 15.6 km. At landfall, the offshore export cable transitions to the onshore cable connecting to the onshore substation.
Offshore Site	Part of the Site where Proposed Works Offshore are proposed to take place. In this application for planning permission, the Offshore Site comprises the Sub Lease Area, where the ABWP Phase I wind turbine generators (WTGs), met mast and inter-array cables are located, and the offshore export cable 10 m corridor connecting WTG T4 to the landfall at high water mark (HWM) near Arklow Harbour.
Onshore cable	Land-based portion of the power cable that transports the total generated power from an offshore wind farm to the onshore power grid. In ABWP Phase I, the onshore cable connects the landfall point at HWM to the onshore substation building.
Onshore Site	Part of the Site where Proposed Works Onshore are proposed to take place. In this application for planning permission, the Onshore Site comprises the onshore substation compound that hosts the onshore substation building and ancillary facilities; the onshore cable 10 m corridor connecting the landfall point from high water mark (HWM) to the onshore substation, and the area that will temporarily be used for temporary storage of plant, vehicles, machinery, excavated soil and materials.
Onshore substation compound	Fenced compound that hosts the onshore substation building and ancillary facilities, including the 38 kV transformer.
Pathway	The route by which an effect is conveyed between a source and a receptor (EPA, 2022).
Planning permission	Formal, legal approval required from a local planning authority or An Coimisiún Pleanála (ACP) to carry out development. The Proposed Works require planning permission submitted from ACP under Section 291 of the Planning and Development Act 2000, as amended.
Proposed Works	The Proposed Works include decommissioning of ABWP Phase I offshore infrastructure (Proposed Works Offshore) and decommissioning of ABWP Phase I onshore infrastructure (Proposed Works Onshore).
Receptor	Any element in the environment which is subject to impacts (EPA, 2022).
Recycling	Subjection of waste to any process or treatment to make it re-usable in whole or in part (Waste Management Act 1996 (as amended)).
Scour protection	Engineered barrier typically placed on the seabed around WTG foundations and subsea cables to prevents sediment erosion caused by accelerated water currents and waves, safeguarding the WTG's stability and protecting subsea

Term	Meaning
	cables. In ABWP Phase I, scour protection was originally introduced in the form of rock armour, however, this proved ineffective, and was removed in 2005. Since then, scour protection has been introduced through sandbags.
Significance	The importance of the outcome of the impact (or the consequence of change) for the receiving environment (EPA, 2022).
Sound	The terms noise and sound are often used interchangeably. Sound is a broad term that refers to any auditory experience created by vibrations that travel through a medium such as air, water, or solids to the ear.
Source	The activity or place from which an effect originates (EPA, 2022)
Sub Lease Area	Area where the ABWP Phase I WTGs, met mast and inter-array cables are located, as defined in the Sub Lease granted by Sure Partners Limited (SPL) to Arklow Energy Limited (Arklow Energy) to construct and operate ABWP Phase I.
Territorial sea	Belt of sea adjacent to a coastal State's land territory and internal waters, over which the State has sovereignty. A coastal State may claim up to 12 nautical miles from its baseline (usually the low-water line along the coast) (UNCLOS, 1982).
Transition Piece	The steel connection structure between the tower and the monopile (MP) foundation.
Trench / channel infilling rate	The rate at which sediment accumulates within a dredged trench or channel, typically expressed as bed-level rise per unit time.
Waste	Any substance or object belonging to a category of waste specified in the First Schedule or for the time being included in the European Waste Catalogue which the holder discards or intends or is required to discard, and anything which is discarded or otherwise dealt with as if it were waste shall be presumed to be waste until the contrary is proved (Waste Management Act 1996 (as amended)).
Waste Hierarchy	The order of preference for managing waste, prioritising prevention, reuse, recycling and recovery ahead of disposal.
Wind Turbine Generator (WTG)	Structure that converts the kinetic energy of ocean winds into electrical energy. ABWP Phase I includes seven GE Energy 3.6s WTGs with a rated capacity of 3.6 megawatts (MW) per WTG.

Acronyms

Acronym	Meaning
ABWP	Arklow Bank Wind Park
ACP	An Coimisiún Pleanála
BHD	Backhoe Dredger
CA	Comparative Assessment
CSD	Cutter Suction Dredgers
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
GHD	Grab Hopper Dredger
H&S	Health and Safety
HV	High-voltage
IEMA	Institute of Environmental Management and Assessment (now known as Institute of Sustainability and Environmental Professionals)
MP	Monopile
MV	Medium-voltage

Acronym	Meaning
SSC	Suspended sediment concentrations
TP	Transition Piece
TSHD	Trailing Hopper Suction Dredger
WID	Water Injection Dredger
WTG	Wind Turbine Generators

Units

Unit	Meaning
km	Kilometres
m^3	cubic metre
nm	Nautical mile
MW	Megawatt

2 DESCRIPTION OF ALTERNATIVES

2.1 Introduction

2.1.1.1 Arklow Energy Limited (Arklow Energy) is seeking planning permission to decommission Arklow Bank Wind Park (ABWP) Phase I (referred to hereafter as 'the Proposed Works'). The Proposed Works include decommissioning of ABWP Phase I offshore infrastructure (Proposed Works Offshore) and decommissioning of ABWP Phase I onshore infrastructure (Proposed Works Onshore).

2.1.1.2 The Proposed Works Offshore will be undertaken within the Offshore Site (see **Volume 2, Chapter 3: Proposed Works Description**), which includes:

- The Sub Lease Area, located on the long narrow Arklow Bank sand bank, situated approximately 10 km off the coast of Arklow, south-east Ireland, where seven wind turbine generators (WTGs) and foundations, associated scour protection, 7.4 km of inter-array cables and one meteorological (met) mast are located; and
- A 10 m wide cable corridor along the 15.6 km offshore export cable route connecting WTG T4 to the landfall point at High Water Mark (HWM).

2.1.1.3 The Proposed Works Onshore will be undertaken within the Onshore Site (see **Volume 2, Chapter 3: Proposed Works Description**), located landward of the HWM in Ferrybank, off North Quay road, within Arklow Harbour, and comprises:

- A fenced compound that hosts the onshore substation building and ancillary facilities; and
- A 10 m wide cable corridor along the onshore cable connecting the landfall point from HWM to the onshore substation.

2.1.1.4 This chapter of the Environmental Impact Assessment Report (EIAR) outlines the alternatives to the Proposed Works described in **Volume 2, Chapter 3: Proposed Works Description**, that have been considered as part of the Environmental Impact Assessment (EIA).

2.1.1.5 The chapter is informed by the following chapters:

- **Volume 2, Chapter 1: Introduction**; and
- **Volume 2, Chapter 3: Proposed Works Description.**

2.1.1.6 The chapter also draws on information contained within the following appendices:

- **Volume 3, Appendix 2.1: Comparative Assessment Report**.

2.2 Consultation

2.2.1.1 The EIA Scoping Presentation (see **Volume 3, Appendix 1.1**) was submitted to An Coimisiún Pleanála (ACP) and prescribed bodies in March 2026 to obtain informal feedback on the proposed scope of the EIAR, and on the assessment approach to be taken for the 'scoped in' technical assessments to be included in the EIAR.

2.2.1.2 It should be noted that the submission of the EIA Scoping Presentation did not constitute a formal scoping request under Article 117 of the 2001 Regulations, but has been used for non-statutory consultation.

2.2.1.3 Feedback provided in response to the EIA Scoping presentation, as well as wider stakeholder engagement feedback, is presented in the **Stakeholder Consultation and Engagement Report** accompanying the application for planning permission. For each technical topic, the key comments raised and details of how these comments have been addressed are presented within the relevant technical chapters of this EIAR (**Volume 2, Chapters 4 – 8**).

2.2.1.4 **Table 2.1** sets out comments raised in relation to alternatives to be considered in the EIAR, with details of how these comments have been addressed.

Table 2.1: Summary of comments relating to the alternatives to be considered in the EIAR.

Comment	How and where considered in the EIAR
NPWS, online meetings held on 24th November 2025 and 14th January 2026	
The 'do-nothing' scenario should be considered in detail as an option.	**Volume 2, Chapter 2: Description of Alternatives** includes a description and qualitative comparison of different alternatives to Proposed Works. In relation to Proposed Works Offshore, alternatives for offshore infrastructure considered include "do-nothing" and "retain *in situ*".
Inland Fisheries Ireland (IFI), written response to EIA Scoping Presentation, 18th March 2026	
IFI would support options for the decommissioning of the wind Park that requires the minimum intervention and which are completed in the quickest time frame.	Noted. **Volume 2, Chapter 2: Description of Alternatives** and **Volume 3, Appendix 2.1: Comparative Assessment Report**, considered the level of disturbance and programme as part of the criteria used to compare different options for Proposed Works Offshore.
The turbine foundations which have been in place for over 20 years will now have become somewhat part of the natural environment comprising, predominantly soft sediment substrate, supporting established benthic communities and contributing to local biodiversity and productivity. Migratory species, including Salmon, Eels and Sea Trout (Salmo Trutta), use this corridor and full removal activities (noise, vibration, sediment resuspension) risk disrupting migration, feeding, and habitat use. Given the duration over which these structures have been in place and the ecological communities likely to have developed and adapted, Inland Fisheries Ireland recommends a minimum disturbance approach with removal being undertaken in the quickest timeframe as possible be adopted.	As described in **Volume 2, Chapter 5: Marine Biodiversity**, the Offshore Site is not considered to support significant benthic communities. Potential effects on migratory species have been assessed. As noted above, **Volume 2, Chapter 2: Description of Alternatives** and **Volume 3, Appendix 2.1: Comparative Assessment Report**, considered the level of disturbance and programme as part of the criteria used to compare different options for Proposed Works Offshore.
Consideration should be given to partial decommissioning options, such as leaving foundations below seabed level in situ, where appropriate. Such approaches may significantly reduce environmental disturbance and to both benthic communities in the area as well as minimum disturbance to migratory pathways and feeding grounds for Salmonids.	**Volume 2, Chapter 2** and **Volume 3, Appendix 2.1** have considered partial decommissioning options, and in relation to monopile (MP) foundations, partial removal, with MPs cut below seabed has been selected as the preferred alternative for Proposed Works Offshore.
ACP, Inspector's Report (ACP 321635-25) – Matters arising, 7th May 2026	
Defining the scope of the proposed development and completion of the Comparative Assessment analysis, in light of the Prospective Applicant not seeking an opinion on design flexibility under S.287	Noted. **Volume 2, Chapter 2** provides an overview of alternatives considered and process followed to define the requirements of the Proposed Works Offshore, which include the completion of a Comparative Assessment Report (**Volume 2, Appendix 2.1**).

2.3 Approach to the Consideration of Alternatives

2.3.1.1 Schedule 6 of the Planning and Development Regulations 2001 (as amended) ('the 2001 Regulations') requires EIARs to include "a description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment". The full relevant legislation and policy context for the Proposed Works has been detailed in **Volume 2, Chapter 1**.

2.3.1.2 The Environmental Protection Agency (EPA) guidelines (EPA, 2022) further indicate that it is generally sufficient to provide a broad description of each main alternatives and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. Guidance prepared for the Department of Communications, Climate Action & Environment (DCCAE) and Sustainable Energy Authority of Ireland (SEAI)

(MDB, 2017) emphasises that selected alternatives must be realistic, reasonable, viable and implementable.

2.3.1.3 In line with the above, a number of alternatives have been considered for Proposed Works Onshore and Offshore and/or in relation to decommissioning approaches for offshore and onshore infrastructure.

2.3.1.4 The Comparative Assessment (CA) presented in **Volume 3, Appendix 2.1** considered the following assessment criteria in detail for the comparison of decommissioning options in relation to WTG foundations (i.e. monopiles (MPs)) and inter-array and offshore export cables:

- Safety – considering health and safety (H&S) risks to decommissioning workers, other sea users and offshore infrastructure;
- Environment - considering potential environmental impacts during and after decommissioning activities;
- Technical feasibility - considering practical and engineering considerations;
- Societal - considering how stakeholders and third party users may be affected by decommissioning options; and
- Cost - considering economic considerations associated with decommissioning activities and long-term liability costs.

2.3.1.5 In this chapter, these five main criteria are considered qualitatively in relation to additional alternatives identified to Proposed Works, and additional onshore and offshore infrastructure components, not covered in the CA, in order to justify the preferred approach to Proposed Works. Alternatives have therefore been colour coded for each assessment criterion as follows:

- Green - alternative presents low adverse risks and/or benefits in relation to a given criterion;
- Yellow - alternative presents moderate adverse risks in relation to a given criterion;
- Orange - alternative presents high adverse risks in relation to a given criterion; and
- Grey - alternative is not considered relevant for a given infrastructure component or not relevant for differentiating between alternatives.

2.3.1.6 For the purposes of comparing between alternatives and identifying a preferred one, colour codes have also been given a numerical score, where the overall highest score corresponds to the preferred approach to be adopted by Proposed Works.

2.3.1.7 Although permitting risks have not been considered in the rating of alternatives, high-level commentary is made in relation to potential permitting challenges and opportunities that would be faced with each alternative.

2.4 Alternatives to Proposed Works Offshore

2.4.1 Overview

2.4.1.1 This section presents a broad description and qualitative comparison of:

- Dredging method alternatives, should dredging works be required to facilitate safe vessel access to offshore infrastructure located within the Sub Lease Area;
- Disposal method and/or location alternatives for any dredged material; and
- Alternatives for offshore infrastructure (i.e. WTGs / met mast, transition piece (TP), MPs, scour protection, and inter-array and offshore export cables), including:
  - Do-nothing - leaving existing offshore infrastructure *in situ* and entirely intact, with no long-term maintenance undertaken;
  - Retain *in situ* - retaining existing offshore infrastructure *in situ* with installation of navigational aids and minimal maintenance in perpetuity to extend the structural integrity of offshore infrastructure. For inter-array of offshore export cables this would require maintaining these buried in perpetuity;

- Life-extension maintenance - keeping the existing offshore infrastructure operating safely and efficiently for additional years, with relatively limited intervention (e.g. repairs, component overhauls, retrofits, software and control upgrades, etc);
- Repowering - replacing or upgrading offshore infrastructure to extend productive life and increase output;
- Conversion / re-purposing - reusing offshore infrastructure for different purposes; and
- Partial / full removal - decommissioning offshore infrastructure partially and/or fully.

2.4.2 Dredging for Vessel Access

2.4.2.1 Given the variable bathymetry conditions historically recorded within the Offshore Site (specifically within the Sub Lease Area where WTGs, met mast and inter-array cables are located), see **Volume 2, Chapter 4: Coastal Processes, Sediment and Water Quality**, and subject to the seabed levels found at the time of decommissioning, there is potential for some localised dredging to be required to facilitate safe vessel access to the Sub Lease Area, should partial / full removal of offshore infrastructure be undertaken.

2.4.2.2 A number of dredging methods have been considered and compared:

- Trailing Hopper Suction Dredgers (TSHD), which are self-propelled vessels equipped with hydraulic dredgers, that make use of centrifugal pumps and can transport the material to the required disposal area. TSHD uses articulated dredging pipes that extend to the seabed;
- Cutter Suction Dredgers (CSD), which have a rotating cutter head at the end of a suction line, typically shaped like a basket and feature blades that rotate within it. Material can be pumped into housing or directly through a discharge pipeline. CSD are highly adaptable, as they can be equipped with a variety of blades and scoops designed to handle different types of materials;
- Backhoe Dredgers (BHD), which operate like land-based excavators, and are particularly useful in confined or shallow areas. BHDs have a hydraulic grab crane mounted on a dredging pontoon, usually held in place by three spud poles;
- Grab Hopper Dredgers (GHD), which operates with a distinctive bivalve grabbing system suspended from a crane, controlled either by cables or hydraulic cylinders. GHDs are able to precisely target and remove specific volumes, useful in shaping and maintaining navigational channels and berthing areas; and
- Water Injection Dredgers (WID), which spray water at a low pressure into the waterbed, fluidising the sediment, and making it flow out.

2.4.2.3 From a safety and technical feasibility perspective, the most favourable methods are considered to be CSD (considered very efficient for precise channel dredging and sandy environments), BHD (considered very efficient for precise excavations) and TSHD, although TSHD reduce their efficiency in very shallow waters due to draught constraints and can be less precise for narrow channel geometry; whilst GHD (limited efficiency in loose sand and poor performance in sites subject to strong currents) and WID (limited efficiency in areas with unpredictable sediment pathways, and limited capacity to create new deep channels) would be anticipated to have a worse performance overall.

2.4.2.4 From an environmental perspective, TSHD (through draghead seabed disturbance and overflow) would be anticipated to generate moderate turbidity, whilst CSD and BHD would generate lower turbidity (given that there is no overflow) and any potential impacts would be more localised. In contrast, GHD (through spillage from grab) and WID (through fluidising sediment) would be anticipated to generate high turbidity and potential large-scale sediment plumes downstream. Other marine users, such as fishers, would mainly be indirectly affected through potential changes in water quality caused by dredging works, and therefore, the rating of alternatives in relation to societal criteria mirrors that applied for environmental criteria. Finally, from a cost perspective, although TSHD normally have associated medium to high day rates, their high production would make them overall competitive. Similarly, CSD and BHD also have a relatively moderate cost in suitable weather and sea state conditions. In contrast GHD is considered to have a high cost per cubic metre (m^3) in offshore sands and WID would only be a competitive alternative for maintenance purposes.

2.4.2.5 As illustrated in **Table 2.2**, overall, the use of CSD and BHD methods are considered the most favourable alternatives for any potential dredging required to facilitate vessel access should partial / full removal of WTGs, TPs and MPs be pursued. The use of CSD, BHD or both would depend on the seabed levels encountered at the time of decommissioning and final volumes of material to be dredged.

Table 2.2: Qualitative rating of alternatives for dredging works potentially required to facilitate safe vessel access in relation to safety, environment, technical feasibility, societal and cost criteria (refer to section 2,3 of this EIAR chapter for .

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
TSHD	2	2	2	2	2	10
CSD	2	3	3	3	2	**13**
BHD	2	3	3	3	2	**13**
GHD	1	1	1	1	1	5
WID	1	1	1	1	1	5

Scoring of alternatives considers: Green (3 points) for low adverse risks / benefits, Yellow (2 points) for moderate risks, Orange (1 point) for high risks, and Grey (0 points) for alternatives not relevant to dredging works.

2.4.3 Disposal of Dredged Material

2.4.3.1 Disposal of dredged material would only be required if full or partial removal of WTGs, TPs and MP are pursued, in relation to:

- Disposal of dredged material to be extracted from the MPs in order to facilitate MP lifting; and
- Disposal of dredged material generated during dredging of vessel access channels (if required).

2.4.3.2 In both cases, three disposal locations have been considered and compared:

- Disposal within the Sub Lease Area;
- Disposal offshore but offsite (i.e. outside the Sub Lease Area), i.e. designated disposal areas; and
- Disposal onshore.

2.4.3.3 From a safety and technical perspective, disposal within the Sub Lease area would be safe and simple, as it would avoid transporting material over long distances, minimising interaction with other marine users, which would be greater if disposing material offsite or taking it to shore. From an environmental perspective, returning material to the sand bank would minimise interference with the sand bank dynamics and sediment transportation patterns, which could not be avoided if taking dredged material outside the local system. From a cost perspective, given the shorter distance and less complex operations, disposal within the Sub Lease Area would have the lowest upfront cost in contrast with potential costs associated with disposal offsite.

2.4.3.4 As illustrated in **Table 2.3**, overall, disposal of dredged material within the Sub Lease Area is considered the most favourable alternative.

Table 2.3: Qualitative rating of alternatives for disposal of dredged material location in relation to safety, environment, technical feasibility, societal and cost criteria.

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Within the Sub Lease Area	3	3	3	3	3	**15**
Within designated offsite disposal site	2	1	2	2	2	9
Onshore disposal	2	1	2	2	2	9

Scoring of alternatives considers: Green (3 points) for low adverse risks / benefits, Yellow (2 points) for moderate risks, Orange (1 point) for high risks, and Grey (0 points) for alternatives not relevant to disposal of dredged material location.

2.4.3.5 In addition to disposal location, two disposal methods have been considered and compared:

- Disposal through a pipeline, which depending on length would need to be supported by anchors; and
- Disposal through side casting from a skip or barge.

2.4.3.6 From a safety and technical perspective, pipeline disposal would increase control over placement of material and could be undertaken continuously during dredging works to optimise the programme of works. However, this would only be applicable for disposal of dredged material located inside MPs, and for vessel access dredging if using CSD (not feasible if using BHD). The complexity of the operation would increase with increased lengths of pipeline required, which should be aimed for in the case of vessel access dredging in order to avoid dredged channels filling up too quickly. The longer the pipeline the more vulnerable it would be to currents and anchor handling would become more complex. In contrast, side casting would be a simple and safe operation but with no full control over disposal location.

2.4.3.7 From an environmental perspective, pipeline disposal would minimise turbidity if well managed and only potentially have highly localised impacts. Assuming that disposal would be undertaken within the Sub Lease Area, no interference with other users would be anticipated. In contrast, side casting would temporarily generate turbidity during discharge. From a cost perspective, pipeline disposal would be efficient for large volumes over short distances, whilst side casting would generally be cost-effective.

2.4.3.8 As illustrated in **Table 2.4**, overall, the use of pipeline disposal would be more suitable for dredged material located inside MPs, where pipeline length could be short and cost-efficient, whilst side casting would be a more favourable alternative for disposal of dredged material over longer distances, with the intention of avoiding sediment return into the dredged channels.

Table 2.4: Qualitative rating of alternatives for disposal methods in relation to safety, environment, technical feasibility, societal and cost criteria.

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Disposal of dredged material located inside MPs						
Pipeline	3	3	3		2	**11**
Side casting	3	2	3		2	10
Disposal of dredged material generated during dredging of vessel access channels (if required)						
Pipeline (only for CSD)	2	3	2		1	8

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Side casting	3	2	3		2	**10**

Scoring of alternatives considers: Green (3 points) for low adverse risks / benefits, Yellow (2 points) for moderate risks, Orange (1 point) for high risks, and Grey (0 points) for alternatives not relevant to disposal methods.

2.4.4 Wind Turbine Generators and Met Mast

2.4.4.1 The do-nothing and retain *in situ* alternatives for WTGs and the met mast would result in existing WTG and met mast components gradually deteriorating over time.

2.4.4.2 Degradation would be at a slower rate under a retain *in situ* alternative, however, given that WTGs are beyond design life and the main structural components are experiencing general degradation, there will be a time when maintenance of components is no longer technically feasible or economically viable. Regarding the met mast, it was originally intended for wind data collection pre-construction, and currently, only a camera is operational, which is mainly used for offshore sea condition monitoring.

2.4.4.3 The gradual degradation of WTG and met mast components would eventually release materials into the marine environment, and also pose a H&S hazard to other marine users and maintenance teams, potentially introducing collision risk and liability costs.

2.4.4.4 WTGs and the met mast are not currently operational, and their components are considered to be in poor and ageing condition, for instance:

- Corrosion in WTG flange joints;
- WTG blades are considered to be in a deficient state and were removed in 2025 for maintenance and assessment. However, these are not planned to be reinstalled due to their condition;
- The medium-voltage (MV) / high-voltage (HV) switchgear in WTGs has surpassed the recommended 10,000 switching operations; and
- Meteorological sensors in the met mast are currently offline.

2.4.4.5 It is not possible to return the WTGs to an operational state. There is no supply of the majority of the components which would be required and limited intervention associated with the life-extension maintenance alternative would not be sufficient to safely operate WTGs and the met mast.

2.4.4.6 In line with this, any option for repowering would require full removal of the WTGs and replacing them with modern units. However, given the age, rating and condition of other components and supporting infrastructure (cables, grid connection, capacity, TPs and MPs), see **Sections 2.4.5 and 2.4.7**, swapping WTGs for others would not be technically feasible. The repowering alternative would therefore require fully replacing remaining offshore infrastructure, redesigning the layout of ABWP Phase I to suit more modern units and compatible electrical systems.

2.4.4.7 Considering the small size of the Sub Lease Area and bathymetric limitations, there would be very limited flexibility in layout, and a number of challenges associated with installation works. In addition, to any potential environmental and social impacts associated with full removal of offshore infrastructure (see **Section 2.4.5**), the construction and operation of a new offshore wind farm within the Offshore Site would have a range of other potential environmental and social impacts that would have to be carefully considered.

2.4.4.8 The conversion or re-purposing alternative for WTGs and met mast would only be applicable once WTGs are fully removed and associated components are re-used or repurposed as an alternative to recycling or other waste management routes, which is only feasible for certain components, e.g. not for WTG blades. **Volume 3, Appendix 3.8: Outline Offshore Waste Management Plan** provides an overview of waste management alternatives considered for offshore components, including those that are part of WTGs and met mast.

2.4.4.9 The partial removal alternative would only apply to WTGs or met mast if components were to be replaced as part of life-time extension maintenance or repowering alternatives, which have already been separately considered and therefore noted as not independently relevant for WTGs. In contrast, the full removal alternative would largely be a reversal of the installation process, with individual components dismantled, lifted and fastened to decommissioning vessels, a process considered technically feasible and of low complexity, with an overall low risk to environmental and social receptors. As with all offshore operations, a moderate but manageable level of H&S risk would need to be addressed, and works would have a relative moderate cost, much lower than potential costs associated with do-nothing, retain in *situ*, life extension maintenance or repowering alternatives.

2.4.4.10 As illustrated in **Table 2.5**, overall, the full removal alternative, complemented with conversion / repurposing of components removed, where feasible and practical, are considered the most favourable alternatives for WTGs and met mast decommissioning, which, in addition is in line with the Foreshore Lease Documentation requirements (see **Volume 2, Chapter 1**) and the waste hierarchy captured in **Volume 3, Appendix 3.8**. This is considered the least challenging alternative from a permitting perspective, as it could be executed within the period of validity of the existing Foreshore Lease Documentation (up to 2033), and would not require securing a Maritime Area Consent (MAC) for any activities extending beyond this date.

Table 2.5: Qualitative rating of alternatives for WTGs in relation to safety, environment, technical feasibility, societal and cost criteria.

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Do-nothing	1	1	3	1	1	8
Retain *in situ*	1	1	1	1	1	5
Life-extension maintenance	1	1	1	1	1	5
Repowering	1	1	1	1	1	5
Conversion / re-purposing (once WTGs is removed)	3	3	2	3	2	**13**
Partial removal						
Full removal	2	3	3	3	2	**13**

Scoring of alternatives considers: Green (3 points) for low adverse risks / benefits, Yellow (2 points) for moderate risks, Orange (1 point) for high risks, and Grey (0 points) for alternatives not relevant to WTG.

2.4.5 Transition Pieces and Foundations

2.4.5.1 The do-nothing and retain *in situ* alternatives for TPs and MPs would result in existing TP and MP components gradually deteriorating over time.

2.4.5.2 Degradation of structures would be at a slower rate under a retain *in situ* alternative, however, given that TPs and MPs are currently experiencing severe corrosion in TP splash zone areas and deterioration in sacrificial anodes, which are used to protect TPs and MPs from corrosion, there will be a time when maintenance of components is no longer technically feasible, economically viable or safe, e.g. increasing corrosion issues may challenge access, dive surveys and inspections.

2.4.5.3 In line with this, the life-extension maintenance alternative and associated limited intervention would not be sufficient to ensure the safe continuity of TPs and MPs in the long-term, which would require significant reinforcement of infrastructure that is technically challenging and not economically viable (Pakenham, Ermakova and Mehmanparast, 2021).

2.4.5.4 The gradual degradation of TP and MP components would lead to structural deterioration caused by increasing structural stress and fatigue, leading to the eventual collapse of these structures, and posing a H&S hazard to other marine users and maintenance teams, potentially introducing high liability costs.

2.4.5.5 Before the total failure of TPs and MPs, submerged and semi-submerged components would develop marine growth, introducing an artificial reef effect of relatively small scale given the low number of TPs / MPs present and lack of any other hard substrates within the Offshore Site.

2.4.5.6 Given the age and condition of TPs and MPs, no upgrade options for TPs and MPs have been identified, and the repowering alternative would require fully removing TPs and MPs and replacing them with bigger units, as MPs of dimensions equivalent to existing MPs, although available on the market, would not be able to support modern WTG units. Modern WTG units would require larger TPs and MPs, and a complete redesign of ABWP Phase I layout (see **Section 2.4.2**).

2.4.5.7 In addition, to any potential environmental and social impacts associated with full removal of offshore infrastructure (see below), the construction and operation of a new offshore wind farm within the Offshore Site would have a range of other potential environmental and social impacts that would have to be carefully considered.

2.4.5.8 The conversion or re-purposing alternative for TPs and MPs would require a range of interventions depending on the alternative selected, examples considered by Arklow Energy include:

- Conversion into fishing platforms, which would require integrating safe landing and transfer systems (e.g. boat landings, ladders, gangways, etc), potentially install platform extensions on the TP to facilitate storage, safe access and movement (given that available space at TPs is limited to approximately 41.25 m^2), and reinforce / redesign parts of the TP to handle human occupancy loads, all in addition to long-term maintenance of both TP / MP, which, as explained above is particularly challenging considering the age and condition of these components. Overall, this alternative would not be a long-term solution for TPs / MPs, interventions required are considered costly and long-term maintenance would be costly;
- Re-purposing for ocean current or tidal energy generation. Whilst ocean current energy devices have been scarcely tested, there are a number of tidal stream energy technologies that use underwater turbines that can be fixed to the seabed and could potentially repurpose the MPs, however, these remain in the research and development phase, requiring high investment costs, and are currently not commercially available (Thennakoon *et al.* 2023; Singh *et al.* 2025). Given the limited maturity of these technologies, their environmental impacts remain largely unknown and complex to assess, and would add to the full and partial removal of TPs and MPs that would be required respectively (see below), integration with grid connection electricity would also have to be assessed in more detail, as current infrastructure could pose challenges and require further upgrades (see **Section 2.4.7**). Accordingly, this alternative is not considered viable at this stage. Additionally, having engaged with a tidal kite developer, the Sub Lease Area was deemed too shallow. In addition, there is a considerable risk that the ageing offshore export and inter-array cables would fail at some point, given their age and the dynamic interface points on the MP / TP; and
- Re-purposing for solar photovoltaic (PV) energy generation, which would require installing a platform extension, such as cantilevered decks or attached platforms to increase the space available for solar PV systems, as this is currently very limited. TP and MP would also require reinforcement works to account for the solar system loads, and integration and controls systems would be required to ensure the grid connection could be repurposed albeit at a lower rating. There is a considerable risk that the ageing offshore export and inter-array cables would fail at some point, given their age and the dynamic interface points on the MP / TP. (see **Section 2.4.7**), all in addition to long-term maintenance of both TP / MP, which, as explained above is particularly challenging considering the age and condition of these

components. Overall, this alternative would not be a long-term solution for TPs / MPs, interventions required are considered costly and long-term maintenance has already been identified as unfeasible.

2.4.5.9 The partial removal alternatives would only apply to MPs and would follow the full removal of TPs. Two MP partial removal alternatives are considered in detail in **Volume 3, Appendix 2.1** cutting of MPs 2 m below the seabed level encountered at the time of decommissioning, or cutting MPs to a depth that minimises exposure of residual MPs post-decommissioning. In both cases, the risks associated with H&S and technical feasibility are considered manageable, environmental and social risks are considered moderate (only differing in post-decommissioning risks of potential residual MP exposure, with higher probability in a 2 m cut scenario), and of similar cost.

2.4.5.10 The TP / MP full removal alternative, also assessed in detail in **Volume 3, Appendix 2.1**, would introduce significant H&S and technical feasibility risks given the relatively low maturity of full removal methods, increased technical complexity and cost (including potential additional dredging required to facilitate safe vessel access for the larger vessels which would be required), risk of structural or extraction failure, and extended use of friction removal technologies, and potential requirement for alternate solutions if the initial machinery fails to deliver extraction. In addition, full TP / MP removal would introduce the largest alterations to the marine environment, largely due to the increased level of dredging required to support safe access of larger vessels required and associated programme extensions in comparison to partial removal alternatives.

2.4.5.11 Full TP and partial / full MP removal options would both allow recovery of materials, increasing opportunities for steel reuse and recycling, see **Volume 3, Appendix 3.8** for an overview of waste management alternatives considered for TPs / MPs.

2.4.5.12 As illustrated in **Table 2.6**, overall, the TP full removal / MP partial removal alternative is considered the most favourable alternative for TPs and MPs. This is also considered one of the least challenging alternatives from a permitting perspective, as it is considered to introduce environmental impacts of smaller scale than the full removal alternative, could be executed within the period of validity of the existing Foreshore Lease Documentation (up to 2033), and would not require securing a Maritime Area Consent (MAC) for any activities extending beyond this date.

Table 2.6: Qualitative rating of alternatives for TPs / MPs in relation to safety, environment, technical feasibility, societal and cost criteria.

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Do-nothing	1	2	3	1	1	9
Retain *in situ*	1	2	1	1	1	6
Life-extension maintenance	1	2	1	1	1	6
Repowering	1	1	1	1	1	5
MP conversion / re-purposing	2	2	2	3	1	10
TP full removal / MP Partial removal	2	2	3	3	2	**12**
TP / MP full removal	2	1	1	3	1	8

Scoring of alternatives considers: Green (3 points) for low adverse risks / benefits, Yellow (2 points) for moderate risks, Orange (1 point) for high risks, and Grey (0 points) for alternatives not relevant to TPs / MPs.

2.4.6 Scour Protection

2.4.6.1 The do-nothing alternative for scour protection would result in existing scour protection (in the form of sandbags filled with sand from the Sub Lease Area) becoming ineffective, and scour developing around MPs retained *in situ*, compromising MPs stability and fatigue. This alternative would also have potential localised effects on sediment dynamics within the Arklow Bank sand bank, of relatively higher scale with longer MP sections located above the seabed (i.e. TP / MP do-nothing / retain *in situ* alternatives (see **Section 2.4.5**). Without the removal of visible scour protection sandbags, these would degrade and potentially release sandbag debris into the marine environment, potentially introducing environmental risks (e.g. associated with pollution or entrapment) and social risks (from a reputational perspective, as debris would have low potential to interfere with activities undertaken by other marine users).

2.4.6.2 The retain *in situ* and life-extension maintenance alternatives would not be applicable to scour protection, as there is no minimal maintenance / limited intervention that can be undertaken, scour protection can either be monitored and maintained or not. Long-term monitoring / maintenance would only be applicable if MPs were to be retained *in situ* and required long-term protection from scour.

2.4.6.3 Repowering would not be applicable to scour protection, as repowering is intended to extend / increase the energy production of offshore wind farms. As described in **Sections 2.4.2** and **2.4.5**, repowering of WTGs and associated TPs / MPs would require a re-design of ABWP Phase I, which would also need to consider adequate scour protection, replacing existing scour protection.

2.4.6.4 The conversion or re-purposing alternative would not be applicable to scour protection either, as it would only be applicable once scour protection sandbags are partially or fully removed and if they could be re-used or repurposed as an alternative to recycling, which is not considered feasible, see **Volume 3, Appendix 3.8**.

2.4.6.5 The partial removal alternative would comprise removing scour protection that is visible and reachable at the time of decommissioning to minimise seabed disturbance whilst recovering as many of the sandbags as reasonably possible with the aim of minimising risks of sandbag debris release. This alternative is considered more technically feasible and less environmentally damaging and costly than full removal, which would require extensive dredging to try locating all sandbags historically placed within the Offshore Site, which, given the dynamic nature of the Arklow Bank sand bank, are likely to have significantly moved and degraded over time, and therefore the overall success of full removal could not be guaranteed.

2.4.6.6 As illustrated in **Table 2.7**, overall, the scour protection partial removal alternative is considered the most favourable alternative. This is also considered one of the least challenging alternatives from a permitting perspective, as it is considered to be the most environmentally responsible whilst introducing environmental risks of smaller scale than the full removal alternative, it could be executed within the period of validity of the existing Foreshore Lease Documentation (up to 2033), and would not require securing a Maritime Area Consent (MAC) for any activities extending beyond this date.

Table 2.7: Qualitative rating of alternatives for scour protection in relation to safety, environment, technical feasibility, societal and cost criteria.

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Do-nothing	3	2	3	2	3	13
Retain *in situ*						
Life-extension maintenance						
Repowering						

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Conversion / re-purposing						
Partial removal	3	3	3	3	2	**14**
Full removal	2	2	1	3	1	9

Scoring of alternatives considers: Green (3 points) for low adverse risks / benefits, Yellow (2 points) for moderate risks, Orange (1 point) for high risks, and Grey (0 points) for alternatives not relevant to scour protection.

2.4.7 Inter-array and Offshore Export Cables

2.4.7.1 The do-nothing alternative for inter-array and offshore export cables would leave cable infrastructure *in situ*, with no remediation, maintenance or monitoring. This alternative could result in cable infrastructure becoming gradually more exposed, posing a risk to other users anchoring or interacting with the seabed where cables are located. Any exposed sections would introduce increased marine growth, as currently observed in some of the short exposed sections of inter-array cable protection systems close to the MPs, see see **Volume 3, Appendix 5.1: Benthic Live Habitat Cable Survey and Observations Log**, although it should be noted that within the Sub Lease Area, the dynamic activity of the Arklow Bank sand bank may regularly bury / unbury inter-array cable sections, potentially hindering the long-term establishment of marine growth.

2.4.7.2 The retain *in situ* alternative for inter-array and offshore export cables would retain offshore infrastructure *in situ*, with any exposed sections re-buried, and long-term monitoring and remediation (in case of exposure) maintained in perpetuity. Although this alternative would benefit other users and be relatively technically feasible and safe, reburial works would have similar potential environmental effects to those associated with new cable infrastructure installation, including seabed disturbance and increase of suspended sediment concentrations (SSC) potentially affecting water quality and marine biodiversity receptors, and ecological disturbance introduced by associated vessel and machinery works, and be costly if maintained in perpetuity.

2.4.7.3 The life-time extension maintenance alternative would be similar to the above but assumes that cable infrastructure is maintained operational. However, the offshore export cable is known to have minor cable amour and insulation damage, and currently vulnerable to sudden failure, and therefore limited intervention associated with this alternative may not be sufficient to ensure the safe operation of cable infrastructure.

2.4.7.4 Repowering would require full removal and replacement of inter-array and offshore export cable infrastructure, given that, as noted in **Sections 2.4.2** and **2.4.5**, repowering would require the installation of modern WTGs that require modern voltage levels and replacement of existing cable infrastructure. To any potential environmental and social impacts associated with full removal of inter-array and offshore export cable infrastructure (see below), the installation of new cable infrastructure would have a range of other potential environmental and social impacts that would have to be carefully considered.

2.4.7.5 The conversion or re-purposing alternative for inter-array and offshore cables would only be applicable once these are fully removed and associated components are re-used or repurposed as an alternative to recycling or other waste management routes. However, as noted in **Volume 3, Appendix 3.8**, recycling is the only alternative available for cable infrastructure and this alternative is therefore not considered relevant for inter-array and offshore export cables.

2.4.7.6 The partial removal alternative would require cutting sections of the inter-array and offshore export cables exposed and leaving the rest of the cables buried and *in situ.* However, risks of cables becoming exposed post-decommissioning could not be ruled out, and the effort required to complete cutting operations in comparison to full removal would not make this option advantageous in comparison.

2.4.7.7 The full removal alternative would be of low technical complexity and have a negligible level of H&S risk, as required operations are widely applied in the industry. Environmental risks would be localised and of temporary nature, with specific management measures required within the vicinity of wreck remains located along the offshore export cable route. This alternative would also allow recovering cable material for recycling purposes.

2.4.7.8 As illustrated in **Table 2.8**, overall, the full removal alternative is considered the most favourable alternative for inter-array and offshore export cables, which, in addition, it is in line with the Foreshore Lease Documentation requirements (see **Volume 2, Chapter 1**). This is also considered the least challenging alternative from a permitting perspective, as it could be executed within the period of validity of the existing Foreshore Lease Documentation (up to 2033), and would not require securing a Maritime Area Consent (MAC) for any activities extending beyond this date.

Table 2.8: Qualitative rating of alternatives for inter-array and offshore export cables in relation to safety, environment, technical feasibility, societal and cost criteria.

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Do-nothing	2	2	3	2	3	12
Retain *in situ*	3	1	3	3	1	11
Life-extension maintenance	1	1	1	3	1	7
Repowering	3	1	1	1	1	7
Conversion / re-purposing						
Partial removal	2	2	2	2	1	9
Full removal	3	2	3	3	2	**13**

Scoring of alternatives considers: Green (3 points) for low adverse risks / benefits, Yellow (2 points) for moderate risks, Orange (1 point) for high risks, and Grey (0 points) for alternatives not relevant to inter-array and offshore export cables.

2.5 Alternatives to Proposed Works Onshore

2.5.1 Overview

2.5.1.1 Since the EIA Scoping Presentation (**Volume 3, Appendix 1.1**) was prepared, the Onshore Site boundary has been revised to include the area that will be used for the temporary storage of plant, machinery, excavated soil and materials, see **Volume 2, Chapter 3**. The additional Onshore Site area is located within existing "Spoil and Bare Ground" (ED2) and therefore findings presented in the Onshore Preliminary Ecological Appraisal appended to the EIA Scoping Presentation remain applicable.

2.5.1.2 The following alternatives for onshore infrastructure (onshore substation and onshore cables) decommissioning have been considered where relevant, further described and compared in the following sections:

- Do-nothing - leaving existing onshore infrastructure *in situ* and entirely intact, with no long-term maintenance undertaken;
- Conversion / re-purposing - reusing onshore infrastructure for different purposes; and
- Full removal - full decommissioning of onshore infrastructure.

2.5.1.3 In contrast with offshore infrastructure, life-extension maintenance, repowering and partial removal are not considered applicable to onshore infrastructure due to their current condition and age and are not considered further in this section.

2.5.2 Onshore Substation

2.5.2.1 The do-nothing alternative for the onshore substation and ancillary equipment would result in significant long-term risks associated with the gradual deterioration of infrastructure, which is already suffering from some level of corrosion (e.g. from cooling radiators and cooling fans). The current general condition of the transformers is also considered to be poor.

2.5.2.2 In the long term, environmental risks would arise mainly from:

- Potential sludge and trapped oils in the oil interceptor, which could degrade, overflow or leak as seals fail. Considering the proximity of the Onshore Site to the sea and the Avoca river, the existing high water table could accelerate contaminants migration into groundwater and then into nearby surface waters; and
- Release of hazardous components and residual oil remains from the transformers, which would gradually degrade over time.

2.5.2.3 In addition, abandoned and derelict infrastructure would attract vandalism and introduce adverse visual effects. Structural and safety hazards would be introduced by failing roofs and water ingress that would further destabilise the onshore substation building materials. Degrading electrical infrastructure could also pose a fire and safety hazard. Although the do-nothing alternative would in principle have no cost to Arklow Energy, given the hazards introduced through infrastructure abandonment, high liability costs could be created.

2.5.2.4 The conversion or re-purposing alternative for the Onshore Substation would only be applicable if the Electricity Supply Board (ESB) were interested in retaining this as part of their grid infrastructure, however, as noted in **Volume 2, Chapter 3**, ESB are only interested in retaining the onshore cable outside the Onshore Site for potential future re-use. Re-purposing for other renewable projects is also unlikely to be feasible given the age and limited capacity of the Onshore Substation, likely to be considered undersized for modern renewable energy projects. **Volume 3, Appendix 3.3: Outline Onshore WMP** provides an overview of waste management alternatives considered for onshore components, however, no alternatives to recycling have been identified at this stage for onshore substation components. Overall, conversion or re-purposing of the onshore substation components is not considered viable.

2.5.2.5 Full removal would require draining, cleaning and/or removing hazardous materials from components, dismantling of infrastructure and substation building for safe disposal in licensed waste management facilities for recycling and processing, and localised excavation to remove any underground components, which would be of low technical complexity, with H&S, environmental and social risks easily managed through common industry management measures, and relatively moderate cost. This alternative would also allow recovering most of the material for recycling and/ or appropriate waste management, see **Volume 3, Appendix 3.3**.

2.5.2.6 As illustrated in **Table 2.9**, overall, the full removal alternative is considered the most favourable alternative for the onshore substation and ancillary facilities.

Table 2.9: Qualitative rating of alternatives for the onshore substation in relation to safety, environment, technical feasibility, societal and cost criteria.

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Do-nothing	1	1	3	1	1	8
Conversion / re-purposing						
Partial removal						
Full removal	3	3	3	3	2	**14**

Scoring of alternatives considers: Green (3 points) for low adverse risks / benefits, Yellow (2 points) for moderate risks, Orange (1 point) for high risks, and Grey (0 points) for alternatives not relevant to onshore substation.

2.5.3 Onshore Cable

2.5.3.1 The do-nothing alternative for the onshore cable would leave cable infrastructure *in situ*, de-energised and buried underground. This alternative would cause degradation of the cable over time, as insulation materials can gradually break down, particularly if moisture ingress occurs, leaking insulation fluids into soil and groundwater over time. Leaving the cable *in situ* could also obstruct new utility installations or construction projects that may be proposed in the future within the vicinity of the onshore cable route.

2.5.3.2 The conversion or re-purposing alternative for the onshore cable would only be applicable for any excavated material generated during full removal works, which assuming it is uncontaminated, would be reused on-site to fill in excavation trenches. As noted in **Volume 3, Appendix 3.8**, recycling is the only alternative available for cable infrastructure.

2.5.3.3 The full removal alternative would be of low technical complexity and have a negligible level of H&S risk, as required excavation works are widely used in onshore cable removal works. Environmental risks would be localised and of temporary nature, manageable with standard industry measures. This alternative would also allow recovering cable material for recycling purposes.

2.5.3.4 As illustrated in **Table 2.8**, overall, the full removal alternative, completed with re-purposing of excavated soil, is considered the most favourable alternative for the onshore cable.

Table 2.10: Qualitative rating of alternatives for the onshore cable in relation to safety, environment, technical feasibility, societal and cost criteria.

Alternative	Safety	Environment	Technical Feasibility	Societal	Cost	Total Score
Do-nothing	1	1	3	3	3	11
Conversion / re-purposing (excavated soil only)	3	3	3	3	2	**14**
Partial removal						
Full removal	3	3	3	3	2	**14**

Scoring of alternatives considers: Green (3 points) for low adverse risks / benefits, Yellow (2 points) for moderate risks, Orange (1 point) for high risks, and Grey (0 points) for alternatives not relevant to the onshore cable.

2.6 Summary of Preferred Alternatives

2.6.1.1 Following the high-level qualitative assessment and comparison of alternatives for the Proposed Works, the following are considered the most favourable and therefore preferred alternatives, further described in **Volume 2, Chapter 3**:

- Proposed Works Offshore:
  - Dredging for vessel access method (if required) – CSD and BHD;
  - Disposal of dredged material location (if required) – within the Sub Lease Area;
  - Disposal of dredged material method (if required) – pipeline for dredged material located inside MPs, and side casting for dredged material generated during vessel access dredging (if required);
  - WTG and met mast – full removal;
  - TP and MP – TP full removal and MP partial removal;
  - Scour protection – partial removal; and
  - Inter-array of offshore export cables – full removal.
- Proposed Works Onshore:

- Onshore substation – full removal; and
- Onshore cable – full removal.

2.7 References

Environmental Protection Agency (EPA), 2003. Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland (2001-DS-EEP-2/5). Synthesis Report. Available at: https://www.epa.ie (Accessed: April 2026)

EPA, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports. Available at: https://www.epa.ie (Accessed: February 2026)

European Commission (EC), 2017. Environmental Impact Assessment of Projects: Guidance on Scoping. Available at: https://circabc.europa.eu (Accessed: March 2026)

Institute of Environmental Management and Assessment (IEMA), 2024. Impact Assessment Guidelines: Implementing the Mitigation Hierarchy from Concept to Construction. Available at: https://www.iema.net

International Association of Oil & Gas Producers (IOGP), 2024. Guideline for comparative assessment in decommissioning. IOGP Report 678. Available at: https://www.iogp.org (Accessed: March 2026)

MacCabe Durney Barnes (MDB), 2017. Guidance on EIS and NIS preparation for Offshore Renewable Energy Projects. Prepared for the Department of Communications, Climate Action & Environment (DCCAE) and Sustainable Energy Authority of Ireland (SEAI). Available at: https://assets.gov.ie (Accessed: February 2026)

Office of the Planning Regulator, n.d. Planning Library. Environment and Climate Glossary. Available at: https://www.opr.ie (Accessed: June 2026)

Pakenham, B., Ermakova, A. and Mehmanparast, A., 2021. A Review of Life Extension Strategies for Offshore Wind Farms Using Techno-Economic Assessments. *Energies* 2021, *14*(7), 1936; https://doi.org/10.3390/en14071936 (Accessed: April 2026)

Singh, D., Muneeb, A., Singh, S., Choksi, K., Mirza, A.B., Luo, F., 2025. Powering the Sea: Challenges and Trends in Tidal Energy Integration, Power Converter Technology, and the Path Forward. IEEE Access, vol. 13, pp. 187155-187186, 2025, doi: 10.1109/ACCESS.2025.3625578 (Accessed: April 2026)

Thennakoon, T.M.T.N., Hewage, H.T.M., Sandunika, D.M.I., Panagoda, L.P.S.S., Senarathna, W.G.C.M., Sulaksha, L.G.T., Weerarathna, D.M., Jayathma, W.M.V.A., Gamage, D.G.M.L., Perera, M.D.V., 2023. Harnessing the Power of Ocean Energy: A Comprehensive Review of Power Generation Technologies and Future Perspectives. Journal of Research Technology and Engineering 4 (3), 73-102. Available at: https://d1wqtxts1xzle7.cloudfront.net (Accessed: April 2026)