ABWP Phase I Decommissioning

Outline Onshore Waste Management Plan

Volume 3, Appendix 3.3



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Project name ABWP Phase I Decommissioning

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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.
Backfilling	Placement of excavated material back into the trench or excavation after removal.
Detailed Onshore Decommissioning Management Plan (DEMP)	The contractor-developed version of the Outline Onshore DEMP (see outline version in **Volume 3, Appendix 3.1**), to be prepared before Proposed Works Onshore commence and maintained as a live document until completion.
Detailed Onshore Waste Management Plan (WMP)	The contractor-developed version of this Outline Onshore WMP, to be prepared before Proposed Works Onshore commence and maintained as a live document until completion.

Term	Meaning
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).
Dredged material	Seabed material arising from localised dredging potentially required to facilitate safe vessel access during Proposed Works Offshore, and / or extraction of seabed material located inside monopile (MP) foundations, as part of MP decommissioning.
Dumping	Any deliberate disposal in the maritime area (including side-cast dredging, plough dredging, water injection dredging and other such dredging techniques of a substance or material from or in conjunction with a vessel or aircraft or offshore installation (Dumping at Sea Act 1996 (as amended)).
Duty of Care	In a waste management context, the duty of care is the requirement to manage waste without causing environmental pollution and to transfer waste only to appropriately authorised persons and facilities.
Hazardous waste	Waste that displays one or more hazardous properties and requires specialist classification, storage, handling, transport and treatment (Waste Management Act 1996 (as amended)).
List of Waste (LoW)	The classification system used to assign waste codes to hazardous and non-hazardous waste.
Non-hazardous waste	Waste that does not display hazardous properties but must still be correctly classified, segregated, stored and transferred (Waste Management Act 1996 (as amended)).
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.
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.
Port marshalling area	The port-based area used for temporary storage, segregation, handling and onward transfer of recovered materials and wastes.
Pre-demolition audit	Inspection and verification process used before works commence to identify materials, hazardous components, reuse opportunities and likely waste streams.
Principal Decommissioning Contractor	In this document, meaning the contractor(s) appointed to undertake the Proposed Works Onshore and to prepare, implement and update the Detailed Onshore DEMP and associated management plans, keeping them as live documents until completion.
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).
Reinstatement	The restoration of areas affected by excavation, cable removal, dismantling or other Proposed Works Onshore, including any road, footway, verge or site surface affected by the works.
Segregation	The separation of waste streams by type at source to improve reuse, recycling, recovery and traceability.
Waste coordinator	The person appointed to oversee implementation, monitoring and review of waste management arrangements for the Proposed Works Onshore.

Term	Meaning
Waste Electrical and Electronic Equipment (WEEE)	Electrical and electronic items requiring separate handling, treatment and recovery from bulk structural materials.
Waste Hierarchy	The order of preference for managing waste, prioritising prevention, reuse, recycling and recovery ahead of disposal.
Waste Management Facility (WMF)	A permitted or licensed facility authorised to receive, treat, recover or dispose of waste.

Acronyms

Acronym	Meaning
ABWP	Arklow Bank Wind Park
ACP	An Coimisiún Pleanála
C&D	Construction and Demolition
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
EU	European Union
KPI	Key Performance Indicator
LoW	List of Waste
NTFSO	National TransFrontier Shipment Office
PCB	Polychlorinated Biphenyls
PLC	Programmable Logic Controller
UPS	Uninterruptible Power Supply
WEEE	Waste Electrical and Electronic Equipment
WMP	Waste Management Plan
WTF	Waste Transfer Form

Units

Unit	Meaning
%:	per cent
km	kilometre
knot	nautical mile per hour
kV	kilovolt
m	metre
m^3	cubic metre
mm	millimetre
MW	megawatt
nm	nautical mile
t	Metric tonne

1 Introduction

1.1 Background

1.1.1.1 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).

1.1.1.2 This Outline Onshore Waste Management Plan (WMP) has been prepared to support the planning application for the Proposed Works.

1.1.1.3 This Outline Onshore WMP is drafted as a living document and is intended to be updated following consent, Principal Decommissioning Contractor appointment, detailed method development and consultation with relevant authorities and stakeholders. The Outline Onshore WMP intends to demonstrate the appropriate Irish planning-stage approach of setting out minimum commitments, implementation principles and further actions, with the Detailed Onshore WMP to be finalised before Proposed Works Onshore commence.

1.1.1.4 The overarching aims of this Outline Onshore WMP are to:

- Ensure waste management during the Proposed Works Onshore complies with relevant legislation, policy and guidance;
- Increase resource efficiency and environmental performance; and
- Protect the environment and the community.

1.1.1.5 The scope of works completed to achieve these aims includes:

- Identify potential waste arisings expected as a result of the Proposed Works Onshore;
- A review of international, national and local legislation, policy and guidance to determine required standards for waste management;
- Development of project-level objectives to help ensure that good waste management is adopted at an early stage, in line with the Waste Hierarchy and standards identified for the project;
- Identify waste minimisation measures to prioritise waste prevention; and
- Identify waste management options for remaining wastes.

1.1.1.6 This Outline Onshore WMP is supported by the following appendices:

- **Appendix A: Proposed Onshore Waste Monitoring Template.**

1.1.1.7 This Outline Onshore WMP has been prepared having regard to the Environmental Protection Agency (EPA) Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects, which set out the Irish good-practice approach for resource efficiency, waste prevention, segregation, tracking and review.

1.2 Scope of the Document

1.2.1.1 It should be noted that this Outline Onshore WMP only considers waste generated during Proposed Works Onshore. Waste management associated with Proposed Works Offshore is outside the scope of this Outline Onshore WMP, and separately covered in **Volume 3, Appendix 3.8: Outline Offshore WMP**.

1.3 Roles and Responsibilities

1.3.1.1 It is important to set out the roles and responsibilities of the various parties involved with the Proposed Works Onshore to ensure that waste management obligations are managed effectively from the start of the decommissioning process. **Table 1.1** summarises the key roles and responsibilities to be defined during the Proposed Works Onshore and implementation of the Detailed Onshore WMP to be developed by the appointed Principal Decommissioning Contractor.

1.3.1.2 The Detailed Onshore WMP will be a live document during works and should be kept at the site for reference and must be accessible to all site operatives.

Table 1.1: Summary of Roles and Responsibilities to be Defined in the Detailed Onshore WMP

Party	Description	Responsibility
Arklow Energy	The Applicant is Arklow Energy Limited (referred to as "Arklow Energy")	Arklow Energy has overall responsibility for the Outline Onshore WMP. The Detailed Onshore WMP will need to include a joint declaration between the appointed Principal Decommissioning Contractor and Arklow Energy to ensure that the waste Duty of Care is complied with and to take all reasonable steps to ensure that materials are handled efficiently and waste is managed appropriately.
Waste coordinator (on behalf of Arklow Energy)	Waste Coordinator Appointing a waste coordinator is not a legal requirement; however, it would ensure that the waste objectives are met	Arklow Energy is responsible for the appointment of a waste coordinator (which could also be done through the Principal Decommissioning Contractor). Appointment of a waste coordinator would initiate the Detailed Onshore WMP process early and drive the waste objectives during the detailed design. (A waste coordinator is not yet appointed).
Relevant directors and managers within the project team	This is not a legal requirement but in practice, the relevant team leaders would need to approve the Proposed Works Onshore's waste objectives identified in the Detailed Onshore WMP, which would need support from both top down and bottom up.	Good practice promotes the early adoption of the Detailed Onshore WMP by the design team so that waste minimisation can be optimised throughout the design process. Where necessary, any design developments would be reflected in the Detailed Onshore WMP.
Principal Decommissioning Contractor	Contractor appointed to execute Proposed Works Onshore (not yet appointed).	The Principal Decommissioning Contractor will be responsible for managing the Proposed Works Onshore and will be responsible for producing the Detailed Onshore WMP (in accordance with this Outline Onshore WMP) and ensuring the WMP is implemented, monitored, reviewed and updated, during the works.
Subcontractor(s)	Subcontractors for the demolition stage (appointed by the Principal Decommissioning Contractor).	Where applicable, it is recommended that subcontractors working under the Principal Decommissioning Contractor produce their own Detailed Onshore WMP in accordance with the measures outlined in this Outline Onshore WMP.

2 Description of Proposed Works Onshore and Waste Generation

2.1 Overview

2.1.1.1 The Proposed Works Onshore will comprise decommissioning of the onshore substation and ancillary equipment, removal of transformer, dismantling of the building and bunded areas, and removal of the section of onshore cable between landfall and the onshore substation compound boundary.

2.1.1.2 The onshore cable removal works will include setting up exclusion zones and signage, excavation, cable extraction, temporary storage of machinery and excavated soil within the Onshore Site.

2.1.1.3 The Proposed Works Onshore works are anticipated to be undertaken during daytime over an indicative period of less than five weeks / approximately 30 days, and may be undertaken separately from, or in parallel with, the Proposed Works Offshore.

2.2 Initial Review of Waste Generated Anticipated

2.2.1 Introduction

2.2.1.1 This section summarises the anticipated waste streams (based on information available at the time of reporting) and outlines recommended management options based on the constraints and opportunities of the Proposed Works Onshore.

2.2.1.2 Recovery rates[1], quantities and waste material breakdown have been estimated based on publicly available information, current knowledge of the components installed and represent the potential viable recovery rates for each of the expected waste type.

2.2.1.3 It would be the responsibility of the Principal Decommissioning Contractor to confirm the waste streams, anticipated volumes and suitable management options upon appointment and up to the point of commencing the Proposed Works Onshore. In addition, where applicable, the Principal Decommissioning Contractor or Arklow Energy (as appropriate) would ensure that any additional requirements such as waste licenses or permits are obtained to ensure full compliance with relevant legislation.

2.2.2 Onshore Substation

2.2.2.1 **Table 2.1** summarises the quantities of waste arisings expected from the decommissioning and demolition of the onshore substation.

Table 2.1: Quantities arising from the decommissioning and demolition of the onshore substation

Onshore Subcomponent (Material List of Waste (LoW))	Volume/Tonnes of Arisings (m³/tonnes)	Estimate reuse onsite (%)	Estimate recycle (%)	Estimate disposal non-hazardous (%)	Estimate disposal hazardous (%)
Onshore substation building (excluding components and ancillary equipment)					
Substation building (construction of concrete and tiles) (17 01 01 17 01 03	~30 t (based on plan dimensions and preliminary estimations)	0	90 - 100	10 - 0	0

[1] Construction & Demolition Waste Statistics for Ireland, EPA. Accessed: March 2026. Available at: https://www.epa.ie/our-services/monitoring--assessment/

Onshore Subcomponent (Material List of Waste (LoW))	Volume/Tonnes of Arisings (m³/tonnes)	Estimate reuse onsite (%)	Estimate recycle (%)	Estimate disposal non-hazardous (%)	Estimate disposal hazardous (%)
17 01 07 if impractical to segregate)					
Transformer and electronic components					
1:1 38 kV transformer (16 02 09* / 16 02 14)	~160m³ gross external volume (based on plan dimensions)	0	50 – 70	40 – 24	10 – 6
Transformer oil (13 03 XX*)	6.7m³ (6,700 L)	0	0	0	100
Switchgear, Servers and UPS (16 02 13* / 16 02 14 / 16 06 XX*)	~1.5 t (based on commercially available and comparable equipment)	0	50 – 70	47.5 – 27.5	2.5
Oil interceptor contents if any (13 05 07* oily water and 13 05 03* sludge)	9.9 m³ minimum containment capacity to be managed if present	0	0	0	100
Foundations and fencing					
Below Ground Concrete bund (17 01 01 concrete 17 04 05 rebar)	~36 t (based on plan dimensions and a preliminary reinforced-concrete take-off assumption)	0	90	10	0
Steel boundary fence and Wind screen (17 04 05)	~1.5 t (based on total length and assuming weight based on commercially available fences)	0	95 – 100	5 – 0	0

Table note: Hazardous waste materials are marked with an asterisk (*), where the specific material is not known with certainty, the LoW code was left incomplete (e.g. for the transformer oil, the specific oil is not known, therefore the general classification into 13 03 for 'waste insulating and heat transmission oils' was assigned; similarly for the UPS batteries, the specific battery technology is not known therefore the general classification into 16 06 for 'batteries and accumulators' was used).

2.2.3 Onshore Cable

2.2.3.1 **Table 2.2** below summarises the estimated waste types and volumes expected to arise from the removal of the onshore export cable.

2.2.3.2 Excavated soil generated during the decommissioning works will be retained and reused onsite for reinstatement/backfilling, where suitable. The material will be inspected and managed to confirm that it comprises uncontaminated soil or other naturally occurring material, excavated during decommissioning activities, and that its reuse is certain, in its natural state, for decommissioning purposes on the same site from which it was excavated. On this basis, the material falls outside the scope of the Irish waste management regime, as the Waste Management Act 1996, as amended by S.I. No. 126 of 2011, does not apply to such material when these conditions are met. The same exclusion is repeated under Regulation 26 of the European Communities (Waste Directive) Regulations 2011. Accordingly, Article/Regulation 27 by-product notification is not applicable, as the material is not being transferred offsite or managed as a by-product; rather, it is excluded from waste controls for same-site reuse.

2.2.3.3 Where excavated material is identified or suspected to be contaminated, it will not be reused. Such material will be appropriately sampled, characterised and classified in accordance with Irish waste legislation and EPA waste classification guidance, including assignment of the relevant LoW code. Where the material is classified as hazardous waste, it will be segregated, stored and consigned only to appropriately authorised waste contractors and permitted/licensed

recovery or disposal facilities, in accordance with the Waste Management Act 1996, as amended, and applicable Irish waste management regulations.

Table 2.2: Quantities arising from removal of onshore export cable

Material	Volume/Tonnes of Arisings (m³/tonnes)	Estimate reuse onsite (%)	Estimate recycle (%)	Estimate disposal non hazardous (t)	Estimate disposal hazardous (t)
Onshore cable					
Cables (17 04 11)	0.5 t (based on the approximate length expected to be removed)	0	90 – 100	10 – 0	0
Trench					
Excavated soil / stones from trench opening (17 05 04)	~70 m³ (material is expected to be reused for reinstatement once the cable is removed)	100	0	0	0

3 Legislation, Policy and Objectives

3.1 Introduction

3.1.1.1 This section of the report provides the overarching principles of waste management. The key principles and targets are summarised in this section and are used to develop project specific objectives and targets.

3.2 Waste Regulatory Framework

3.2.1.1 The principal waste legislation for the Proposed Works Onshore is the Waste Management Act 1996 (No. 10 of 1996), as amended. This Act provides the main legal framework for waste prevention, collection, transfer, recovery and disposal in Ireland, and requires waste to be managed without causing environmental pollution.

3.2.1.2 The waste hierarchy applies to all Project wastes under Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, as amended by Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste, and as implemented by the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) and the European Union (Waste Directive) Regulations 2020 (S.I. No. 323 of 2020). The Proposed Works Onshore will therefore prioritise prevention, preparing for re-use, recycling and recovery ahead of disposal.

3.2.1.3 In policy terms, this Outline Onshore WMP has also been prepared having regard to A Waste Action Plan for a Circular Economy: Ireland's National Waste Policy 2020–2025, the Whole-of-Government Circular Economy Strategy 2022–2023 and the National Waste Management Plan for a Circular Economy 2024–2030. Together, these documents support waste prevention, stronger segregation, higher-value re-use and recycling, improved by-product and end-of-waste pathways, better domestic treatment capacity and reduced reliance on disposal.

3.2.1.4 The Circular Economy and Miscellaneous Provisions Act 2022 (No. 26 of 2022) and the Whole-of-Government Circular Economy Strategy 2022–2023 support this approach by promoting resource efficiency, longer material use and higher-value recovery. For the Proposed Works Onshore, this means that decommissioning methods and waste routes will be selected to maximise re-use, refurbishment, recycling and recovery where practicable.

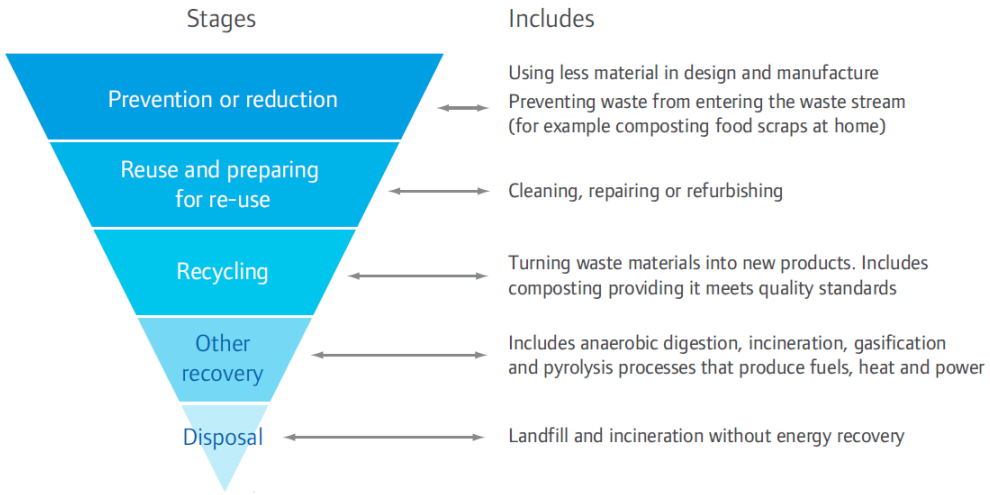


Figure 1: Waste Hierarchy

3.2.1.5 All waste streams will be classified using the List of Waste[2] and relevant EPA guidance before they leave the Onshore Site.

3.2.1.6 Waste may only be transferred by holders of an appropriate authorisation under the Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007), as amended, and may only be accepted at facilities authorised under the Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821 of 2007), as amended, or under an EPA licence, as applicable. Where a third party arranges recovery or disposal on behalf of the Project, the Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S.I. No. 113 of 2008) may also apply.

3.2.1.7 Under the Waste Framework Directive Member States must achieve 70% of material recovery of non-hazardous, non-soil-and-stone Construction and Demolition waste by 2020.

3.3 Local Council Targets

3.3.1.1 At local level, the Onshore Site is located in County Wicklow.

3.3.1.2 The current national local-authority waste planning framework is the National Waste Management Plan for a Circular Economy 2024–2030, which was adopted by all 31 local authorities in February 2024.

3.3.1.3 Wicklow County Council also applies the County of Wicklow (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws 2018. While these bye-laws are primarily relevant to household and commercial waste, they are applicable to any commercial-type waste arising from onshore support compounds, offices, welfare facilities, warehouses or marshalling areas used by the Proposed Works Onshore within County Wicklow.

3.4 Duty of Care

3.4.1.1 Under section 32 of the Waste Management Act 1996 (No. 10 of 1996), as amended, any person who holds, transports, recovers or disposes of waste must do so without causing, or being likely to cause, environmental pollution, and must only transfer waste to an appropriate person, i.e. a person authorised to collect, recover or dispose of that waste. Any loss, spillage or incident likely to cause pollution must be reported without delay to the relevant local authority and, for hazardous waste, also to the Environmental Protection Agency.

[2] Guidance on the Interpretation and Application of List of Waste Entries and Sub-Entries. Environmental Protection Agency (EPA), February 2025. Available at: https://www.epa.ie/

3.4.1.2 To demonstrate compliance, the Principal Decommissioning Contractor or Arklow Energy (as appropriate) will implement an auditable waste control system through the Detailed Onshore Waste Management Plan. That system will:

- assign clear responsibilities for waste classification, segregation, storage, transfer approval, documentation and incident reporting;
- identify each waste stream by source, description, List of Waste code and hazardous / non-hazardous status before off-site transfer;
- verify that all collectors hold a valid waste collection permit and that all receiving facilities hold the relevant authorisation;
- keep a record for each load showing the waste stream, quantity, origin, carrier, permit details, destination, receiving facility and intended recovery / disposal route; and
- retain supporting evidence, including transfer records, receipt / acceptance evidence, inspection records and incident reports.

3.4.1.3 For the Onshore Site location, the only mandatory electronic waste tracking system specifically identified is for hazardous waste moved within Ireland under the European Communities (Shipments of Hazardous Waste Exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011). The National TransFrontier Shipment Office (NTFSO) and the Dublin City Council, operates this compulsory system through the Waste Transfer Management Portal, using Waste Transfer Forms (WTFs), which must be completed online, signed, accompany the load in transit, and be validated by the receiving facility.

3.5 Project Waste Management Objectives

3.5.1.1 A list of proposed waste objectives for the Proposed Onshore Works is provided in **Table 3.1**. These combine general objectives and specific targets, based on national and local policy framework, best practice guidance and professional judgement.

Table 3.1: Waste Objectives

No.	Objective	Basis
1	Waste should be managed in line with the Waste Hierarchy	Priority must be given to waste prevention, followed by reuse on-site, efficient recycling, recovery and disposal as a last resort.
2	Waste should be managed following a good practice approach	Arklow Energy should adopt an emphasis on the upper levels of the Waste Hierarchy (waste prevention and reuse on-site) and the development of effective systems (e.g. Key Performance Indicators (KPIs)) to develop implement and monitor the Detailed Onshore WMP.
3	Waste should be managed as sustainably as possible	When identifying suitable waste management options, Arklow Energy should take into consideration the relative economic, social and environmental advantages and disadvantages of the options available.
4	The Proposed Works Onshore should aim to divert as much waste as possible from landfill through prevention, reuse, recycling and recovery where practicable.	Estimated volumes of excavation arisings have been provided by the project team (see **Section 2.2**). These are to be confirmed by the Principal Decommissioning Contractor once appointed. At this stage a target diversion from landfill of >70% will be proposed where feasible for Construction and Demolition wastes; generally accepted best practice aims towards >95% diversion from landfill. The Detailed Onshore WMP will determine in greater detail the achievability of these targets and strive for a good practice approach.
5	Minimise greenhouse gas emissions	The Detailed Onshore WMP should take into account the wider sustainability agenda, considering energy/ fossil fuel consumption and the overall efficiency of recycling and recovery operations, including transport.
6	Waste should be managed with due regard for Health and Safety	Waste management has a significant interface with health and safety. Health and safety must be taken into account when assessing waste management options and where necessary may be an overriding factor in determining waste management options.
7	Maintain full Duty of Care records and auditable waste tracking for all onshore waste movements	The Duty of Care section of the updated draft already sets out the need for an auditable system recording waste source, description, LoW code, carrier, destination and facility authorisation. This should be elevated into a project objective so that the Detailed Onshore WMP, waste transfer records, hazardous waste portal records (where

No.	Objective	Basis
		applicable) and disposal / recycling certificates are all maintained and available for audit.

4 Waste Management

4.1 Introduction

4.1.1.1 In line with the Waste Hierarchy priority must be given to waste prevention. Waste minimisation measures are outlined in **Section 4.2**. After minimisation measures, remaining waste must be managed in line with the objectives listed in **Section 3.5**. Management options are proposed in **Section 4.3**.

4.1.1.2 The Detailed Onshore WMP will be maintained as a live document by the Principal Decommissioning Contractor, providing further details on how the measures will be implemented prior to commencement of works. There will also be a requirement during Proposed Works Onshore for continual monitoring of wastes and review of waste arisings against that predicted to demonstrate compliance with the waste management objectives and measures proposed.

4.2 Waste Minimisation Measures

4.2.1.1 Recommended measures to achieve the objectives in **Table 3.1** for the Proposed Works Onshore are set out in **Table 4.1**.

4.2.1.2 Given that the project comprises decommissioning infrastructure, there is inevitably limited opportunity for minimising wastes. Some of the minimisation measures outlined in this table consider measures for maximising reuse/recycling opportunities rather than purely minimising waste generation.

Table 4.1: Recommended Waste Minimisation Measures

Waste Minimisation Measures		
		Standard Practice
		Good Practice
		Best Practice
Project-wide materials inventory and pre-demolition audit		Prepare and maintain a project-specific materials inventory and pre-decommissioning / pre-demolition audit before Proposed Works Onshore commence, using design records, maintenance data and verification surveys to identify materials, hazardous constituents and likely reuse/recycling outlets.
Detailed Onshore WMP		The Detailed Onshore WMP should define waste streams, segregation requirements, documentation, authorised carriers/facilities and review procedures.
Sequenced removal of onshore components		Onshore decommissioning should be linked to a clear removal sequence so that oil drainage, equipment strip-out, cable works and demolition are carried out in a controlled order that prevents avoidable contamination of recyclable materials and reduces unnecessary handling.
Excavation and soil management		Cable removal works will be planned and undertaken to minimise excavation volumes and disturbance to surrounding soils. Topsoil and subsoil will be stripped, stored, and reinstated separately to preserve soil structure and fertility. Excavated areas will be kept to the smallest practicable footprint, and works will be sequenced to limit the duration of exposed ground. Immediate backfilling and reinstatement will be undertaken following cable removal to reduce erosion risk and compaction.
Safe and efficient cable recovery using underground service controls		Onshore cable recovery should follow a safe digging system of work based on utility records, cable locating equipment and controlled excavation / trial holes. This will also minimise excavation volumes and soil waste management.
Selective strip-out of WEEE, batteries and internal cables before demolition		All switchgear, servers, UPS units, PLC / communications equipment, batteries and internal cables should be removed before demolition of the building shell.
Pre-approved downstream routes for transformer, WEEE, batteries and cable recycling		Before removal starts, confirm the intended downstream recycling / treatment routes for the transformer, transformer oil, WEEE, batteries, cable granulation, metals and concrete.
Education and awareness including waste training, spill preparedness and performance review		All site personnel should receive waste-related induction / toolbox training covering segregation, hazardous-waste awareness, spill response, cable excavation controls and the specific waste arrangements for the onshore substation works.

Waste Minimisation Measures		
		Standard Practice
		Good Practice
		Best Practice
Dedicated temporary storage for hazardous, WEEE and recyclable streams	The site should include clearly identified temporary storage areas / containers for the principal onshore waste streams before off-site transfer.	

4.3 Material Management Options

4.3.1.1 For each of the materials forecast to arise from the proposed decommissioning works, an assessment of the best management option has been carried out following the waste hierarchy.

4.3.1.2 Waste materials will be segregated on-site to achieve the best recycling rates and highest value use. Management options are presented in **Table 4.2**. The options identified are presented as suggestions for consideration. Some of these options may not prove to be practicable due to site or programme constraints. It would be the responsibility of the Principal Decommissioning Contractor and/or Arklow Energy to identify the practicability of whether certain waste materials are reused or recycled.

4.3.1.3 Facilities chosen will be assessed to ensure that their recycling performance meets or exceeds industry best practice and compares favourably with other suitable sites in the area.

4.3.1.4 It would be the responsibility of the Principal Decommissioning Contractor to confirm the waste streams, anticipated volumes and suitable management options upon appointment and up to the point of commencing decommissioning. In addition, where applicable, the Principal Decommissioning Contractor or Arklow Energy (as appropriate) would ensure that any additional requirements such as waste licenses or permits are obtained to ensure full compliance with relevant legislation.

Table 4.2: Anticipated Waste Streams during the Proposed Works Onshore

Waste Streams Anticipated	European Waste Code(s)	Activity Generating the Waste	Anticipated Quantities of Waste Arising	Anticipated % Waste Diverted from Landfill *	Management Options
*green: majority diverted from landfill, amber: >50% diverted, red: majority sent to landfill)					
C&D waste – substation building demolition arisings	(17 01 01 17 01 03 17 01 07 if impractical to segregate)	Dismantling and demolition of the small concrete substation building, including removal of the tiled roof and associated building fabric after strip-out of internal equipment.	~30 t	90 - 100%	Carry out selective strip-out before demolition, segregate concrete / masonry and tiles where practicable, and send suitable mineral arisings to authorised C&D recycling / crushing facilities. Use mixed C&D coding only where source segregation is not practicable.
Potentially hazardous electrical equipment – 1:1 38 kV transformer body and internals	16 02 09*; or 16 02 14	Removal of the onshore transformer following isolation and drainage of transformer oil, followed by transport to a licensed facility for further decontamination and metal recovery.	~160 m³ gross external volume	50–70%	Drain and decontaminate (as far as reasonably practical) first, then dismantle and recover metallic fractions through an authorised electrical-equipment / metal recycling route. Residual contaminated fractions should be managed through authorised hazardous waste routes.
Insulator oils – transformer oil	13 03 XX*	Draining of transformer oil from the 38 kV transformer prior to removal of the transformer body.	9.0 m³	Majority diverted from landfill	Remove separately by tanker and transfer to an authorised hazardous waste treatment, decontamination, regeneration or recovery route. This stream should be kept completely separate from structural / recyclable waste streams.
Electrical equipment – switchgear, servers, UPS and comms infrastructure	16 02 13*; or 16 02 14	Dismantling and removal of switchgear, servers, PLC, UPS, communications infrastructure and associated electrical equipment from inside the substation building.	~ 1.5 t	50–70%	Remove before structural demolition, segregate WEEE from batteries and hazardous ancillaries, assess any items suitable for reuse / refurbishment, and send remaining equipment through authorised WEEE treatment and recovery routes.
Batteries – from UPS	16 06 XX*	Dismantling of UPS	~ 0.1 t	Variable; dependent on route secured	Remove separately from the UPS cabinet, store in a secure and appropriately labelled area, and transfer to an authorised battery recycling route.
Concrete – concrete transformer foundation bund	17 01 01 concrete	Excavation and removal of the transformer concrete foundation bund after removal of the transformer and associated liquids.	~36 t	90%	Break out and segregate concrete and any rebar where practicable. Send concrete to authorised crushing / aggregate recovery and rebar to metal recycling. If contamination is identified, reclassify and manage accordingly.
Steel and Iron – steel boundary fence and wind screen	17 04 05	Dismantling and removal of the steel boundary fence around the substation compound.	~1.5 t	95–100%	Dismantle and send as a clean ferrous metal stream to an authorised metal recycling facility. Keep separate from mixed demolition arisings to preserve recycling value.

Waste Streams Anticipated	European Waste Code(s)	Activity Generating the Waste	Anticipated Quantities of Waste Arising	Anticipated % Waste Diverted from Landfill *	Management Options
*green: majority diverted from landfill, amber: >50% diverted, red: majority sent to landfill)					
Cables – onshore export cable and associated removed cable sections	17 04 11	Excavation, cutting and removal of the approximately 30 m cable section within the Onshore Site, plus any associated recoverable cable sections removed during substation strip-out.	~0.5 t	90–100%	Recover cable where practicable, keep removed sections clean and containerised, and send to an authorised copper granulation / cable recycling route, as already anticipated in the project scope. Record any short residual section lawfully left in situ below the revetment.
General site waste generated	20 01 08 (food waste) 20 01 01 (paper/ card) 20 01 39 (plastics) 15 01 04 (metal cans) 20 03 01 (mixed waste)	Waste arising from welfare facilities, stores, offices and general housekeeping activities associated with onshore works.	Minimal	Target >70% diversion from landfill	General operational wastes will be managed through source segregation at port and other support locations. Separate receptacles will be provided for food waste, paper/cardboard, plastics, cans and mixed dry recyclables, with only residual waste directed to general residual waste treatment. The Detailed Onshore WMP will identify the collection arrangements, storage controls and authorised facilities to be used. This stream is expected to be comparatively small relative to the structural and material recovery streams, but good segregation will remain important to meet project waste objectives.
Packaging waste	15 01 04 (metal) 15 01 01 (paper/ card) 15 01 02 (plastic) 15 01 03 (wood)	Packaging associated with consumables, storage, replacement parts, containers and materials used during decommissioning and marshalling,	Minimal	Overall target >70%[3] Glass Packaging target >75% Paper and Cardboard Packaging target >85% Metal Packaging target >80% Plastic Packaging target >55%	Packaging waste will be managed in accordance with the principles of prevention, reuse and recycling. Opportunities for supplier take-back, returnable packaging and reuse of pallets, crates and drums will be considered where practicable. Remaining packaging waste will be segregated by material type, including paper/cardboard, plastics, timber and metals, and transferred to authorised recycling facilities. Effective segregation at source is expected to provide a high diversion rate for this waste stream.

[3] A Waste Action Plan for a Circular Economy Ireland's National Waste Policy 2020-2025, Department of Communications, Climate Action and Environment (2020). Available at: https://assets.gov.ie/

Waste Streams Anticipated	European Waste Code(s)	Activity Generating the Waste	Anticipated Quantities of Waste Arising	Anticipated % Waste Diverted from Landfill *	Management Options
*green: majority diverted from landfill, amber: >50% diverted, red: majority sent to landfill)					
				Wood Packaging target >30%	
				Paper and Cardboard Packaging target >85%	

Table note: Hazardous waste materials are marked with an asterisk (*), where the specific material is not known with certainty, the LoW code was left incomplete (e.g. for the transformer oil, the specific oil is not known, therefore the general classification into 13 03 for waste insulating and heat transmission oils was assigned; similarly for the UPS batteries, the specific battery technology is not known therefore the general classification into 16 06 for batteries and accumulators was used).

4.4 Waste Management Controls

4.4.1 Training and Communication

4.4.1.1 It is the Principal Decommissioning Contractor's responsibility to ensure all site operatives receive training to enable them to identify their roles and responsibilities whilst handling waste during the decommissioning works, including providing awareness of waste minimisation measures (including how incoming packaging material is to be minimised and handled). This would be in the form of inductions and/or tool-box talks.

4.4.2 Recording of Waste Arisings

4.4.2.1 Duty of Care requires an auditable system which records all wastes generated and details their movement. It is the Principal Decommissioning Contractor's responsibility to implement a monitoring system and carry out sufficient auditing of demolition and construction waste. Example monitoring templates are provided in **Appendix A: Proposed Onshore Waste Monitoring Template** which provide the minimum level of data that should be collected by the relevant contractor. Data should be collected in digital format.

4.4.2.2 Information would be obtained from the Duty of Care compliance records (e.g. waste transfer notes) and should provide a breakdown of the following:

- Quantity of each waste stream generated;
- Breakdown of waste quantities reused, recycled, recovered or disposed of at landfill, all against the targets set beforehand; and
- Details of waste carriers and disposal facilities.

4.4.3 Ongoing Review of Implementation

4.4.3.1 The Detailed Onshore WMP will be updated as the Proposed Works Onshore progresses. This will help to identify which waste streams are not achieving their anticipated recycling potential, so that alternative methods to handle those waste streams can be explored for the remainder of the Proposed Works Onshore.

4.4.3.2 One of the outcomes of the Detailed Onshore WMP should be the production of a record of waste arisings generated during the works, to enable the Arklow Energy and Principal Decommissioning Contractor to compare the volumes and types of waste being generated against the original estimates.

5 Further Actions

5.1.1.1 The Outline Onshore WMP sets the direction for the Detailed Onshore WMP to be produced by the Principal Decommissioning Contractor for the management of waste associated with the Proposed Works Onshore.

5.1.1.2 A Detailed Onshore WMP will need to be prepared prior to commencement of the decommissioning works. This should include accurate waste estimates and further development of the waste management options in accordance with the principles set out herein.

5.1.1.3 The Detailed Onshore WMP is a live document and should be updated during Proposed Works Onshore as required, reflecting any changes in conditions, waste arisings or waste management options.

6 References

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Appendix A Proposed Onshore Waste Monitoring Template

Record of Decommissioning Waste Arisings – Example Template

Waste stream	LoW code	Waste category [inert, non-hazardous or hazardous]	Forecast amount m^3 / tonnes	Waste minimisation option [design out, reuse, recycle, segregate, offsite sorting, landfill]	Actual amount (Total) m3	Actual amount (breakdown) m^3 / tonnes						
						Reuse onsite	Reuse onsite	Recycled for use onsite	Recycled for use onsite	Sent to transfer facility	Sent to exempt site	Sent to landfill

Record of Waste Carriers and Disposal Facilities – Example Template

Waste details		Waste carrier and or broker			Disposal facility This may include more than facility. such as transfer station, treatment facility, landfill. Include details for each facility.		
Waste stream	LoW code	Contractor name	Registration No	Expiry date of registration	Facility name	Licence or permit No	Conditions of licence checked?